

**Filters and Fillers: Adolescents' Filter Use on Social Media and the Acceptance of
Cosmetic Surgery**

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Abstract

This study examined whether adolescents' use of (a) body and (b) face filters was related to acceptance of cosmetic surgery (ACS) (i.e., intrapersonal and social acceptance, and intention). Attention was paid to possible differences according to adolescents' (1) sex, (2) self-esteem, and (3) pubertal timing. A cross-sectional online survey among 333 Flemish adolescents ($M_{age} = 16.06$, $SD = 1.45$) with 71.2% girls was used to test the hypothesized model via structural equation modeling. The use of face filters predicted social motivations of ACS and consideration of cosmetic surgery. Body filter use only predicted social motivations of ACS. Only girls showed a link between body filter use and social ACS. The findings underline the role of filter use in adolescents' ACS.

Keywords: social media, cosmetic surgery, filter use, self-effects, adolescents

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With a 20.6% worldwide increase of cosmetic surgical procedures over 2015-2019 (ISAPS, 2019), the popularity of these procedures is rising. Cosmetic surgery refers to the “maintenance, restoration, or enhancement of one’s physical appearance through surgical and medical techniques” (Swami, 2009, p. 1). The normalization of such surgeries may be especially influential for adolescents since they are still experiencing profound body changes, which makes appearance especially salient during adolescence (Abreu & Kaiser, 2016). Indeed, recent reports highlight a growing number of adolescents undergoing plastic surgery, with rhinoplasty (i.e., augmentation of the nose) being the most popular procedure (ASPS, 2018).

Scholars argue that one of the factors normalizing such behaviors in adolescents may be their usage of social media filters, which enable adolescents to digitally enhance their pictures (Tremblay et al., 2021). Research demonstrated that the use of both face and body filters are positively related to (young) adults’ acceptance of cosmetic surgery (ACS) (Chen et al., 2019; Varman et al., 2021). Yet, little is known about these links when it comes to adolescents. Such knowledge seems relevant though as adolescents are pervasive social media users (Rideout & Robb, 2019) and they may be particularly susceptible to using filters given the increased importance of appearance during adolescence (Markey, 2010). Hence, the current study aimed to address this gap in the literature by examining the link between adolescents’ filter uses on social media and their acceptance of cosmetic surgery. In three ways, the study aims to contribute to the literature.

First, we differentiated between the use of body and face filters. Existing studies have exclusively focused on face filter use (e.g., Varman et al., 2021) or addressed both face and body filter use as a single online behavior (e.g., Chen et al., 2019), ignoring possible differential outcomes tied to these two types of filters. Second, we paid attention to the multidimensionality of ACS by taking into account (a) intrapersonal (e.g., more confidence)

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as well as (b) social (e.g., romantic benefits) reasons for cosmetic surgery and (c) consideration of undergoing cosmetic surgery (Henderson-King & Henderson-King, 2005). Third, we accounted for the possible conditional nature of the link between filter use and ACS by examining the moderating roles of adolescents' sex, self-esteem, and pubertal timing.

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Filters are AI-generated tools to digitally enhance pictures, often used on visual-based social media platforms such as Instagram and Snapchat (Tremblay et al., 2021). Via filters, adolescents can change their facial (e.g., thinner nose, flawless skin) and body features (e.g., thinner waist, bigger breasts) in order to meet prevailing beauty standards (Tremblay et al., 2021). Cross-sectional research has found evidence for so-called 'Snapchat dysmorphia' among (young) adults, meaning that filter use can be related to more positive attitudes towards cosmetic surgery (Chen et al., 2019) and is associated with one's desire to undergo cosmetic procedures (Varman et al., 2021).

Self-effects theory may explain why exposure to an 'idealized' version of yourself may lead to greater ACS (Valkenburg, 2017). The theory refers to two key mechanisms: self-perception and self-presentation processes. Self-perception processes postulate that individuals determine their self-concepts by retrospectively observing their past behaviors (Bem, 1972). Individuals may not consciously engage in self-perception processes, but they might unconsciously infer their attitudes by observing past behavior, independent of rewards or pressure. Their behavior is thus considered to be evidence of their own attitudes (Bem, 1972). Following self-perception processes in the context of filter use and ACS, adolescents may observe their online persona using and, hence, accepting online beauty enhancement tools (i.e., face and body filters). When adolescents observe their own uses of beauty enhancement tools in the online context, they may also be more inclined to use beauty

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enhancement tools in the offline context, since they find it acceptable to use tools to improve one's appearance. Such offline beauty enhancement tools include among other things make-up but also cosmetic surgery.

