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Facing the Matter: An Eye-tracking Assessment of Social Media Beauty Filter's Impact on

Cosmetic Surgery Normative Beliefs

Camilla Marie Owens

A thesis submitted to the faculty of
Brigham Young University
in partial fulfillment of the requirements for the degree of

Master of Arts

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ABSTRACT

Facing the Matter: An Eye-tracking Assessment of Social Media Beauty Filter's Impact on
Cosmetic Surgery Normative Beliefs

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Master of Arts

Communication research has begun to assess the unique relationship between social comparison, social media, and body image (Lewallen & Behm-Morawitz, 2016), yet little research has been done to assess the unique connection between body dissatisfaction, social media filters, and cosmetic surgery (Beos et al., 2021). Studies have found that viewing edited body images on Instagram positively correlates with decreased body satisfaction and behaviors of body objectification (Tiggemann, & Barbato, 2018). This study used a series of scales to measure individuals' media exposure (MTUAS: Rosen et al., 2013) body area satisfaction (BASS; Brown et al., 1990), facial region satisfaction (FRSS; Guthrie et al., 2008), cosmetic surgery normative beliefs (ACSS; Henderson-King & Henderson-King, 2005), and Instagram appearance comparison (IACS; Di Gesto et al., 2020) in conjunction with eye-tracking, and social comparison theory (Festinger, 1954). Measures were used to assess characteristics in visual processing behavior among women at differing levels of IACS, BASS, FRSS, and ACSS, and if media exposure and Instagram comparison tendencies are connected to body area satisfaction and cosmetic surgery normative beliefs. A sample of 120 females 18 years of age and older who use social media completed the scales two weeks before being eye-tracked where they viewed three images of a female's face with and without makeup and one that had been digitally enhanced. Results revealed that media exposure was not connected to cosmetic surgery normative beliefs and that Instagram comparison tendencies were not linked to cosmetic surgery normative beliefs with visual attention, yet a positive trend was observed in that direction. Implications for social comparison theory and recommendations for future research relating to facial beauty filters are discussed.

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Introduction

Viewing digitally manipulated photos has been linked with intentions to undergo a facial cosmetic procedure (Beos et al., 2021). Photo manipulation fulfills the purpose of enhancing a picture's quality through editing before uploading, and photo manipulation has become an acceptable norm for posting images of oneself on social media platforms such as Instagram. Due to the convenience of technological advancements in filters and other forms of photo manipulation, editing one's face has become a common practice that has been found to correlate with body image concerns (da Silva et al., 2021). As a result, this has led to increased interest from researchers in the attitudes and intentions to undergo a cosmetic procedure among users of image-based social media (Wick & Keel, 2020). Despite the close connection between social media, facial photo manipulation, and body dissatisfaction, little research has explored these connections to each other (Beos et al., 2021).

Social media platforms like Instagram provide readily available content that presents altered representations of natural beauty (Brucculieri, 2018). With the aid of technological advancements, pursuing beauty ideals is attainable easier than ever before, yet these advancements bring consequences that can impact an individual's health and wellbeing (Auer, 2020; Fardouly et al., 2015; Van den Berg et al., 2007). Negative effects related to body image and self-esteem have become increasingly common as beauty trends become more idealistic, normalized, and prevalent (Eggert, 2017; Stein et al., 2019; Tolentino, 2019).

Undergoing a cosmetic procedure is linked to negative psychological outcomes that include impaired well-being (Brunton et al., 2014; Walker et al., 2021). Additionally, images that have been altered—either manually or by filters—present a risk for some viewers who may be prone to experience mental health issues (Milothridis, 2020).

While many are susceptible to the impact and use of social media, individuals with low self-esteem are prone to experience body dissatisfaction due to self-objection (Fardouly et al., 2015; Fardouly & Vartanian, 2016; Lonergan et al., 2019). With an altered perception of self-identity, such individuals are negatively impacted and seek to change their appearance to mediate their self-esteem and mental health disorders (Sherlock & Wagstaff, 2019). Considered at a higher level, beauty trends perpetuated via social media can impact society at large (Abraham & Zuckerman, 2011; International Society of Aesthetic Plastic Surgery, 2018).

Prior research has found that photo manipulation is both negatively linked with facial dissatisfaction and predicted cosmetic procedure attitudes and intentions (Beos et al., 2021), while images of facial cosmetic procedures on social media impacted females' body dissatisfaction and desire to undergo cosmetic procedures (Walker et al., 2019). To enhance findings from prior research, the current study will present altered and unaltered images of females for assessment through means of eye-tracking accompanied by self-report measurement scales used in previous studies. Through the theoretical framework of social comparison theory, the current study will use natural, and altered images to assess visual comparison of the face and its impact on females' attitudes, behaviors, and intentions toward cosmetic surgery.

Literature Review

Body Image

      Body image is a vital element of personal identity that impacts the perceptions one has towards oneself (Grogan, 2016). Going beyond one's thoughts and feelings about their appearance, body image also includes deeper psychological considerations like attitudes and experiences of embodiment (Grogan, 2016). Body image is a multifaceted concept of self that extends from the psychological to the physical identity of human beings. As the two are closely intertwined with the concept of identity, research has shown strong connections between body image and self-esteem (O'Dea, 2012).

      Body image and self-esteem are known to be linked together as salient issues. O'Dea (2012) stated that, since body image illustrates the bulk of an individual's self-concept, it is easy to conclude that self-esteem and body dissatisfaction are interrelated. In a short-term longitudinal study by Mellor et al. (2010), it was found that low self-esteem was linked to higher body dissatisfaction—supporting other research that has been discussed and demonstrating the importance of body image and its correlation to self-esteem. Although steps can be taken to improve self-esteem by updating one's body image through means such as cosmetic surgery, research has concluded that "There is no scientific evidence that surgery improves self-esteem or confidence in the long term, although it tends to increase satisfaction with the body part that was 'fixed'" (Abraham & Zuckerman, 2011, p. 453).

      Body Dissatisfaction and Objectification Theory. Objectification theory facilitates a deeper exploration of the relationship between body image and self-esteem, hypothesizing that females are "typically acculturated to internalize an observer's perspective as a primary view of their physical selves" (Fredrickson & Roberts, 1997, p. 173). Social media platforms like

Instagram are a treasure trove for individuals to engage in objectification practices, as one's relevance and importance are measured in large part by following the platform's shifting beauty trends (Baker et al., 2019). This presents a gap between reality and assumed reality individuals pursue to improve their body image. Over time, such behavior can lead to surgeries to deal with the perceived expectations of normalcy viewed on social media (Tolentino, 2019).

Body Dissatisfaction and Social Media. It is a common practice for social media influencers to alter their appearance to attain fame in industries like beauty, fashion, and fitness. This is often accomplished through unhealthy dieting, cosmetic surgery, or self-altering photo editing apps to achieve an ideal beauty trend (Peyser, 2019). Due to its widespread use and prevalence, photo-based social media has been widely studied as a potential risk factor for body dissatisfaction (Fardouly et al., 2015; Fardouly & Vartanian, 2016; Lonergan et al., 2019). Studies have primarily focused on the impact social media has on females' self-esteem and have found that body comparison predicts body dissatisfaction and depressive mood in these participants (Fardouly et al., 2015; Van den Berg et al., 2007). Although the effects are known, the root cause of body dissatisfaction remains obscure.

Selfies and the photo editing culture associated with meeting idealized body image standards have been identified as significant contributing factors to body dissatisfaction, lending greater understanding to the behaviors that impact body dissatisfaction (McLean et al., 2015). Fardouly and associates (2018) found that social media sites associated with poor body image outcomes are primarily photo-based (e.g., Instagram) and frequently involve social comparisons between images of oneself, friends, and acquaintances.

Altered Images and the Beauty Ideal. It has become a common practice for social media users to enhance their body's appearance through the practice of using photo filters or

through manual edits. Research notes that females spend a considerable amount of time viewing edited images on social media along with choosing and editing their pictures with filters before posting their content on Instagram (Tiggemann, & Barbato, 2018). This presents women with an unrealistic perception of beauty as it relates to reality. Furthermore, research has discovered that viewing and editing body images on Instagram have been found to enhance body dissatisfaction and body objectification (Tiggemann, & Barbato, 2018).

Cosmetic surgeons have noted an increase in requests to alter their clients' bodies, to look more like the version of themselves that they see with their Instagram filters (Brucculieri, 2018). This filtered concept of attainable expectations can leave some individuals feeling inadequate as they actively seek to attain beauty ideals. Sherlock and Wagstaff (2019) state that "excessive Instagram use may contribute to negative psychological outcomes and poor appearance-related self-perception" (p. 482).

Beauty Trends and Cosmetic Procedures. Social media is strongly linked to body dissatisfaction and cosmetic procedures. Stein and associates (2019) stated that "social networks have replaced traditional media as the main channel by which beauty ideals are conveyed— often resulting in body dissatisfaction and reduced self-esteem among users" (p. 2). Consequently, many dissatisfied females have turned to plastic surgery to attain the standards viewed on social media platforms. In an interview with celebrity makeup artist Colby Smith, The New Yorker reported that 95% of Instagram influencers have undergone some type of cosmetic procedure (Tolentino, 2019). Smith also stated that growing trends like Botox brow lifts play a key role in influencing individuals to engage in cosmetic procedures (Tolentino, 2019). Sansone and Sansone (2007) also noted an increase in surgical and non-surgical cosmetic procedures like Botox injections, hyaluronic acid injections, dermal fillers, and fat

injections that provide temporary surgical outcomes without the downtime of surgery. For many individuals, the motivations for such procedures—surgical or not—stem from online exposure to celebrities and other promoted portrayals of ideal beauty (Brucculieri, 2018). Research that has explored celebrity worship and cosmetic surgery suggests a strong link between copying behaviors with cosmetic surgical beauty trends (Tijerina et al., 2019).

Cosmetic Surgery and Social Media Influencers. Social media is an important tool for both individuals and professionals alike, as it aids in the dissemination of information and greatly assists professionals with marketing through self-promotion. In total, social media usage amounts to 14 hours per week and nearly 60 hours per month for individuals aged 18 to 29, who account for 90% of social media users (Perrin, 2015). While social media platforms have, overall, experienced a significant increase in users across all age groups, teens and young adults remain the most active users (Perrin, 2015).