The second key mechanism, self-presentation processes, suggests that users reflect on how they present themselves online. Using tools, in this context beauty filters, can help to create the desired self-presentation online (Valkenburg, 2017). Moreover, individuals tend to be consistent in the way they present themselves online (Valkenburg, 2017). The latter may increase the likelihood that social media users want to present themselves similarly offline. In this context, adolescents may show more acceptance towards cosmetic surgery, which can facilitate such idealized self-presentations offline.

Existing studies have already garnered some evidence for such mechanisms among adolescents. For example, the study of de Vries et al. (2014) shows that general social media use predicts increased appearance investment among adolescents, which in turn relates to an augmented desire to undergo cosmetic surgery. Hence, it may be possible that appearance investment in the form of filter use (i.e., body and face filters) on social media might be predictive of adolescents' ACS (i.e., intrapersonal acceptance, social acceptance, and consideration). However, empirical evidence examining this reasoning is lacking.

Moreover, existing studies have rarely addressed the multidimensional nature of ACS and have often examined only one component of this construct (e.g., consideration, Walker et al., 2019). Yet, in the context of cosmetic and grooming procedures, Cash (1987; 1988) highlights that scholars should pay attention to both the subjective and social nature of these procedures. Particularly, he highlights that individuals engage in appearance enhancement practices in order to manage one's self-image, but also to relate oneself to existing social structures and engage in social impressions. Henderson-King and Henderson-King (2005) applied this reasoning to the context of cosmetic procedures and found that acceptance of

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cosmetic surgery encompasses three components: (a) intrapersonal and (b) social acceptance, and (c) consideration. With intrapersonal ACS, they refer to one's self-oriented motives to undergo cosmetic procedures (e.g., to feel better about oneself). Social ACS, on the other hand, pays attention to individuals' socially-driven motives to undergo cosmetic surgery (e.g., to be more attractive to one's partner). Finally, consideration reflects one's likelihood to have cosmetic surgery in the future. In the context of beauty filter use on social media and ACS, it is relevant that these different components are explored separately as it may be possible that some dimensions are more relevant than others. Presumably, social ACS may be especially apparent in the context of social media since social media platforms make adolescents aware of social rewards (e.g., comments and likes) attached to meeting beauty ideals (Tiggemann et al., 2018).

Furthermore, previous studies have operationalized filter use as a single behavior, encompassing both face and body filters (e.g., Chen et al., 2019), or have exclusively focused on face filters (e.g., Varman et al., 2021). Yet, it may be possible that differences emerge in terms of ACS outcomes depending on which type of filter is looked at. Especially face filters might have stronger links with ACS because they are more accessible. Face filters are typically integrated into social media apps like Instagram or Snapchat (Varman et al., 2021) which makes them easy to use. Body filters tend to be less accessible because they often require downloading additional apps or even Photoshop in order to adjust one's body. As such, one can reason that ACS as an outcome of face filter uses is more common among adolescents than ACS as an outcome of body filter uses because face filters are probably used more often. Though no studies have reported exact numbers on face versus body filter use, let alone explored their different links to ACS. Therefore, the current study differentiates between body and face filter use and examines the following two hypotheses :

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H1.1: Adolescents' use of body filters on social media is positively related to (a) intrapersonal acceptance, (b) social acceptance, and (c) consideration of cosmetic surgery.

H1.2: Adolescents' use of face filters on social media is positively related to (a) intrapersonal acceptance, (b) social acceptance, and (c) consideration of cosmetic surgery.

The Role of Sex, Self-Esteem and Pubertal Timing

Some groups of adolescents are expected to respond differently to filter use. Particularly, the literature implies that sex (Huang et al., 2020), self-esteem (Huang et al., 2020), and pubertal timing (de Guzman & Nishina, 2014) may be relevant moderators in the hypothesized relations. Girls might experience a stronger link between filter use and ACS because they use more filters (Dhir et al., 2016) and also more frequently undergo cosmetic surgery procedures (ISAPS, 2019). Scholars argue that this may be explained by the greater societal pressure for girls to meet beauty standards and the gender stereotypical belief that valuing appearance is inherently feminine (Hargreaves & Tiggemann, 2004). Hence, we hypothesize the following:

H2.1: The positive relation between body filter use on social media and (a) intrapersonal acceptance, (b) social acceptance, and (c) consideration of cosmetic surgery is stronger for girls than for boys.

H2.2: The positive relation between face filter use on social media and (a) intrapersonal acceptance, (b) social acceptance, and (c) consideration of cosmetic surgery is stronger for girls than for boys.

Further, self-esteem may operate as a 'protective factor' or buffer to the detrimental effects of filter use. Studies show that adolescents with a higher self-esteem experience less detrimental body-related media effects, than adolescents with lower self-esteem (Huang et al.,

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2020). Moreover, individuals with low self-esteem tend to have more favorable beliefs towards plastic surgery and greater intentions to undergo such procedures (Furnham et al., 2012). As such, we also hypothesized that:

H3.1: The positive relation between body filter use on social media and (a) intrapersonal acceptance, (b) social acceptance, and (c) consideration of cosmetic surgery is stronger for adolescents with low self-esteem than for adolescents with high self-esteem

H3.2: The positive relation between face filter use on social media and (a) intrapersonal acceptance, (b) social acceptance, and (c) consideration of cosmetic surgery is stronger for adolescents with low self-esteem than for adolescents with high self-esteem

Late pubertal timing, on the other hand, could act as a ‘vulnerability factor’ in the relations between filter use and ACS. Adolescents whose body has not gone through pubertal changes yet might experience a greater discrepancy between their actual versus ideal body (e.g., no breasts yet for girls or broader shoulders for boys) (McCabe & Ricciardelli, 2004). Research indeed shows that adolescents with late pubertal timing are more at risk of appearance dissatisfaction and worrying about their body size (de Guzman & Nishina, 2014; Williams & Currie, 2000). Hence, it may be possible that late maturing adolescents are more likely to use filters and subsequently higher levels of ACS to comply to the typical feminine or masculine characteristics that their body has not grown into yet. However, research is lacking to support this reasoning. Therefore, we hypothesize that:

H4.1: The positive relation between body filter use on social media and (a) intrapersonal acceptance, (b) social acceptance, and (c) consideration of cosmetic surgery is stronger for adolescents with a late pubertal timing than for adolescents with an on-time and early pubertal timing.

H4.2: The positive relation between face filter use on social media and (a) intrapersonal acceptance, (b) social acceptance, and (c) consideration of cosmetic surgery is stronger for adolescents with a late pubertal timing than for adolescents with an on-time and early pubertal timing.

See Figure 1 for the full hypothesized model.

[FIGURE 1 ABOUT HERE]

Methods

Sample and Procedure

Adolescents (12-18 years old) were recruited from 16 different schools in Flanders, Belgium through random sampling. The data for this cross-sectional study were collected in October 2020¹². Respondents were able to go to school but physical distancing measures were still operative due to the COVID-19 pandemic. Therefore, respondents were contacted by the school principals to fill in an online survey at home and were rewarded with coupons worth 7 euros after completion. Respondents could contact the first author of the study at any time via e-mail or *Whatsapp* with questions or concerns. This study was approved by the ethical commission of [blinded for review].

Of the 1152 respondents contacted (i.e., adolescents who participated in the first wave of the project via paper-and-pencil surveys), 417 filled in the online survey completely (drop-out rate = 63.8%). This large drop-out rate can be explained by the change in data collection methods due to the COVID-19 pandemic (i.e., going from in school data collection to online data collection giving us less control over the respondents' participation).

¹ The study was part of a larger survey project 'the Positive Body and Sex Project'. Data for this project was also collected at other times, in January 2020 (at school via paper-and-pencil surveys) and October 2020 (online at home). Note that only in October 2020, information about filter use was collected. For more information regarding this project, please contact the first author.

² The datasets together with the syntaxes and outputs of the results are publicly available on OSF via https://osf.io/bnefs/?view_only=e7734f945a1e422aa8729628e8d5cd21

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Respondents' answers were omitted if they reported an age below 12 or above 18 and if they did not fill in the variables of interest for this study. After cleaning the data, the analytical sample consisted of 333 respondents ($M_{age} = 16.06$, $SD = 1.45$) with 71.2% girls. Based on the Belgian secondary school system division, 51.7% followed the first education level, which prepares for college education, 42.6% followed the middle education level, which teaches technical skills (e.g., electricity, woodworking), and 5.4% followed the third education level leading to professions (e.g., baker, hairdresser), 0.3% did not know their education level.

Socio-Demographic Variables

Age, sex (0 = *boy*, 1 = *girl*), height and weight, which were used to calculate BMI (kg/m^2), and education level were questioned. These variables were used as control variables and sex was used to test H2.