Social media has also become a primary source for viewing and sharing visual content relating to beauty ideals. Platforms like Facebook, Instagram, and YouTube have become the top three most significant mediums for leading and promoting trends in cosmetic procedures (Naftali et al., 2018). Instagram's photo and video-based structure make it an increasingly popular choice among social media users, as the content is easily and quickly consumed (Al-Kandari et al., 2016). Additionally, Instagram's popularity continues to increase as is evident by its one billion monthly active users and 500 million daily active users in 2019 alone. Within the United States, Instagram users between the ages of 13 to 17 make up 63% of its daily users with 34% of users being millennials and the average amount of time for viewing content on Instagram amounts to 38 minutes per day (Smith, 2014).

Celebrities as Cosmetic Surgery Influencers. Social media consists of many celebrities who make up its high-profile influencers. With eminence in the media, celebrities can influence others to engage in cosmetic procedures (Tijerina et al., 2019). A study by Tijerina and colleagues (2019) observed that the likelihood of undergoing cosmetic surgery is strongly linked to individuals with celebrity obsession. Maltby and Day (2011) found that individuals who admire a celebrity's body shape are more willing to undergo a surgical procedure for cosmetic reasons to emulate a beauty ideal. In addition, Maltby and Day (2011) concluded that intense celebrity worship is a factor in predicting that a cosmetic procedure is likely to occur within eight months.

Using Google Trends to collect data regarding search interest following a celebrity announcement, Tijerina and colleagues (2019) discovered a correlation between celebrity cosmetic procedures and an increase in interest in the cosmetic procedures promoted by celebrities. For example, after Kylie Jenner's lip augmentation announcement, Google searches increased with the term "lip filters" to 3,233% within the United States. In addition, a similar pattern was observed following Caitlyn Jenner's gender reassignment surgery announcement, with a similar surge in increased searches for related procedures (Tijerina et al., 2019). Tijerina and colleagues' (2019) analysis concludes that enduring focus on celebrities provides an increase in public awareness relating to healthcare and cosmetic surgery and that such public announcements can provide public interest.

Cosmetic Surgeons as Social Media Influencers. Due to the significant influence of Instagram, cosmetic surgeons have taken part in the promotion of aesthetic/cosmetic procedures. Economides and colleges (2019) found that the use of social media has increased within the field of cosmetic surgery. In a prospective analysis by Naftali et al. (2018), it was

found that "63% of the posts on Instagram originated from plastic surgeons, with 83% of posts being self-promotional (p. 1)." Across all cosmetic surgery social media content on Facebook, Instagram, and YouTube, educational content was only found to account for 16% of all social media content relating to plastic surgery (Naftali et al., 2018). Professional social media use with plastic surgeons is rising as surgeons create account profiles to gain professional exposure (Economides et al., 2019). From these studies, it seems that Instagram has become the medium of choice for many cosmetic surgeons to market their professional work through self-promotion.

Cosmetic surgeons' ability to influence is significant. In a report by the International Society of Aesthetic Plastic Surgery (2018), the United States is number one in the world for cosmetic surgeons with a total of 7,009 surgeons (p. 7). In a study that looked at Twitter's impact on plastic surgery as it relates to conversation and education, three-quarters of social media influencers were found to be physically located in the United States with credentials of being either board-certified or eligible plastic surgeons (Chandawarkar et al., 2018). Such information provides a significant look into the impact cosmetic surgeons have in shaping the perspectives of individuals through social media.

With an increase in professional use among surgeons on social media, it is important to note the type of use and engagement of plastic surgeons on social media. In a study by Economides and colleagues (2019) among plastic surgeons with a social media presence, differences were identified between academic and nonacademic surgeons' beliefs and behaviors regarding social media use and cosmetic surgery. Ultimately, academic surgeons—those who are primarily affiliated with a university, or community/city hospitals (Economides et al., 2019)— are more likely to believe that social media worsens the image of cosmetic surgery in

comparison to that of other cohorts. In contrast among nonacademic surgeons—those who work primarily in private practices (Economides et al., 2019)—the belief exists that social media is positive for the field of cosmetic surgery. In terms of behaviors, Economides et al. (2019) found that 71.9% of nonacademic surgeons are likely to maintain an active professional social media account compared to university-affiliated community surgeons who are only 41.4% likely to do so. Overall, aesthetic/cosmetic surgery surgeons are most likely to have an active social media account related to their professional services (Economides et al., 2019). Although cosmetic surgeons utilize social media for its novelty in business growth, studies note that it is not fully understood within the context of social media sponsorship and promotion, as no peer-reviewed articles have yet looked at addressing such limitations.

Trends in Cosmetic Procedures. Cosmetic surgery is a surgical procedure "performed to reshape normal structures of the body in order to improve the patient's appearance and self-esteem" (Sandman & Hansson, 2020, p. 2). While ideal beauty trends are increasingly and conveniently viewed across social media, cosmetic surgery has become a global beauty practice for improving psychological outcomes related to poor self-perception about one's appearance. A report by the International Society of Aesthetic Plastic Surgery states that a little over 11.3 million surgical procedures and 13.6 million non-surgical procedures were performed globally in 2019 (International Society of Aesthetic Plastic Surgery, p. 7). The nations that ranked the highest in the report were the United States, with over 3.9 million surgical procedures, and Brazil, with just over 2.5 million non-surgical procedures performed in that year alone (International Society of Aesthetic Plastic Surgery, 2019, pp. 15–16).

Across the world, the most common procedure for individuals 18 years of age and younger is rhinoplasty surgery, commonly known as a nose job, while individuals 19 to 65

years and older had botulinum toxin—or Botox—injections, making it the most practiced

procedure within that age group (International Society of Aesthetic Plastic Surgery, 2019, p. 7).

The world's highest overall surgical procedure in 2019 was breast augmentation with over 1.7

million procedures done globally (International Society of Aesthetic Plastic Surgery, 2019, p.

9). These statistics highlight the expansiveness of cosmetic surgery around the world and the

significant impact and prevalence it has in nations like the United States and Brazil, where such

cosmetic procedures have become an increasingly common beauty practice.

Health Effects Associated with Cosmetic Surgery. As with any medical procedure,

the consequences relating to an individual's health and wellbeing ought to be assessed. Surgical

journals review the practices of cosmetic procedures along with an area of research that

explores the impact of cosmetic surgeries and its link to mental health. Consequently,

researchers have found that many individuals who request cosmetic procedures struggle with

existing mental health issues such as body dysmorphia, eating disorders, depression, and

anxiety (Auer, 2020). Von Soest et al. (2020) observed that "symptoms of depression and

anxiety, together with a history of deliberate self-harm, parasuicide, and illicit drug use were

predictors of prospective cosmetic surgery (p. 1270)," and Cleary and associates (2020)

observed that when interventions such as cosmetic surgery were introduced symptoms of

mental illness were not alleviated. Similar results were found for patients with body dysmorphic

disorder (BDD). Individuals with BDD suffer from a debilitating obsession with self-perception

and perfection, which is categorized within the category of obsessive-compulsive disorder

(Vashi, 2016). On average, BDD patients do not benefit from cosmetic procedures to improve

their well-being and could instead benefit more from psychiatric and psychopharmacologic

therapy (Crerand et al., 2006).

Studies have also uncovered a significant link between social media use and its impact on mental health as it relates to body image. For example, Sherlock and Wagstaff (2019) discovered that the "frequency of Instagram use is correlated with depressive symptoms, self-esteem, general and physical appearance anxiety, and body dissatisfaction and that the relationship between Instagram use and each of these variables is mediated by social comparison orientation (p. 482)." Although these symptoms are not as intense as BDD, they have the potential to develop into more serious issues related to self-perception and individual health.

   Cosmetic Surgery's Link to Suicide. Research has found a correlation between mental health and the type of cosmetic surgery pursued by individuals with mental health disorders. For example, although breast augmentation has been found to increase women's self-confidence, women with breast implants are also at a higher risk for suicide (Rohrich et al., 2007). Health researchers have studied potential reasonings for the increased risk and have found that breast implants are linked to connective tissue disorder development. Yet, no evidence has been found to support that the reaction might promote suicidal behavior (Milothridis, 2020). In contrast, a stronger link exists between women with a predisposition for personality characteristics associated with mental health disorders who undergo breast augmentation. This appears to be the contributing factor involved in a higher increased risk of suicide among breast augmentation patients (Milothridis, 2020). Moreover, research has reported that patients undergoing breast augmentation have "elevated mental health problems" and that "factors in the domains of physical appearance, drug use, relationships, and exposure to abuse were all related to breast augmentation" (von Soest et al., 2020, p. 1270). As breast augmentation surgery is reported to be the most common cosmetic procedure undergone by women worldwide, awareness and

screening of mental health issues need to be more actively addressed (International Society of Aesthetic Plastic Surgery, 2018; Rohrich et al., 2007).

       Makeup's Connection to Cosmetic Surgery. The use of makeup has been linked to an acceptance of cosmetic surgery. In one study, it was found that the more participants (male or female) supported the use of makeup for beautification, the more willing they were to undergo a surgical cosmetic procedure (Henderson-King & Henderson-King, 2005). Researchers have stated that makeup shares a connection to cosmetic surgery in that each produces dishonest signaling where a person presents an artificially enhanced indicator of themselves and the quality of their genetics (Nicolas & Welling, 2017). Both beauty cosmetics and cosmetic surgery are motivated by high artificial societal beauty norms, which serve as the significant motivating factor for using makeup and undergoing a cosmetic procedure. However, negative stigmas exist with both makeup and cosmetic surgery. Negative connotations have been observed specifically with women who wear makeup (Bernard et al., 2019; Cox & Glick, 1986; Kellie et al., 2021; Kyle & Mahler, 1996; Workman & Johnson, 1991). Women who wear makeup are viewed "to possess less humanness, agency, experience, competence, warmth, morality, and mental capacity than women not wearing makeup" (Bonell et al., 2021, p. 234). Although women experience significant explicit and implicit encouragement to undergo a cosmetic procedure, there is significant societal backlash for undergoing a cosmetic procedure, which can include negative stereotyping, feelings of judgment, and personal viewing of procedures as unjustifiable or that it is morally condemnable (Davis, 2009, 2013). Regardless of societal standards, and in comparison to makeup, cosmetic surgery is noted to present significant risk (Nicolas & Welling, 2017), including increased incidents of suicide (Milothridis, 2020; Rohrich et al., 2007). In efforts to warn others of the negative impact

associated with the pursuit of beauty ideals, awareness and self-compassion have been advocated as effective ways to mediate individuals' perceptions of health and wellbeing as it relates to definitions of attainable beauty.