General Social Media Use

Respondents indicated how much time they spend on Facebook, Instagram, Youtube, Snapchat, and TikTok over the past five months (1 = *never*, 7 = *more than three hours per day*). Higher scores represented a higher general social media use ($M = 3.95$, $SD = 1.11$). This variable was used as a control variable.

Filter Use on Social Media

Respondents indicated how often they used (1) “filters that make your face more beautiful (e.g., filters that make your skin more even, enlarge your lips, enlarge your eyes,...)” (i.e., face filters; $M = 1.86$, $SD = 1.21$) and (2) “filters that make your body more beautiful (e.g., filters that elongate your legs)” (i.e., body filters; $M = 1.36$, $SD = .79$). A 5-point scale was used (1 = [*almost*] *never*, 5 = [*almost*] *always*).

Acceptance of Cosmetic Surgery

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The Acceptance of Cosmetic Surgery Scale of Henderson-King and Henderson-King was used (2005). Participants rated 15 statements about cosmetic surgery using a 7-point Likert scale (1 = *strongly disagree*, 7 = *strongly agree*). The PCA resulted in a three-factor solution explaining 44.48% of the variance. The first 5-item factor represents individuals' consideration to undergo cosmetic surgery (e.g., "In the future, I could end up having some kind of cosmetic surgery"), $\alpha = .93$ ($M = 3.19$, $SD = 1.56$). The second 5-item factor reflects individuals' self-oriented motives for cosmetic surgery (e.g., "Cosmetic surgery can be a big benefit to people's self-image"), $\alpha = .80$ ($M = 4.34$, $SD = .98$). The last 5-item factor reflects individual's social motivations for cosmetic surgery (e.g., "If it would benefit my career, I would think about having plastic surgery"), $\alpha = .88$ ($M = 2.33$, $SD = 1.13$).

Self-Esteem

The One-Item Self-Esteem Scale of Robins et al. (2001) was used: "I have a lot of self-confidence". A five-point scale ranging from *not at all resembling me* (= 1) to *totally resembling me* (= 5) was used ($M = 2.83$, $SD = 1.07$). To test H3, self-esteem was categorized as low self-esteem (values 1-2) ($N = 112$), middle self-esteem (value 3) ($N = 123$), and high self-esteem (values 4-5) ($N = 94$). Four responses were missing.

Pubertal Timing

Pubertal timing was measured by four items from the Pubertal Development Scale (Petersen et al., 1988). Girls described for example the status of their breast growth and boys reported their vocal changes ($\alpha_{\text{boys}} = .75$; $\alpha_{\text{girls}} = .67$). Answer options were (1) *not yet started*, (2) *has barely started*, (3) *is still going on*, (4) *seems complete*, or (5) *I do not know*. Given the sensitivity of such questions, respondents could also not answer this question. Respondents who selected "I do not know yet" or decided to not answer the question were coded as having a missing value ($N = 65$).

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Following Beyens et al. (2015), the average scores of respondents of the same age and sex were subtracted from the score of each respondent. The new variable, pubertal timing, represented the respondent's developmental status relative to that of the same-aged/same-sex respondents in the sample. A positive score indicates a more advanced pubertal maturation while a negative score indicates a less advanced pubertal maturation. Respondents were categorized into "late" ($N = 68$), "on-time" ($N = 109$) and "early" ($N = 91$) with cutoffs at the 25th and 75th percentiles (Skoog et al., 2009).

Analyses

To analyze H1, structural equation modeling (SEM) was used in Mplus (version 8.6, Muthén & Muthén, 2018) with maximum likelihood estimation. Face filter and body filter use were included as predicting variables and the three cosmetic surgery acceptance components were included as dependent variables. Age, sex, BMI, educational level and general social media use were included as control variables. Independent variables were allowed to covary, as were dependent variables. For relations in which both face and body filter use were related to (one of) the subcomponents of ACS, additional parameter difference testing was conducted to examine which predictor was the strongest. Two goodness-of-fit-indices were used: the root mean square error of approximation (RMSEA) and the Bentler Comparative Fit Index (CFI) (Hu & Bentler, 1999). Generally, CFI values between .90 and .95 and RMSEA values between .05 and .08 indicate an acceptable model fit, and CFI values larger than .95 and RMSEA values smaller than .05 indicate good model fit (Kline, 2005).

To test H2-4, multigroup comparison tests were conducted. Models in which the paths were allowed to differ between girls and boys (H2.1. and H2.2.), low, middle, and high self-esteem adolescents (H3.1. and H3.2.), and adolescents with early, on-time, and late pubertal timing (H4.1. and H4.2.) were compared to the fit of models in which these paths were

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constrained to be equal. If the chi square difference test was significant, a path-by-path analysis would be conducted.

Results

Descriptive Statistics

Zero-order correlations, means, and standard deviations for the variables are presented in Table 1.

[TABLE 1 ABOUT HERE]

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The hypothesized model initially did not show an adequate fit with the data, $\chi^2(260) = 659.02, p < .001, RMSEA = .07, CFI = .89$. Following other scholars (e.g., Byrne, 2013; Kline, 2016), we consulted modification indices and correlated error terms if this correlation was theoretically meaningful. We correlated the errors of item 7 (“If I knew there would be no negative side effects or pain, I would like to try cosmetic surgery”) and item 6 (“If I could have a surgical procedure done for free I would consider trying cosmetic surgery”) ($MI = 46.66, EPC = .55$) because both refer to the costs of cosmetic surgery. Errors of item 11 (“I would think about having cosmetic surgery in order to keep looking young”) and item 12 (“If it would benefit my career I would think about having plastic surgery”) ($MI = 26.63, EPC = .26$) were correlated because both refer to benefits on a societal level. After these modifications, the model showed an acceptable model fit, $\chi^2(258) = 588.36, p < .001, RMSEA = .06, CFI = .91$.

Support for H1.1b was found as Figure 2 displays that body filter use significantly predicted social ACS, $B = .27, \beta = .19, SE = .07, p < .01$. Yet, body filter use did not predict the other subcomponents of ACS, rejecting H1.1a and H1.1c. H1.2b. and H1.2c. were supported, as face filter use predicted social, $B = .20, \beta = .19, SE = .07, p < .01$, and consideration ACS, $B = .36, \beta = .28, SE = .06, p < .001$. Difference parameters indicated that

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the link between body filters and social ACS was not significantly stronger than the link between face filters and social ACS, $p > .05$.

[FIGURE 2 ABOUT HERE]

Sex, self-esteem, and pubertal timing differences

For H2.1. and H2.2., chi-square difference test showed a significant difference, $\Delta\chi^2(30) = 68.91, p < .001$. As for H2.1., parameter difference tests did not indicate a significant difference between boys and girls in terms of the link between body filter use and consideration of cosmetic surgery, $p > .05$, and intrapersonal ACS, $p > .05$. A difference between boys and girls in terms of body filter use and social ACS did emerge, $p < .05$. Specifically, this link was only present among girls, $B = .38, \beta = .26, SE = .08, p < .01$, and not among boys, $p > .05$. Overall, H2.1a and H2.1c were rejected and H2.1b was confirmed.

As for H2.2., parameter difference tests did not indicate a difference between boys and girls in terms of the relations between face filters and consideration of cosmetic surgery, $p > .05$, social ACS, $p > .05$, and intrapersonal ACS, $p > .05$. Overall, H2.2a-c were rejected.

Regarding H3.1 and H3.2, no significant differences for self-esteem were found, $\Delta\chi^2(70) = 72.69, p > .05$, thus fully rejecting our predictions.

Lastly for H4.1. and H4.2., the chi-square difference test showed a significant difference, $\Delta\chi^2(70) = 182.73, p < .001$. As for H4.1., difference parameters indicated that the relation between body filter use and intrapersonal ACS differed between late and on-time adolescents, $p < .05$, and between on-time and early adolescents, $p < .05$, but not between late and early adolescents, $p > .05$. Yet, the relation between intrapersonal ACS and body filter use was insignificant among each group and, as such, the overall moderation effects could not be further interpreted. Overall, H4.1a-H4.1c were rejected.

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As for H4.2., difference parameter tests indicated no differences between the three pubertal timing groups for face filter uses and their relation with consideration of cosmetic surgery, and social and intrapersonal ACS. Hence, H4.2a-H4.2b were rejected.

Discussion

We investigated whether filter use on social media contributes to ACS among adolescents. To our knowledge, at the time of this study, there are limited studies exploring the role of filter use in the acceptance of cosmetic surgery, especially among both adolescent boys and girls (Wang et al., 2021). The study contributes to the literature by (1) differentiating between face and body filter use, (2) addressing the multidimensional nature of ACS, and (3) accounting for the moderating role of sex, self-esteem, and pubertal timing. Our findings imply that the use of beauty-enhancement filters may help to explain the recent popularization of cosmetic surgery among adolescents (ASPS, 2018; Tremblay et al., 2021).