Using Awareness and Self-compassion as a Mechanism for Mediation. There is little support for the use of warning labels on altered images as a way of reducing state appearance comparison for individuals who are exposed to depictions of ideal beauty (Danthinne et al., 2020). Additional research has found that self-compassion does not moderate body dissatisfaction with social media use, and efforts to choose, edit, and monitor responses to selfies could impact individuals' mental health (Lonergan et al., 2019). Furthermore, self-compassion, as applied through positive body-affirming statements, has been found to provide negative outcomes for college-aged women as it causes them to think about their body flaws. In a study by Engeln and Imando (2020), participants were asked to mentally repeat the affirmation of either "I love my body" or "I am [age] years old" while working on a five-minute writing task. Participants who told themselves that they loved their bodies wrote negatively about their appearance at 53% compared to the control group's six percent who only repeated their age before the writing prompt. As a result, additional research approaches are needed for educating and mediating the issue.

Theoretical Framework

Social comparison theory provides a strong theoretical foundation for understanding the connection between self-perception of body image and media consumption through social media platforms. Ultimately, social comparison theory is a method of thought about information regarding one or more people in comparison to oneself (Wood, 1996). Developed by Festinger (1954), the theory proposes the idea that first, an individual possesses a drive to evaluate their

options and abilities. Secondly, when no objective, non-social means for evaluation are possible, individuals seek to evaluate their abilities and opinions by comparing them to the abilities and opinions of others.

Directional Comparisons. Social comparison theory assesses the effects of upward (Swallow & Kuiper, 1988; Wood, 1989) and downward comparisons (Wills, 1981), which moves beyond the act of simply comparing oneself to others. For an upward comparison to occur, an individual must examine their current state of being with that of another individual with whom they perceive as having a superior or elevated state of being from their own (Collins, 1996). In contrast, a downward comparison is made when an individual identifies the state of the second individual as worse off or inferior to their current state (Swallow & Kuiper, 1988).

Festinger (1954) proposed that upward comparisons establish a drive to seek betterment, especially in oneself. Researchers have concluded similar results to Festinger's (1954) claim regarding the positive effect of upward social comparisons towards self-improvement (Collins, 1996), whereas others have found that upward comparisons can present a negative outcome for individuals and their wellbeing (Swallow & Kuiper, 1988; Vogel et al., 2014).

Positive outcomes from social comparison may result when an individual making the comparison finds they share similarities with the individual whom they are comparing themselves with (Collins, 1996). This is due to the dependent belief of the individual making the comparisons that they are similar to or better off than the person with whom they are comparing themselves, which may lead to individuals using upward comparisons for self-enhancement when they are not feeling threatened. According to Collins (1996, p. 63), a high

level of self-esteem is a critical element for individuals to establish a positive social comparison. Such research has been enhanced by further studies, which have found that the process of social comparison with another person who is similar to or better-off may result in positive outcomes with a sense of inspiration rather than adverse perceptions towards the self.

In contrast, negative social comparisons may occur and lead an individual to develop feelings of low self-esteem, reduced motivation for self-improvement (Swallow & Kuiper, 1988; Vogel et al., 2014), and depression (Swallow & Kuiper, 1988). Furthermore, individuals who do not experience such emotions towards themselves may establish a negative self-evaluation approach by creating social comparisons, whereas depressed individuals may become even more depressed (Swallow & Kuiper, 1988). Negative social comparisons have been found to result when individuals' comparisons lead to perceptions of unattainability (Swallow & Kuiper, 1988; Vogel et al., 2014). Such a conclusion can occur when an individual perceives that they are lesser than the person with whom they are comparing themselves.

Downward comparisons—as presented by Thomas Wills (1981)—provide perspective into an individual's self-evaluation process within the theoretical framework of social comparison theory. As mentioned previously, a downward comparison transpires when a person views the state of someone else as worse off or inferior to their own (Swallow & Kuiper, 1988). Additionally, it provides an individual who may be experiencing negative effects the opportunity to enhance the condition of their well-being when they compare themselves to others within the perspective of a lesser state (Wills, p. 245, 1981). Such a comparison may happen actively or passively, and as posited by Wills (1981), presents strong theoretical support for assessing relationships of various phenomena. Moreover, Aspinwall and Taylor (1993) note

that downward comparisons can create and enhance positive self-evaluations for persons with low self-esteem along with other difficulties and setbacks.

   Body Image Comparisons. Social comparison theory provides a robust theory for assessing body image satisfaction. Because individuals instinctively compare themselves to others across a variety of social situations (Adams, 2020), body image satisfaction is a suitable avenue for exploration. Researchers have noted that an inconsistent view of oneself against an idealized self may increase body dissatisfaction (Richins, 1991, p. 73; Sohn, 2009 p. 20; Tiggemann & McGill, 2004; Tiggemann & Slater, 2004), whereas other findings state that such a discrepancy may result in the development of motivating upward comparisons (Knobloch-Westerwick & Romero, 2011; Veldhuis, Konijn, & Knobloch-Westerwick, 2017). Although research relating to both body image and downward comparisons is limited, a trend has been observed with persons making such comparisons and a modest increase in self-esteem when they view others as less attractive than themselves (Thornton & Moore, 1993).

   It has been noted that communication research has just begun to assess the unique relationship between social comparison, social media, and body image (Lewallen & Behm-Morawitz, 2016). The primary source observed for encouraging social comparison behaviors has been found to focus on one's peers rather than celebrities and other public figures encountered on social media (Tiggemann et al., 2018). In addition to body dissatisfaction that can result from celebrity and peer comparison, self-comparisons made by applying social media filters have also been discussed as a contributing force to body dissatisfaction and the pursuit of cosmetic surgery (Brucculieri, 2018; da Silva et al., 2021). Concerns relating to body image dissatisfaction, social media filters, and cosmetic procedures have largely been discussed by the media in a qualitative fashion to introduce trends and concerns (Tolentino, 2019), by

interviewing cosmetic surgeons on their experience with patients' requests to look more like

their filtered selves (Brucculieri, 2018), or by conducting surveys (Beos et al., 2021; Walker et

al., 2021). Considering this research, the present study will explore the connection between

social comparison, social media, and body image by assessing beauty filters' impact on female

elective desire for facial cosmetic surgery.

H1: When presented with a peer-like image, regardless of personal satisfaction with

one's appearance, women will have more normative beliefs about cosmetic surgery if

they perceive that a peer has adopted cosmetic enhancements.

Body Image Self-Evaluation Measures

To properly report on the effects of social comparison on body dissatisfaction,

appropriate self-report measures must be applied. With a focus on body image, visual social

media, and cosmetic surgery, the most widely used body satisfaction scales include the

Acceptance of Cosmetic Surgery Scale (ACSS; Henderson-King & Henderson-King, 2005) and

the Body Areas Satisfaction Scale (BASS; Brown et al., 1990). Each scale has been used

extensively in the study of body image research and will be expanded on hereafter as they relate

to the objectives of the current study. Furthermore, the Media and Technology Usage and

Attitudes Scale (MTUAS; Rosen et al., 2013), and the Instagram Appearance Comparison Scale

(IACS; Di Gesto et al., 2020) will be used for an in-depth analysis of social media use and

behavior as it relates to body image. Moreover, each scale has been effective in studying body

image as it relates to social media's link to elective cosmetic surgery.

Eye-Tracking Research. Measurements of individual importance, interest, and

attention can be gauged in a variety of ways that may include self-reports, memory, and so

forth. However, such methods for measuring attention are primarily based on a person's recall

rather than measuring attention in real-time—representing an indirect means of assessment. In comparison, eye-tracking provides a direct approach for studying visual attention that allows data to be gathered in real-time regarding participants' visual attention, which yields insights into attitudes and perceptions.

Eye-tracking involves the assessment of visual behavior, which is a term used for defining how people with sight use their vision as it relates to visual perception, visual processing, and visual attention, in addition to an assortment of other related concepts (King et al., 2019). According to King and colleagues (2019), the process of eye-tracking includes the ability to monitor a person's visual behavior through the position and movement of their eyes as it relates to visual events and or stimuli that are displayed through various electronic display screens or within real-world environments.

Scan path analysis is the method of studying a person's eye movements while they look at a screen (John, 2019). Elements of scan path analysis include fixations and saccades. Fixations transpire when a person's eye briefly stops to consider an aspect within their field of vision, and the rapidly occurring motion from one fixation point to the next that connects those fixations are called saccades (King et al., 2019). As saccades involve the connecting movement between fixations, they provide understanding regarding an individual's visual attention and behaviors (King et al., 2019). Recent studies have suggested that cognitive processing continues during saccadic movement (Rayner, 2009), although vision is temporarily suppressed (King et al., 2019).

To distinguish between visual attentional interest for a particular element or area of interest with a stimulus, eye-tracking researchers must isolate and define regions of the stimulus. Such regions are known as areas of interest (AOIs; King et al., 2019).

Although it provides many strengths as a research tool, eye-tracking is not exempt from limitations. Duchowski (2017) suggests that all eye-tracking involves the widely accepted expectation "that attention is linked to foveal gaze direction, but we acknowledge that it may not always be so" (p. 13). Due to the process involved with eye-tracking, which includes calibration, tracking, and the lab environment, participants may adjust their visual behavior due to an awareness that they are being studied, which may present a Hawthorne effect to a study. In turn, this awareness can impact participants' visual behavior although they may state otherwise (Leckner, 2012).

Regardless of possible limitations, studying an individual's visual gaze adds perspective regarding visual measurements related to behavior. This includes the frequency of blinking, or if an individual's pupil diameter changes, it can be used for determining states such as arousal and mind wandering (King et al., 2019). Because eye-tracking provides additive data to self-report measures employed in the current study, it will be used as a primary method for data collection.

Fixation. A person's visual attentional bias may manifest itself through fixation tendencies. Known as a characteristic of visual behavior, fixations involve halting the movement of the eye for consideration of a visual phenomenon within one's field of vision (King et al., 2019). When the eye momentarily stops it is positioned in a way that allows for items to pass through the central point of a person's visual attention (or foveal) where awareness is at its best and the most intentional visual behavior is comprised of fixations (King, et al., 2019). The time which a fixation lasts is known as dwell time or gaze duration (John, 2019), and is thought that a person's cognitive processing of visual stimuli happens when their eyes fixate on the item during dwell time (John, 2019; Rayner, 2009).

Avoidance Tendencies. In an eye-tracking study by Lykins et al. (2014), researchers learned that women who experience body dissatisfaction typically avoid looking at regions of the body with which they experience personal dissatisfaction. From these behaviors, it was suggested that body dissatisfied females avoid making comparisons to preserve self-esteem as an instinctual defense mechanism rather than following through with upward or downward comparisons (Lykins et al., 2014).

Eye-tracking and Body Image. Eye-tracking has been used across a variety of body image and health-related topics. Such topics of research include visual attention and body satisfaction (Gao et al., 2014), body dysmorphic disorder (Greenberg et al., 2014), male body image (Cordes et al., 2016), youth's attention to responsibility messages (Thomsen & Fulton, 2007), eating disorders (Kerr-Gaffney et al., 2019), focus on specific eating disorders like bulimia nervosa (Naumann et al., 2019), and anorexia nervosa (Pinhas et al., 2014), along with assessments of fashion, body image, and Instagram promotion (Mañas-Viniegra et al., 2019).

Eye-tracking, Body Image, and Instagram. Researchers have also used eye-tracking to study Instagram and its impact on body image. These studies include topics of visual assessment like female's Instagram use and body image (Baker, et al., 2019), processing thin-ideal Instagram body images with disclaimer comments (Bue & Harrison, 2020), Instagram use frequency and visual attention relating to body regions in women (Bue, 2020), and the impacts of thin, sexualized selfies on the social media platform (Vendemia & DeAndrea, 2018). Yet, no eye-tracking research currently exists that explores the impact of enhanced Instagram beauty pictures as they relate to the study of body image and body satisfaction. Research assessing females' Instagram use has been found to negatively link with female body satisfaction as it relates to high anxiety and eye-fixation (Bue, 2020). Such eye-tracking findings, along with a

gap in research relating to enhanced Instagram images, provide opportunities for exploration within the field of body image research.

H2: When viewing peer-like images of the face, fixation time will be significantly longer on facial features that have been enhanced with a filter.

Research Questions

Considering the literature on visual attention, female body image, and cosmetic enhancements, the present study employs scales used in prior research to assess female visual attention and its connection to elective desires to undergo cosmetic procedures. Using natural and visually enhanced images the study assesses participants' visual attention, acceptance of cosmetic surgery, psychometric responses, body area satisfaction, and sociocultural attitudes towards appearance. As a result, the following research questions are proposed:

RQ1: Is media exposure related to body area satisfaction (RQ1a), facial region satisfaction (RQ1b), or cosmetic surgery normative beliefs (RQ1c)?

RQ2: How do differing levels of Instagram Comparison tendencies impact body area satisfaction (RQ2a), facial region satisfaction (RQ2b), and cosmetic surgery normative beliefs (RQ2c)?

RQ3: Are there differences in visual processing behavior (facial region fixation time) among those at differing levels of IACS (RQ3a), BASS (RQ3b), FRSS (RQ3c), and ACSS (RQ3d)?

Method

Female participants were recruited by email at a large Western U.S. university by college professors who forwarded an IRB-approved email about the study. Additionally, snowball recruitment was used. Interested individuals completed the pre-test questionnaire and

waited two weeks to be eye-tracked. Eye-tracking was used to capture participants' visual attention data and pre and post-tests included several additional measures outlined below.

Design. Through the framework of social comparison theory, the present study examined how participants perceived images of a female face and how self-perception impacted attitudes, behaviors, and intentions towards self-perception, and body image impacts attitudes towards cosmetic surgery in a between-subjects design. Female participants were presented with three experimental conditions of visual stimuli that included a featured female with a natural complexion and facial features, makeup with natural facial features, and the makeup image with digitally enhanced facial features.

Participants. A total of 120 women successfully participated in the post-test and pretest. Female college students of various races that were 18 years of age or older who actively use social media were chosen to participate. Research participants were invited to take part in the study through a survey that was emailed to students enrolled in courses throughout the university. Participants were selected based on their age (being 18 years old or older), biological gender assigned at birth (female), social media use, and willingness to participate.

Two weeks after completing the survey, qualifying individuals were sent an email with a link to schedule an appointment at the eye-tracking lab. Participants were then expected to arrive at the eye-tracking lab at their scheduled time to participate in the study where they were told they would be looking at images they might encounter on social media while being eye-tracked.

Procedure. An outlined step-by-step explanation of the study procedure follows.

Invitation. Participants were recruited through a questionnaire that was sent to students at a large Western university. Once individuals completed the survey and were successfully

determined that they could and would like to participate, they were contacted two weeks after completing the pretest to schedule an appointment to visit the eye-tracking lab to complete the post-test of the study where they would then be compensated for their participation in the study.

Pre-test. Potential participants were contacted via email and invited to fill out the pre-test survey. If interested and willing to participate, individuals were asked to provide a contact email to participate in the second half of the study two weeks after completing the pre-test. Participants were emailed a link two weeks later to schedule a time to be eye-tracked once they completed the pre-test.

The pre-test included an assessment of age, biological gender, social media usage, and interest to participate in the study. Additionally, the MUTAS, BASS, ACSS, and IACS were also administered in the pre-test. Once individuals completed the pre-test, they were emailed two weeks later to schedule a time to be eye-tracked and complete a short post-test survey.

Post-Test. After two weeks, participants visited the eye-tracking lab where they took part in the study's post-test. Participants spent 10 minutes or less participating in the eye-tracking post-test. The post-test included a random assignment to viewing each of the three visual stimuli in one of six randomized orders (e.g., image 1 no makeup, image 3 enhanced image, and image 2 makeup) being eye-tracked, and filling out the post-survey.

Stimuli. Participants viewed images of a brunette Caucasian female without makeup, with makeup, and one with makeup and photo enhancements made to the female's facial features to resemble cosmetic procedures commonly found on Instagram and referred to as Instagram face. Individuals were told they would be eye-tracked while viewing images they may encounter on social media and to view the images as if they were at home scrolling through their social media feed. Before each image, participants viewed a gray screen to break up the

images and to create an emotional baseline for each image condition. Participants viewed each image stimuli for 15 seconds.

   Visual Stimuli. Individuals viewed three images of a female featured from the collarbone up in front of a neutral-colored background. The first image showed the woman without any makeup or visually manipulated enhancements. The second image showed the female with a full face of makeup applied (e.g., foundation, concealer, eyeliner, mascara, blush, etc.). The last image was an altered image of the makeup picture where the facial features had been touched up to resemble a filtered look. As facial features were the primary focus of this study, no adjustments were made to smooth out skin tone. Visual enhancements were made using the free version of the application Facetune2. The third image was altered in the forehead, eyebrows, nose, cheeks, lips, and jawline. Additionally, the eyes, hair, and skin texture were left untouched.

   Images were presented to participants in a randomized order. To establish an emotional baseline for each image, participants first saw a gray screen for six seconds before viewing images of the female for 15 seconds each.

   Eye-tracking and Post-Test. Participants were led to the eye-tracking lab where they were debriefed on the study and signed a consent form. Afterward, participants were seated in front of a computer connected to the Tobii Pro Spectrum 600Hz eye-tracking camera, configured for sampling at 300Hz. Next, to provide optimal results, research assistants seated participants 24–26 inches away from the camera. Once participants were accurately and comfortably seated, the researcher calibrated participants' eyes and, using a random number generator, assigned participants to one of the six conditions. The researcher added the

participant's number into the iMotions software and began showing the participant the stimuli for their randomized condition.

After completing the eye-tracking portion of the study, which took one minute and two seconds to complete, participants took a post-test where they were asked to rate each image they saw in terms of attractiveness on a five-point Likert- scale ranging from "not at all attractive," "slightly attractive," "moderately attractive," "very attractive," and "extremely attractive." From there, participants were asked to include reasons why they chose the answer they did and were provided with the opportunity to type out their answers before moving on to the next image. This was applied to each of the three visual stimuli. Once participants completed the post-survey they were paid and debriefed.

Demographic Questionnaire. Participants were selected through the pretest questionnaire that asked for participants' age, biological gender assigned at birth, and social media use and behaviors.

Measures. To assess the impact of female participants' visual comparison of the face, how it correlates with attitudes and behaviors of individual body image, and intentions for undergoing cosmetic surgery, measurements drawn from prior research were applied. Measurements included the MTUAS, ACSS, BASS, ASMC, and the IACS.

MTUAS. Since its development in 2013, the Media and Technology Usage and Attitudes Scale (Rosen et al., 2013) has been used across the globe as a reliable measurement method for assessing media technology involvement and user attitudes and behaviors across various mediums (Özgür, 2016). Established by Rosen and colleagues (2013), the scale provides researchers with a variety of breadth and depth for media usage and attitude analysis that includes factor analysis of 11 subscales focusing on the usage of a variety of media

technologies that include "general social media usage, Internet searching, media sharing, text messaging, video gaming, online friendships, Facebook friendships, phone calling, and watching television" (Rosen et al., 2013, p. 2504). Additionally, four attitude-based subscales are included that consist of "positive attitudes, negative attitudes, technological anxiety/dependence, and attitudes toward task-switching" (Rosen et al., 2013, p. 2501).

For purposes of the following study, MTUAS provides depth for establishing a foundation of participants' use and attitudes towards technology and its use and role in their lives ($M = 5.078$, $SD = 1.176$, $\alpha = .828$). Presented to participants on a 10-point Likert scale, the items included on the scale consist of daily frequency of checking social media sites or using a smartphone to check social media sites, frequency of visiting one's social media homepage, and frequency of activity such as reading posts from others, liking content, or creating posts and posting pictures.

ACSS. Since its introduction in the early 2000s (Henderson-King & Henderson-King, 2005) the Acceptance of Cosmetic Surgery Scale (ACSS) has been widely used in body image research for understanding key factors that influence individual acceptance of cosmetic procedures (Meskó & Láng, 2019; Swami et al., 2009; Walker et al., 2021). The ACSS measures three subscales of cosmetic surgery acceptance, which consist of Interpersonal, Social, and Consider (Beos et al., 2021).