Both the uses of face and body filters were related to more social beliefs on cosmetic surgery. This finding is not surprising though, especially in the context of social media. As previously indicated, scholars consider social media to be an important transmitter of predominant idea that meeting beauty ideals will be socially rewarded (e.g., via likes and comments) (Tiggemann et al., 2018). Hence, it may be possible that adolescents are motivated to use beauty enhancement filters in order to receive social rewards. Following self-effects theory (Valkenburg, 2017), this online social motivation to enhance one's appearance may facilitate offline socially-motivated cosmetic surgery procedures. As such, future research may benefit from paying attention to motives of adolescents' filter uses and, even, likes and comments received on filtered posts. It may be possible that only adolescents who are motivated to use face and body filters to gain approval from others are also more inclined to undergo cosmetic surgery to gain social benefits.

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Filter uses did not seem to be a relevant factor in explaining self-oriented motivations for cosmetic surgery. Adolescence is characterized by an increasing need for approval of others (e.g., peers), especially when it comes to appearance-related topics such as appearance enhancement behaviors (Jones et al., 2004). Hence, it may be possible that social benefits tied to cosmetic surgery were more relevant for adolescents than self-oriented motivations. Future research is therefore especially advised to further take into account perceived subjective and descriptive norms of peers when examining adolescents' ACS.

Further, face filter use did predict adolescents' actual consideration to undergo cosmetic surgery in the future. This result points to the relevance of differentiating between face and body filter use. Potentially, adolescents consider face procedures (e.g., fillers, botox) to be less intrusive because they do not always require surgery compared to body procedures (e.g., breast augmentation, liposuction). Therefore, adolescents may be less reluctant in taking the step from face filter use to considering cosmetic procedures to match one's offline face with one's online enhanced face, in comparison to considering more invasive body procedures to match one's online enhanced body.

Such considerations could result in adolescents actually undergoing face cosmetic procedures (Richetin et al., 2019). Yet, this reflection should be interpreted with caution since we did not distinguish between face and body surgical procedures. A next step in research may therefore include differentiating between different types of plastic surgical procedures, for example ranging from least to most invasive, as a response to using beauty filters on social media. Scholars should especially pay attention to this potential behavioral outcome as cosmetic procedures at such a young age may not always lead to more appearance satisfaction. Particularly, the literature highlights that for individuals with severe body dissatisfaction, cosmetic surgery generally does not improve their body image. On the contrary, scholars even emphasize that sometimes cosmetic surgery distracts the attention

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from the body part that has been treated and makes individuals realize that they are dissatisfied with other body parts as well, ending up pursuing surgery after surgery (Markey & Markey, 2015). Especially for adolescents this might be the case since they are still discovering their changing bodies (Abreu & Kasier, 2016).

Additionally, we advise future research to take into account possible sex differences when further exploring the implications of filter use. Specifically, we expected that girls would experience a stronger link between body and face filter use and ACS. Yet, this reasoning was only partially supported. Specifically, only among girls an increase in body filter use was related to social motivating beliefs to undergo cosmetic surgery. This finding underlines how girls' experiences with appearance cannot be interpreted without acknowledging the influence of the social context. Indeed, sociocultural theories of body image point to girls experiencing a greater societal pressure to comply to appearance standards in comparison to boys (Hargreaves & Tiggemann, 2004). As such, they will be more inclined to use filters to match their online appearances to beauty ideals and, in turn, are more motivated to look like their ideal selves in order to fit societal standards.

Lastly, next to self-effects, future research may benefit from examining underlying, explaining mechanisms in the found relations. Specifically, it may be possible that links between filter use and ACS are mediated by self-objectifying practices (Fredrickson & Roberts, 1997). Theoretically, if adolescents use filters on social media and they receive likes and comments on these enhanced pictures, they may internalize an observer's perspective to one's own body. As such, they may engage in self-objectification, which can be described as valuing one's appearance above other body competences. Self-objectification may facilitate adolescents to support even further objectification of their bodies by accepting and considering cosmetic surgery to enhance one's appearance. Indeed, existing studies have already provided evidence for this reasoning since self-objectification can be related to

intentions to have cosmetic surgery among women (Calogero et al., 2014). Similar relations may also be present among adolescents in the context of filter use on social media.

Limitations

The results of the present study should be interpreted in the context of a number of limitations. These limitations provide directions for future research. First, our sample focused on adolescents in Flanders, Belgium. Research conducted in a western context might limit the generalization of the findings in other cultural contexts. In non-Western samples, different attitudes towards cosmetic surgery may prevail. Thus, we encourage researchers to further explore the ramifications of filter uses on social media in diverse samples of adolescents based on their country and culture.