The Intrapersonal factor assesses expected personal benefits from cosmetic surgery, such as enhancing one's body for personal appearance satisfaction. Social delves into the underlying social motives that impact a person's decision to undergo a surgical cosmetic procedure, such as enhancing one's appearance for the satisfaction of one's partner. On the other hand, the Consider factor measures considerations that influence a person's reasons and

the impact of how likely they are to apply for cosmetic surgery. Factors that can be included in the Consider category relate to a person's pain, infections, and wound healing complications (Meskó & Láng, 2019).

For measuring each of the three subscales, ACSS uses 15 statements on a Likert scale where participants indicate how much they agree with each statement regarding their acceptance of cosmetic surgery (Beos et al., 2021). Within each subscale (Intrapersonal, Social, and Consider), five items are provided. After the completion of the Likert scale, participants' overall mean scores are then calculated with higher scores showing more positive views toward cosmetic procedures. Previous studies have shown a Cronbach's alpha of .88 for the entirety of the ACSS (Sharp et al., 2014; Henderson-King & Henderson-King, 2005). For purposes of this study, the 15 statement ACSS scale was administered in a five-point Likert-scale ($M = 2.461$, $SD = .900$, $\alpha = .932$).

BASS. The Body Areas Satisfaction Scale (BASS) originates from the attitudinal body-image instrument Multidimensional Body Self-Relations Questionnaire (MBSRQ; Brown et al., 1990) and has been modified in previous research to focus on regions of the face as it relates to cosmetic surgery (Guthrie et al., 2008; Beos et al., 2021). Because the original scale only included six facial aspects (eyes, eyebrows, lips, cheeks, skin complexion, and the entire face) additional research has been done to strengthen the scale expanding it to include all aspects of the face for purposes of researching surgical cosmetic enhancements ($M = 27.093$, $SD = .6.202$, $\alpha = .824$).

To tailor the scale for purposes of covering all facial features, prior research recommends adjusting the original scale by adding 10 additional items (Guthrie et al., 2008). For purposes of FRSS, the modified scale developed by Guthrie et al. (2008) is used to help

researchers gauge participants' feelings about 16 different facial features such as skin complexion, eyebrows, lips, and more. Such facial features are put on a five-point Likert scale. Participants' responses are then itemized in a reverse score and are summed to provide a total score that may range from 16 to 80. Higher scores show greater facial dissatisfaction.

For purposes of this study, a modified BASS scale (FRSS) is used by adding additional facial features as recommended and demonstrated in other studies (Beos et al., 2021; Guthrie et al., 2008). For the present study, the FRSS includes the following facial regions, which coincide with areas of interest for eye-tracking. These facial regions include the face (overall face), forehead, brows, between the brows, eyes, nose, cheeks, lips, region above the lips, corners of the mouth, chin, and jawline (M = 46.248, SD = .7.923, α = .867).

IACS. Formulated by Di Gesto and associates in 2020, the Instagram Appearance Comparison Scale was created as a measurement method for assessing levels for comparison between individuals and those they view on Instagram (Di Gesto et al., 2022). The fifteen-item scale uses a five-point Likert scale response ranging from one (never) to five (very often). Questions that focus on Instagram use and self-comparison to others viewed on Instagram are also used (e.g., "When I use Instagram, I compare my physical appearance to that of others"). The higher the score the greater the level of physical appearance comparisons on Instagram (Di Gesto et al., 2022) (M = 2.566, SD = .992, α = .955).

Results

RQ1: Media Exposure Fails to Influence Scores, but Other Notable Relationships Exist

A bivariate correlation matrix was constructed containing each of the main variables of interest to address RQ1. Referencing Table 1, the answer to RQ1 and its derivatives is no—media exposure is not related to body area satisfaction, facial region satisfaction, or cosmetic

surgery normative beliefs. Statistical power is admittedly a limitation; however, in the current

study, it seems that mere media exposure does not impact any of these variables. There are,

however, notable relationships to discuss within the correlation matrix.

Table 1

Bivariate Correlation Matrix

	Media and Technology Usage and Attitudes Scale (MTUAS)	Body Area Satisfaction Scale (BASS)	Facial Region Satisfaction Scale (FRSS)	Instagram Appearance Comparison Scale (IACS)	Acceptance of Cosmetic Surgery Scale (ACSS)
MTUAS		-.003	-.128	.154	.079
BASS			.626**	-.469**	-.248**
FRSS				-.419**	-.235*
IACS					.165
ACSS					

Note. Bivariate correlations among variables. MTUAS n = 120, BASS n = 118, FRSS n = 117, IACS n = 116, ACSS n = 116.

*p < .05, **p < .01

Unsurprisingly, body and face satisfaction were strongly and positively linked (r = .626, p < .001), and both were inversely correlated with cosmetic surgery normative beliefs

(body satisfaction, r = -.248, p = .007; face satisfaction, r = -.235, p = .011). In other words,

individuals who were satisfied with their body also tended to be satisfied with their face, and

lower satisfaction with either of these yielded increased normative beliefs toward cosmetic

surgery. Relationships with the Instagram appearance comparison scale are also worth

mentioning, as higher scores on this scale correlated inversely with both body (report) and facial

satisfaction (report). It seems that increased comparison behavior yields decreased satisfaction with the body and face. These relationships will be further explored with RQ2.

RQ2: IACS Quartiles and Relationships with BASS, FRSS, and ACSS

To address RQ2, (How do differing levels of Instagram Comparison tendencies impact body area satisfaction (RQ2a), facial region satisfaction (RQ2b), and cosmetic surgery normative beliefs (RQ2c)?) a series of one-way ANOVAs were conducted (see Tables 2-4 and Figures 1-3). For each of these ANOVAs, the Instagram appearance comparison scale results were divided into quartiles, consisting of -1SD from the mean and below (Quartile 1), between -1SD to the mean (Quartile 2), above the mean to +1SD (Quartile 3), and above +1SD from the mean (Quartile 4). The resulting variable was used as the predictor to test relationships with body area satisfaction (RQ2a), facial region satisfaction (RQ2b), and cosmetic surgery normative beliefs (RQ2c). The results were as follows.

RQ2a: One-way ANOVA, IACS quartiles and BASS. The one-way ANOVA comparing IACS quartiles to BASS was significant ($F(3,112) = 10.966, p < .001$), such that those in the highest IACS quartile reported significantly lower body area satisfaction scores than their lower IACS peers. A full reporting of the comparisons between variables can be found in Table 2, with an accompanying means plot in Figure 1.
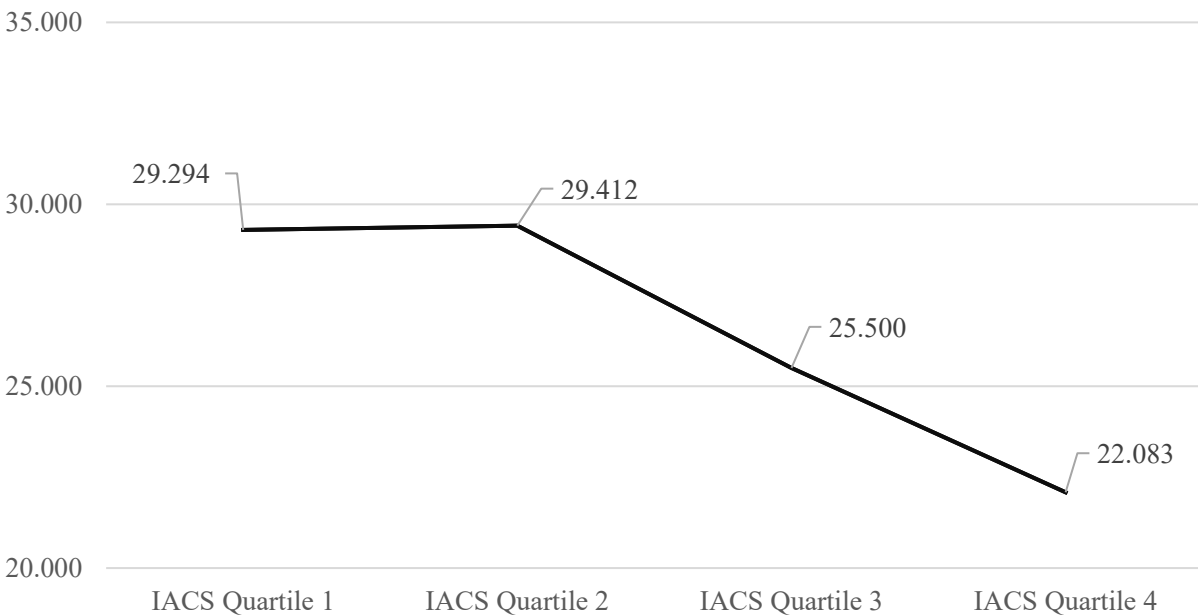
Table 2

One-Way ANOVA Comparing IACS Quartiles to BASS - Bonferroni

Dependent Variable	(I) Condition	(J) Condition	Mean Difference (I-J)	Std. Error	Sig.	95% CI Lower Bound	95% CI Upper Bound
IACS Quartiles	Quartile 1	Quartile 2	-0.118	1.559	1.000	-4.306	4.070
		Quartile 3	3.794	1.765	0.202	-0.946	8.535
		Quartile 4	7.211**	1.765	<.001	2.470	11.951
	Quartile 2	Quartile 1	0.118	1.559	1.000	-4.070	4.306
		Quartile 3	3.912*	1.378	0.032	0.210	7.613
		Quartile 4	7.328**	1.378	<.001	3.627	11.030
	Quartile 3	Quartile 1	-3.794	1.765	0.202	-8.535	0.946
		Quartile 2	-3.912*	1.378	0.032	-7.613	-0.210
		Quartile 4	3.417	1.607	0.214	-0.900	7.734
	Quartile 4	Quartile 1	-7.211**	1.765	<.001	-11.951	-2.470
		Quartile 2	-7.328**	1.378	<.001	-11.030	-3.627
		Quartile 3	-3.417	1.607	0.214	-7.734	0.900

Note. Multiple comparisons among variables. Quartile 1 $n = 17$, Quartile 2 $n = 51$, Quartile 3 $n = 24$, Quartile 4 $n = 24$. $N = 116$.
*$p < .05$, **$p < .01$

Figure 1: *BASS Means by IACS Quartile*

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RQ2b: One-way ANOVA, IACS quartiles, and FRSS. The one-way ANOVA comparing IACS quartiles to FRSS was significant ($F(3,112) = 7.850$, $p < .001$). Similar to the results for the BASS, those in the two highest IACS quartiles reported significantly lower facial region satisfaction scores than their lower IACS peers. A full reporting of the comparisons between variables can be found in Table 3, with an accompanying means plot in Figure 2.