Relatedly, a gender imbalance is present in the current study's sample since almost two-third of the respondents were girls. The imbalance poses limitations on the generalizability of the current study's results. Existing studies have demonstrated that female adolescents are more likely to participate in studies than their male peers (e.g., Post et al., 2012). Future studies are recommended to anticipate the non-response of male respondents by inviting more boys than girls to participate in the study.

Further, we adopted a self-report design, which relies on adolescents accurately and honestly responding to survey items. Future research may benefit from including additional variables such as social desirability when examining filter uses and ACS.

Lastly, our study was limited by its cross-sectional design and, thus, no causal or temporal statements about the tested model could be made. Longitudinal or experimental studies are required to further examine the model. In this way, the possible reciprocal or, even, bidirectional nature of filter use effects can be explored.

Conclusions

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Together, the current study demonstrated that filter use on social media plays an important role in adolescents' ACS. Particularly, face and body filter use on social media was linked to social motivating beliefs to undergo cosmetic surgery. Also, only face filter use predicted consideration of cosmetic surgery. Further, the relation between body filter use and ACS appeared to only be present among girl. No differences were found in terms of adolescents' self-esteem and pubertal timing. The research contributes to the literature on adolescents' specific appearance-related behaviors on social media and ACS.

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Table 1

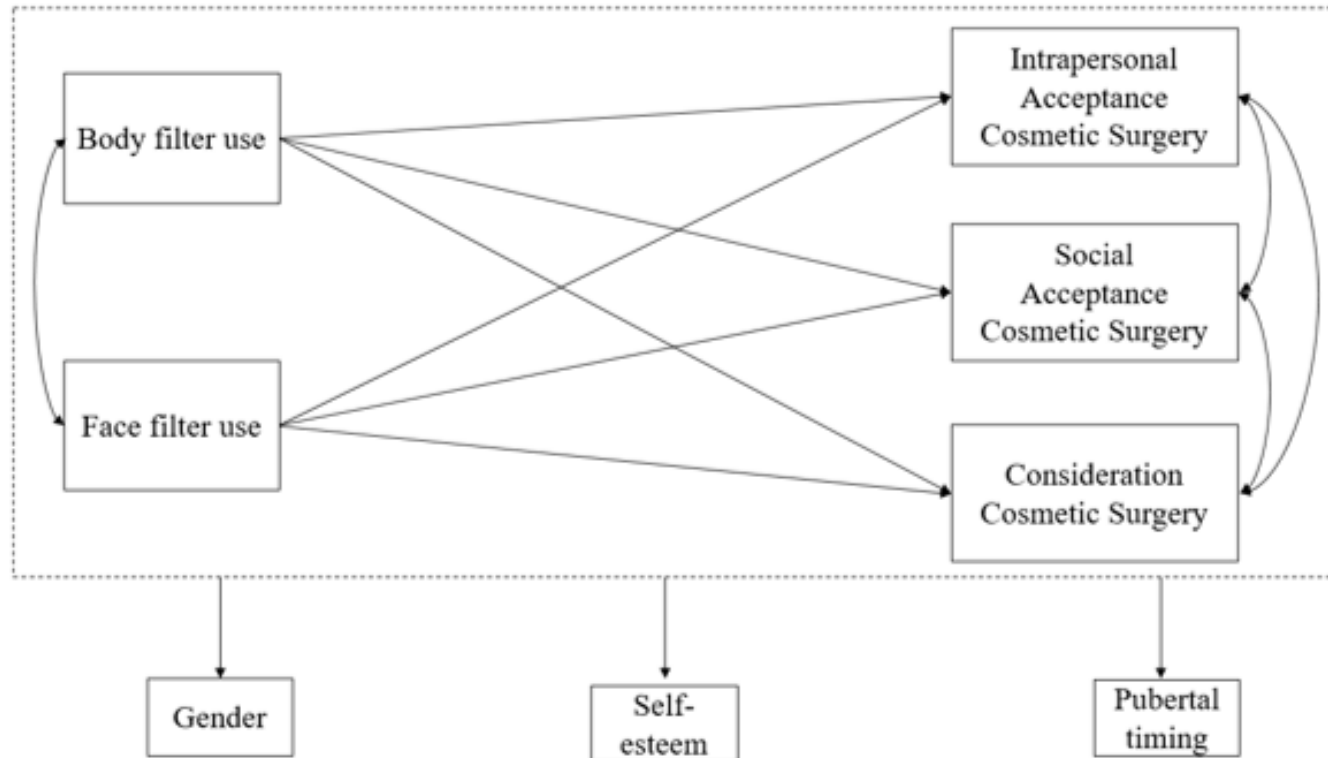
Means, standard deviations, and correlations