Table 3

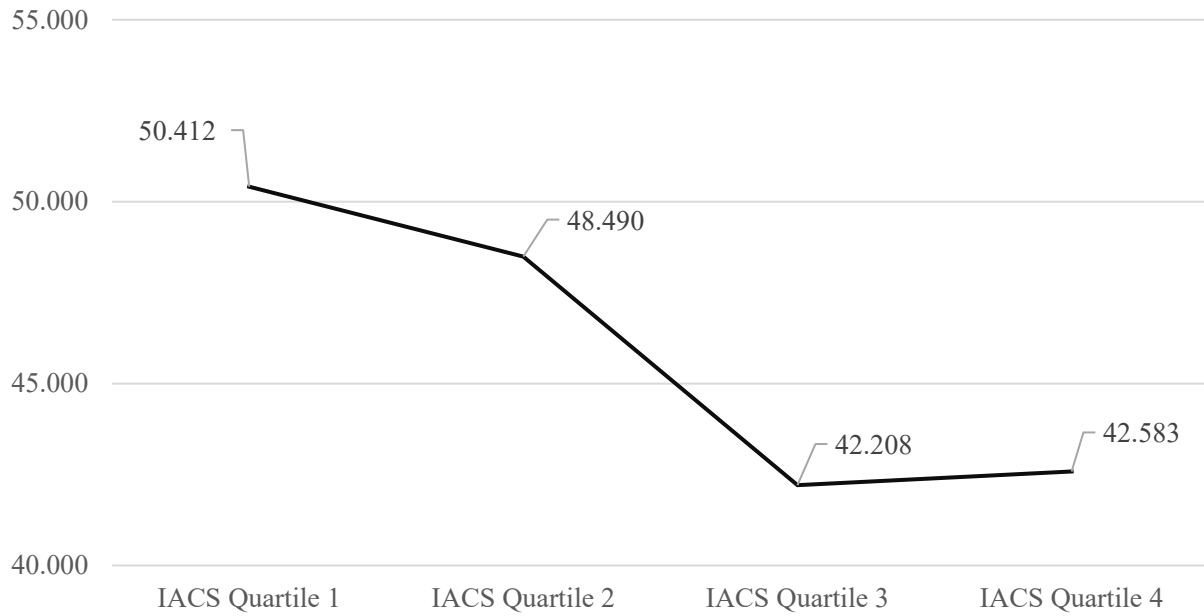*One-Way ANOVA Comparing IACS Quartiles to FRSS - Bonferroni*

Dependent Variable	(I) Condition	(J) Condition	Mean Difference (I-J)	Std. Error	Sig.	95% CI Lower Bound	95% CI Upper Bound
IACS Quartiles	Quartile 1	Quartile 2	1.922	2.053	1.000	-3.592	7.435
		Quartile 3	8.203**	2.323	0.004	1.963	14.444
		Quartile 4	7.828**	2.323	0.006	1.588	14.069
	Quartile 2	Quartile 1	-1.922	2.053	1.000	-7.435	3.592
		Quartile 3	6.282**	1.814	0.005	1.409	11.155
		Quartile 4	5.907**	1.814	0.009	1.034	10.780
	Quartile 3	Quartile 1	-8.203**	2.323	0.004	-14.444	-1.963
		Quartile 2	-6.282**	1.814	0.005	-11.155	-1.409
		Quartile 4	-0.375	2.116	1.000	-6.058	5.308
	Quartile 4	Quartile 1	-7.828**	2.323	0.006	-14.069	-1.588
		Quartile 2	-5.907**	1.814	0.009	-10.780	-1.034
		Quartile 3	0.375	2.116	1.000	-5.308	6.058

Note. Multiple comparisons among variables. Quartile 1 $n = 17$, Quartile 2 $n = 51$, Quartile 3 $n = 24$, Quartile 4 $n = 24$. $N = 116$.
$*p < .05$, $**p < .01$

**Figure 2:** *FRSS Means by IACS Quartile*

RQ2c: One-way ANOVA, IACS quartiles, and ACSS. The one-way ANOVA comparing IACS quartiles to ACSS was not significant ($F(3,112) = 1.218$, $p = .307$). While the means (see Figure 3) presents a similar disparity between the lower two and upper two IACS quartiles as observed with BASS and FRSS—these differences are too small to be considered consequential.

Figure 3: *ACSS Means by IACS Quartile*
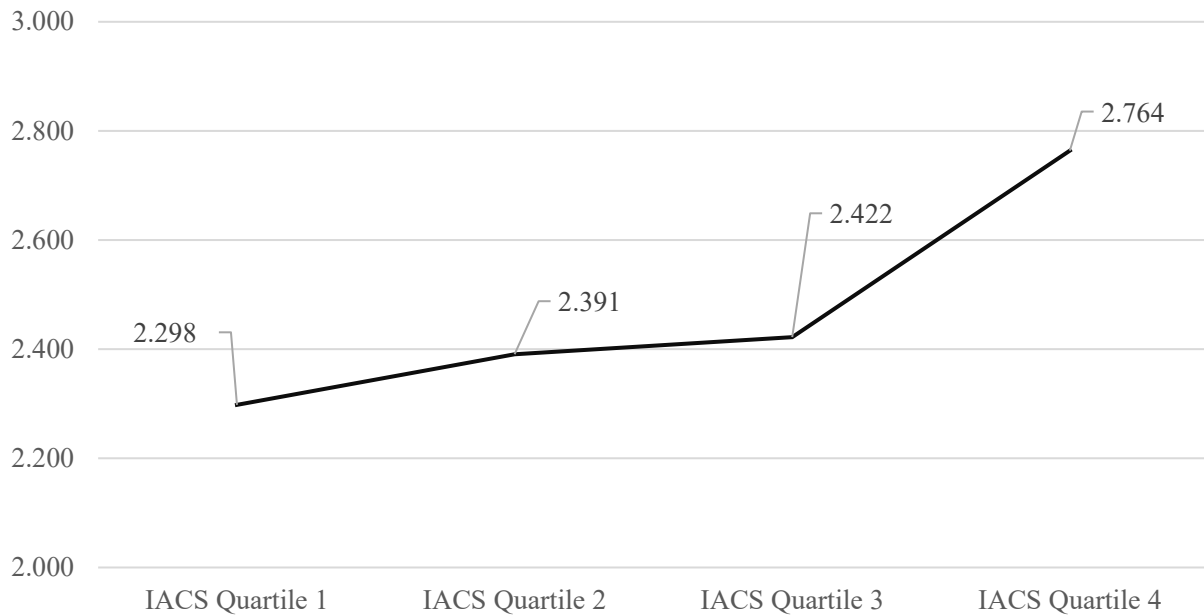
Overall, RQ2 and its derivatives asked how the various IACS quartiles related to scores on the BASS, FRSS, and ACSS. For BASS, the answer is that those in the highest quartiles of Instagram comparison tendencies reported lower body satisfaction scores than all other quartiles. Similarly, for FRSS, those in the two highest quartiles of Instagram comparison tendencies reported lower facial satisfaction scores. Finally, for ACSS, Instagram comparison tendencies were not significantly related to participants' perceptions of cosmetic surgery acceptability— although the means exhibited a clear increase moving from Quartile 1 through to Quartile 4.

RQ3: Manipulated Variables on Facial Regional Attention with No Makeup, Makeup, and Digital Enhancement

RQ3 addresses a question that has not been thoroughly explored in the literature—are there differences in visual processing behavior among those at differing levels of IACS (RQ3a),

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BASS (RQ3b), FRSS (RQ3c), and ACSS (RQ3d)? To test this, scores for each of the measures were split at the mean, providing two groups—one for scores below the mean, and one for scores at the mean and above—and the differences in total fixation time between these groups were compared. The visuals that participants were exposed to were three photos of a model's face, one with no makeup, one with makeup, and one that was digitally enhanced. On each of these faces, AOIs invisible to the research participant were created around 11 regions of the face, corresponding with the FRSS: forehead, eyebrows, between the brows, eyes, nose, cheeks, lips, region above the lips, corners of the mouth, chin, and jawline.

Independent samples *t*-tests were performed to identify significant differences between the two groups for each measure. Due to the number of analyses performed, only significant differences between groups will be reported below, as follows.

RQ3a: Differences in facial region visual attention between low and high IACS participants. For the no-makeup image, the *t*-test analyses comparing visual attention for low and high IACS participants were significant for the following regions: forehead ($t(114) = -2.498$, $p = .015$), eyes ($t(114) = 2.098$, $p = .038$), and nose ($t(114) = -2.422$, $p = .017$). Those with IACS scores above the mean fixated longer on the forehead, longer on the nose, and shorter on the eyes than those with IACS scores below the mean (see Figure 4).

Figure 4: *No Makeup Facial Region Fixation Times, IACS Scores Split Below the Mean and At the Mean and Above*
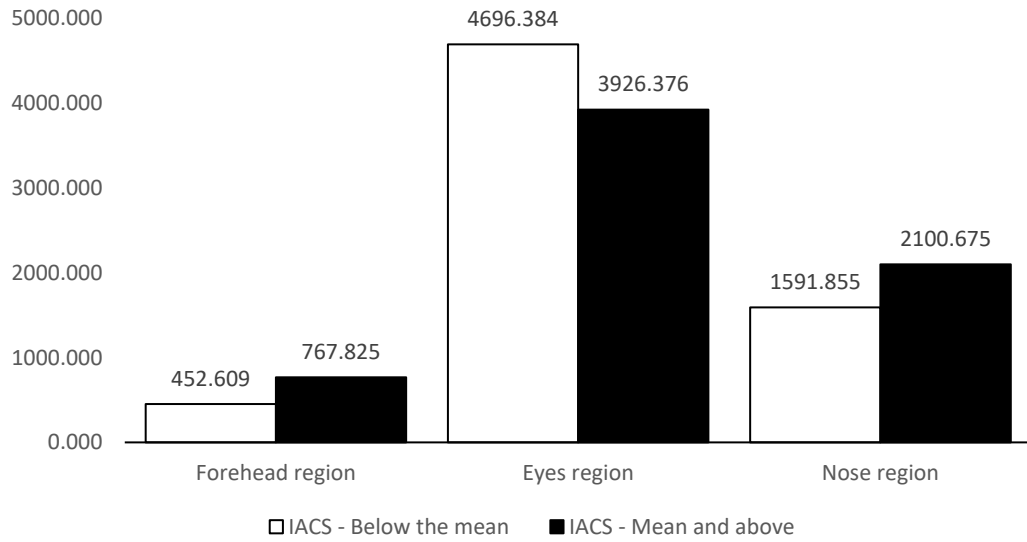
Note: Below the mean n = 68, forehead region SD = 477.920, eyes region SD = 1937.880, nose region SD = 1093.576. Mean and above n = 48, forehead region SD = 776.559, eyes region SD = 1959.679, nose region SD = 1143.041.

For the makeup image, significant differences were found for the eyebrow (t(114) = -2.128, p = .050) and nose (t(114) = -2.104, p = .038) regions. In these cases, those with IACS scores at the mean or above fixated longer on both regions (see Figure 5).

For the digitally modified image, no significant differences existed in regional visual attention between those with IACS scores below or above the mean.

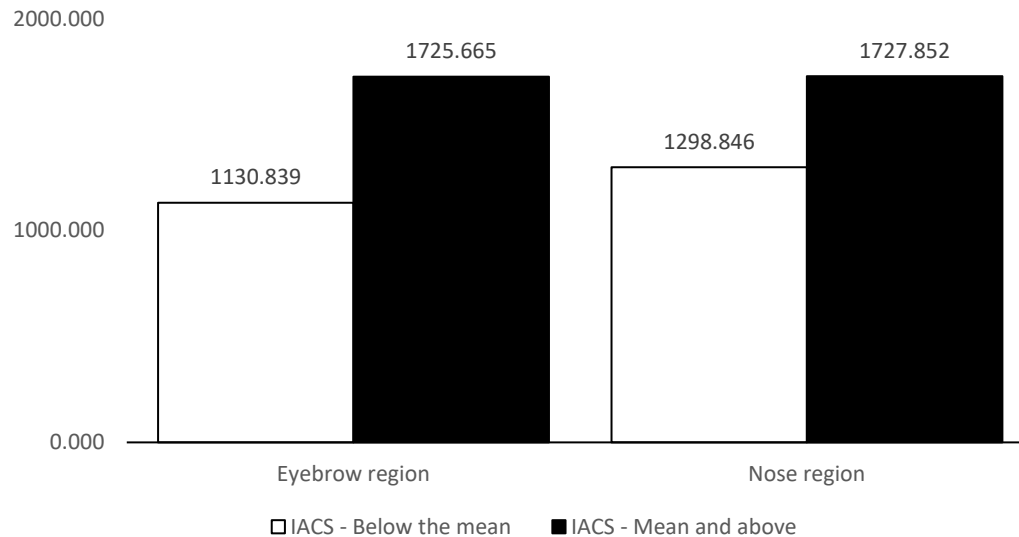**Figure 5:** *Makeup Facial Region Fixation Times, IACS Scores Split Below the Mean and At the Mean and Above*

Note: Below the mean *n* = 68, eyebrow region *SD* = 1205.247, nose region *SD* = 1037.029. Mean and above *n* = 48, eyebrow region *SD* = 1805.165, nose region *SD* = 1142.338.

RQ3b: Differences in facial region visual attention between low and high BASS participants. For the no makeup and digitally modified images, no significant differences existed in regional visual attention between those with BASS scores below or above the mean. However, for the makeup image, fixation time on the eyebrow region approached significance ($t(116) = 1.905$, $p = .059$), such that those with BASS scores below the mean ($M = 1,610.800$ms, $SD = 1601.654$) fixated on the eyebrows longer than their peers with higher BASS scores ($M = 1098.277$ms, $SD = 1319.161$).

RQ3c: Differences in facial region visual attention between low and high FRSS participants. For the no-makeup image, the *t*-test analyses comparing visual attention for low and high FRSS participants were significant for the forehead ($t(116) = -2.498$, $p = .015$) and eye

(t(116) = 2.098, p = .038) regions. In these cases, those with lower FRSS scores fixated on the forehead region longer, but the eye region shorter, than their higher FRSS peers (see Figure 6).

Figure 6: *No Makeup Facial Region Fixation Times, FRSS Scores Split Below the Mean and At the Mean and Above*

Note: Below the mean n = 67, forehead region SD = 721.128, eyes region SD = 1874.749. Mean and above n = 50, forehead region SD = 469.295, eyes region SD = 1994.603.

For the makeup image, the only region that prompted a significant difference in fixation time was the chin (t(114) = -2.582, p = .012), where those with lower FRSS scores fixated on the region for less time (M = 37.264ms, SD = 108.225) than those with higher FRSS scores (M = 136.412ms, SD = 254.895).
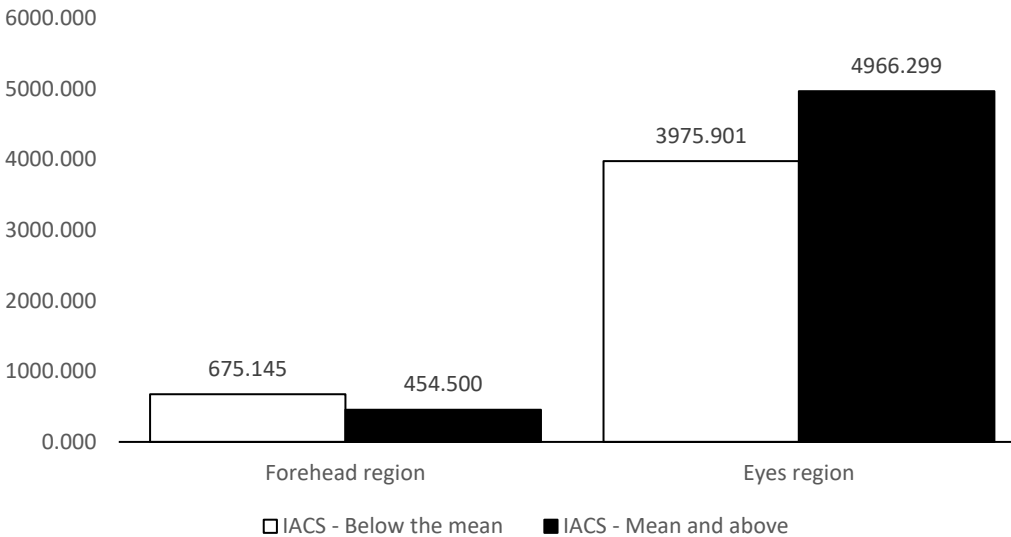
For the digitally modified image, no significant differences existed in regional visual attention between those with FRSS scores below or above the mean.

RQ3d: Differences in facial region visual attention between low and high ACSS participants. For the no makeup, makeup, and digitally modified images, no significant differences manifested between those at lower or higher levels of ACSS.

Discussion

The present study employed various measures to determine an individual's media exposure (MTUAS), body area satisfaction (BASS), facial region satisfaction (FRSS), and cosmetic surgery normative beliefs (ACSS) to determine the relationship between those factors as well as its influence on facial regional visual attention. While media exposure did not provide significant findings, results showed that individuals who use social media and compare themselves with others were a significant factor for those with normalized beliefs towards cosmetic surgery, which was assessed through IACS. No significant Instagram comparison tendencies were related to participants' views of cosmetic surgery acceptability, yet a clear positive increase was observed across all four conditions promoting exploration for future research.

Media Exposure

The MTUAS, which measures isolated social media behaviors in terms of activity, did not provide a significant correlation between social media use and body dissatisfaction. This is supportive of prior research that has observed the act of being exposed to media does not correlate with significant body dissatisfaction, whereas comparison tendencies towards oneself and a beauty standard is a significant factor in becoming dissatisfied with one's body resulting in cosmetic surgery normative beliefs and cosmetic procedures (Day, 2011). Significant body dissatisfaction from viewing media is primarily observed in individuals suffering from underlying conditions such as low self-esteem, depressive mood (Van den Berg et al., 2007), and excessive concerns with specific regions of the body and face, which is the case for individuals suffering from a disorder like BDD (Vashi, 2016). In comparison, prior research

states that body comparison predicts body dissatisfaction in women (Fardouly et al., 2015; Van den Berg et al., 2007), which was assessed in this study through the IACS.

Overall, media exposure was not found to significantly correlate with body area satisfaction, facial region satisfaction, or acceptance of cosmetic surgery. However, the act of comparing one's body and facial features to that of others on social media was significantly linked to both body and facial region dissatisfaction for individuals with higher social comparison tendencies on social media. This correlation is notable as it supports the current study's theoretical framework of social comparison theory concerning body image and social media use.

Additionally, social media exposure was not an impactful factor in assessing the correlation of body and facial region satisfaction in this study. Notably, satisfaction with the body and face were observed to be negatively related to cosmetic procedures and normalizing beliefs about cosmetic surgery. However, it was discovered that both body and facial satisfaction are positively related to one another. With the Instagram appearance comparison scale, individuals who were observed to have increased behaviors in comparing themselves to others were found to have a decreased satisfaction with their own body and face. Meaning one's body area and facial area dissatisfaction (or satisfaction) is positively correlated to one another. This adds additional findings to prior research that has employed the Instagram comparison scale (Di Gesto et al., 2020) as it has been successfully used to assess body and facial region satisfaction in addition to social comparison.

Body Area and Facial Region Satisfaction

To assess the relationship between body area satisfaction, facial region satisfaction, and cosmetic surgery normative beliefs as posited in prior research (Beos et al., 2021; Walker et al.,

2021), the current study used the IACS to assess relationships between these factors. Consequently, observed individuals who were satisfied with their bodies also tended to be satisfied with their faces. Lower satisfaction with either the body or face yielded increased normalized beliefs toward undergoing a cosmetic procedure. Simply stated, body area satisfaction was found to correlate with facial satisfaction and low satisfaction in either the body or facial regions resulting in normalized beliefs towards cosmetic surgery.