	M(SD)	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.
1. Face filter use	1.86 (1.21)	1	.55***	.36***	.16**	.26***	.19**	-.09	-.15**	.012	.21***	.12*	.18**
2. Body filter use	1.36 (.79)		1	.21***	.09	.26***	.04	-.05	-.09	-.08	.18**	.11*	.10
3. Cosmetic surgery consideration	3.19 (1.56)			1	.48***	.63***	.13*	.04	-.09	.07	.16	-.01	.178**
4. Cosmetic surgery intrapersonal acceptance	4.34 (.98)				1	.26***	.05	.08	-.04	.09	.06	.03	.15**
5. Cosmetic surgery social acceptance	2.33 (.45)					1	-.09	-.02	-.11*	-.10	.04	.01	.09
6. Sex	/						1	.01	-.29***	.10	.13*	.04	.08
7. Pubertal timing	.01 (.38)							1	-.06	-.01	.13*	-.18	-.06
8. Self-esteem	2.84 (1.04)								1	.03	.01	-.02	-.13*
9. Age	16.06 (1.45)									1	.19***	.19**	.13*
10. BMI	21.10 (3.28)										1	.16**	.10
11. Educational level	1.91 (.97)											1	.23***
12. General social media use	3.95 (1.11)												1

Note. $N = 333$. * $p < .05$; ** $p < .01$; *** $p < .001$

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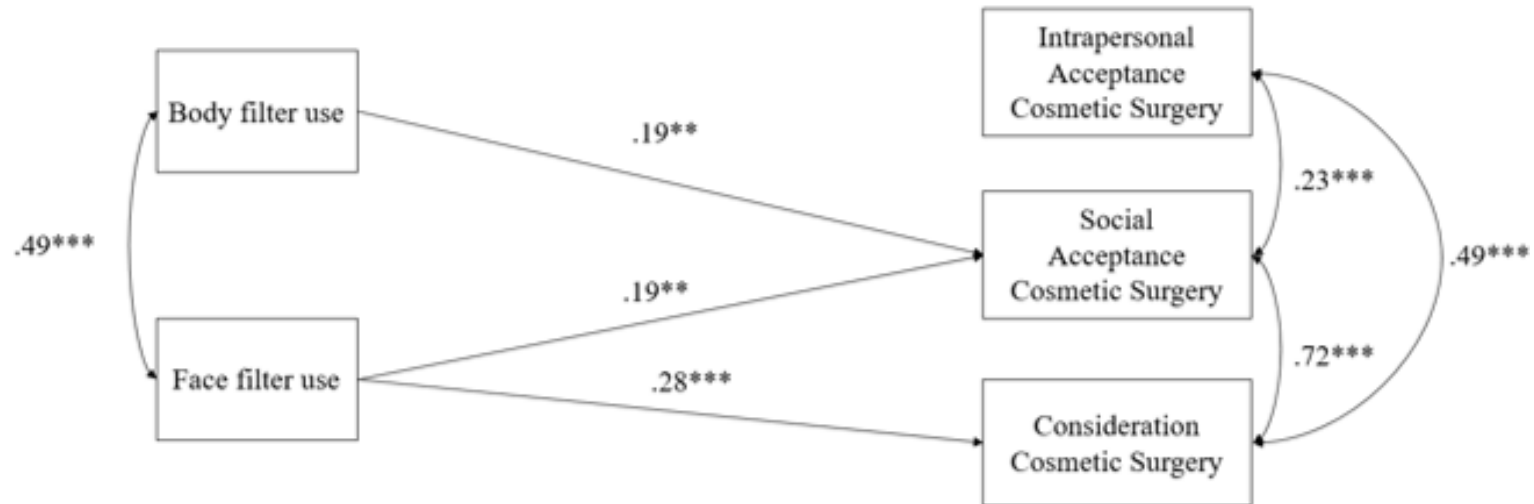
Figure 1



Hypothesized model. Control variables are gender, age, educational level, and general social media use. Control variables and errors are not shown for clarity.

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Figure 2



Note. Results for the hypothesized model. $N = 333$. * $p < .05$; ** $p < .01$; *** $p < .001$. Coefficients represent standardized betas. For clarity, control variables, measurement parts, and residual variances are not shown.