Such findings are supported by prior research that has found comparison tendencies in individuals with a high fixation on celebrities (Tijerina et al., 2019), social media influencers (Tolentino, 2019), as well as portrayals of celebrities and other promotions of the beauty ideal (Brucculieri, 2018; Day, 2011). Individuals with an increased focus on measuring up to beauty ideals are more likely to have normalized beliefs about cosmetic surgery due to social comparisons between themselves and others on social media. As a result of substantiating findings from prior research, it is recommended that future research should assess such findings with a population that exhibits high levels of celebrity adoration or behaviors of following trending beauty ideals.

In addition to making social comparisons, a decreased satisfaction towards one's own body and face was observed to be significantly notable among participants' scoring across several scales. The present study found between the IACS and BASS, individuals who scored the highest in IACS experienced less body area satisfaction compared to those with lower scores. Moreover, those who scored the highest in the IACS had lower facial region satisfaction compared to others sampled in the study. As concluded from the results of this study, body area satisfaction was observed to be significantly lower in individuals who scored high on the

Instagram comparison scale. This means that individuals who actively engage in body comparisons on social media were more likely to be dissatisfied with their bodies.

Regarding facial comparisons measured through FRSS, individuals who had the highest scores with comparison tendencies on Instagram also had the lowest scores for facial satisfaction. With acceptance of cosmetic procedures, the Instagram comparison tendencies observed were not significantly impactful towards individuals' desires to undergo a cosmetic procedure, although there was an upward trend heading towards that direction across all four quartiles measured. Future research should assess the upward trend towards cosmetic surgery normative beliefs and its relationship to Instagram comparison tendencies with a larger sample size.

Cosmetic Surgery Normative Beliefs

The design for the current study was based on prior research by Beos et al. (2021) who looked at photo manipulation and its connection to facial dissatisfaction and attitudes and intentions towards cosmetic procedures, and prior research from Walker et al. (2021) who explored whether exposure to images depicting facial cosmetic enhancements increases the desire for elective cosmetic surgery. Furthermore, the present study sought to explore the question of whether differences exist between visual processing behavior among women at differing levels of IACS, BASS, FRSS, and ACSS. To add depth to prior studies and to answer the proposed research questions and hypotheses, the element of eye-tracking was used to provide increased insights where participants' responses to visual stimuli could be assessed and analyzed between various scales used in prior research.

Due to multiple visual stimuli (three images) and conditions (three conditions), eye-tracking data was quite expansive. Eye-tracking results showed that the digitally modified

image presented no significant differences in regional visual attention for ACSS, BASS, FRSS, and IACS.

Across each visual condition, no significant differences were observed for ACSS. As mentioned previously, prior research has noted that positive outcomes may result from social comparison when individuals making a comparison find they share similarities to those they compare themselves with (Collins, 1996). These comparisons include peer and self-comparisons, with researchers noting that when social media filters are applied, it can significantly impact body dissatisfaction leading towards desires for cosmetic procedures (Brucculieri, 2018; da Silva et al., 2021). By viewing a peer-like model instead of a celebrity or other public figure in the beauty world, participants exhibited no significant behaviors towards cosmetic surgery. However, for those who use social media to compare themselves with others (IACS), a trend was observed across all groups of participants showing a positive increase in acceptance of cosmetic surgery. This supports prior findings that upward comparisons can drive personal betterment (Festinger, 1954), and that cosmetic procedures may satisfy that role. Whereas those who may have normative beliefs towards cosmetic surgery, the upward comparisons made by these individuals could have the potential to present negative outcomes as observed in other studies (Swallow & Kuiper, 1988; Vogel et al., 2014). This provides questions for future studies to explore the possibilities and limitations of using modified images for visual assessment as it relates to cosmetic surgery normative beliefs.

For IACS, within the no-makeup image, participants' visual attention was significantly spent in the regions of the forehead, eyes, and nose. For those who had scored high above the mean more time was spent looking at the forehead and nose, whereas the eyes were looked at significantly less. For the makeup image, a general assessment of IACS fixation found more time

was spent fixating on the eyebrow and nose regions, while those with IACS scores at or above the mean spent more time fixating on both regions. For the IACS fixations, the nose and eyebrows presented the most significant facial enhancements. In comparison, no significant differences were observed in regional attention for BASS. These insights provide possible questions for future researchers to explore the possibilities of assessing regions of the face as it relates to makeup enhancements over cosmetic surgery enhancements.

Limitations and Future Research

Limitations presented in the eye-tracking portion of the study included a small sample of digitally modified images. Since the digitally modified enhancements were intended to be subtle and natural-looking it may have impacted the results of the findings of this portion of the study. For example, makeup trends and digitally enhanced images on social media are commonly known to enhance the size and shape of the eyes. However, within this study, the eyes were not enhanced to any degree. As a result, the model appeared relatively normal, which may have allowed participants to focus on the unique individual characteristics of the model shown. It is recommended that future research incorporate varying degrees and conditions of digitally modified images to gauge individuals' viewing behaviors and visual interest relating to modifications applied to female models. Additionally, future research may also consider viewing modified images in comparison to pictures of individuals with facial cosmetic enhancements.

<div align="center">

Conclusion

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Social media use, which has become a constant in individuals' lives, was found not to cause individuals to pursue cosmetic procedures. Rather, comparison tendencies between participants and those they view on social media provide greater significance towards positive

attitudes and behaviors towards cosmetic surgery. Significant findings were observed with individuals who used social media to compare themselves with others —such as their peers— which was measured in the IACS scale. As observed, social comparisons are significantly linked to the body and facial dissatisfaction of individuals with higher social comparison behaviors on social media. These findings are supportive of social comparison theory as it relates to peer comparison, body image, social media use, and social media beauty filters. Although the results from this study did not provide keen insights on elective desires to undergo a cosmetic procedure from viewing visual stimuli, the results support prior research assessing body image and social media use.

Viewing digitally enhanced photos did not provide a significant effect on elective desires to undergo a cosmetic procedure due to cosmetic surgery normative beliefs. However, it was observed across all four conditions that individuals were exhibiting a clear increase in cosmetic surgery acceptability as it relates to Instagram comparison tendencies. Future researchers may look to investigate the strength of upward comparisons and negative outcomes related to facial assessment. In addition, future eye-tracking studies may consider adding additional stimuli, combining the element of facial region assessment through eye-tracking with emotional response through facial expression analysis (FEA), and a post-survey for gauging thoughts and opinions on the stimuli, self-comparison, and personal improvement.

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Media and Technology Usage and Attitudes Scale (MTUAS)

1 = Never to 10 = All the time

How often do you do each of the following activities on social networking sites such as Facebook, Instagram, and TikTok?

1. Check your Facebook, Instagram, or TikTok page.
2. Check your Facebook, Instagram, or TikTok page from your smartphone.
3. Check Facebook, Instagram, or TikTok at work or school.
4. Post status updates.
5. Post photos.
6. Browse profiles and photos.
7. Read postings.
8. Comment on postings, status updates, photos, etc.
9. Click "Like" to a posting, photo, etc.

Body Area Satisfaction Scale (BASS)

1 = Very dissatisfied to 5 = Very satisfied

Please rate how satisfied you are with each of the following regions of your own face.

1. Face (overall face)
2. Forehead
3. Bows
4. Between the brows
5. Eyes
6. Nose
7. Cheeks
8. Lips
9. Region above the lips
10. Corners of the mouth
11. Chin
12. Jawline

Acceptance of Cosmetic Surgery Scale (ACSS)

1 = Strongly disagree to 7 = Strongly agree

Please read each of the following items carefully and indicate the number that best reflects your agreement with the statement.

1. It makes sense to have minor cosmetic surgery rather than spending years feeling bad about the way you look.

2. Cosmetic surgery is a good thing because it can help people feel better about themselves.

3. In the future, I could end up having some kind of cosmetic surgery.

4. People who are very unhappy with their physical appearance should consider cosmetic surgery as one option.

5. If cosmetic surgery can make someone happier with the way they look, then they should try it.

6. If I could have a surgical procedure done for free I would consider trying cosmetic surgery.

7. If I knew there would be no negative side effects or pain, I would like to try cosmetic surgery.

8. I have sometimes thought about having cosmetic surgery.

9. I would seriously consider having cosmetic surgery if my partner thought it was a good idea.

10. I would never have any kind of plastic surgery.

11. I would think about having cosmetic surgery in order to keep looking young.

12. If it would benefit my career I would think about having plastic surgery.

13. I would seriously consider having cosmetic surgery if I thought my partner would find me more attractive.

14. Cosmetic surgery can be a big benefit to people's self-image.

15. If a simple cosmetic surgery procedure would make me more attractive to others, I would think about trying it.

Instagram Appearance Comparison Scale (IACS)

1 = Never to 5 = Very often

Please read each statement carefully any statement relating to your Instagram account mark your answer for each one.

1. When I use social media, I compare my physical appearance to that of others.
2. When I use social media, I compare my clothing to that of others.

3. When I use social media, I find that I compare my body shape to that of others.

4. When I look at photos, videos, and/or direct stories of people <u>I follow</u> on social media, I compare my body to theirs.

5. When I look at family members' photos, videos, stories, and/or live streams that <u>I follow</u> on social media, I find I compare my body to theirs.

6. When I look at photos, videos, stories and/or live streams of individuals that <u>I associate with regularly and follow</u> on social media, I find that I compare my body with theirs.

7. When I look at photos, videos, stories, and/or live streams of individuals that <u>I follow on social media but with whom I do not regularly associate with</u>, I compare my body to theirs.

8. When I look at photos, videos, stories, and/or live streams of individuals <u>I know and regularly associate with but do not follow on social media</u>, I compare my body with theirs.

9. When I look at celebrities (actors, musicians, sportsmen, modes, etc.) that I follow on social media, I compare my body to theirs.

10. When I compare my body to that of people <u>I follow</u> on social media, I happen to feel worse about myself.

11. When I compare my body to that of family members who <u>I follow</u> on social media, I happen to feel worse about myself.

12. When I compare my body to that of individuals that <u>I follow on social media</u> and with whom <u>I associate with regularly</u>, I happen to feel worse about myself.

13. When I compare my body to individuals that <u>I follow on social media</u> and with whom I <u>do not associate with regularly</u>, I happen to feel worse about myself.

14. When I compare my body to individuals whom I <u>do not follow</u> on social media and who I <u>do not associate with regularly</u>, I happen to feel worse about myself.

15. When I compare my body to that of celebrities (actors, musicians, sportsmen, models, etc.) who <u>I follow</u> on social media, I happen to feel worse about myself.