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MIRROR MIRROR ON THE WALL: DOES THE USE OF FILTERS ON SELFIES INFLUENCE WOMEN'S MAKE-UP PURCHASE BEHAVIOUR?

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Mirror mirror on the wall: does the use of filters on selfies influence women's make-up purchase behaviour?

Abstract: Social media has become an important part of society and is commonly used as a way of self-presentation, where people post selfies, many times manipulated by filters. This research predicted that the use of filters in selfies would lead to women's lower state self-esteem, once the image created does not correspond to reality, which would in turn would induce higher make-up purchase intention in order to bring that desired self to life. After analysing data through parametric, non-parametric tests, ANCOVAs and a mediation process, it was concluded that the use of filters does not have an impact on women's state self-esteem nor in their purchase intention of make-up. Lastly, managerial implications are discussed based on the findings.

Keywords: Consumer behaviour; Beauty; Filters; State self-esteem; Make-up

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1. Introduction

Worldwide internet users spend on average 145 minutes per day on social networking (Statista 2021). This number has had an increase of 62,5% since 2012, where 90 minutes were the daily time spent navigating social media (Statista 2021). When compared to conventional mass media, the social media allows interaction through information and photo sharing with other users, where individuals create their own personal profiles (Stefanone, Lackaff, and Rosen 2011). While posting photographs via online social media, many people carefully choose the information related to the self and intentionally manipulate the images to present themselves (Kim and Tussyadiah 2013).

The phenomenon of strategic self-presentation was substantially promoted by social media applications such as Instagram, by allowing users to enhance the quality of their photos (Hancock and Toma 2009). Self-presentation can be defined as the influence one has regarding the impressions formed by an audience about the self, by controlling the information given (Schlenker and Wowra 2003). Hancock and Toma (2009) state that self-presentation involves the editing and adjusting of the self to create a favourable desired impression, believing that individuals who use social media often present the most attractive versions of themselves.

There are several motivations for people using social media: getting in contact with new people seems to be the most important reason, followed by keeping in touch with friends and general socializing (Hutchison and Mitchell 2009). However, there are gender differences when it comes to the reasons for using social media (Krasnova et al. 2017), since women work harder on their profiles when it comes to physical beauty (Manago et al. 2008), while men are more likely to promote their work (Smith 2013) - this is one of the reasons that led this study to be focused on women. The most common way used for self-presentation by social media users is taking and uploading selfies (Mills et al. 2018). The era of photo manipulation was led by the

desire of people to present themselves as flawless, and thanks to filters it is possible for someone to enhance their facial features instantly (Sung et al. 2016; Kim and Li 2020).

Hence, the use of social media leads to a greater preoccupation and focus on physical appearance (Cohen, Newton-John, and Slater 2017). However, there is a common mismatch between the physical appearance of someone and their photos on social media, which increases significantly when filters – that manipulate the photos - are used (Kim and Li 2020). Women, when compared to men, have more motivation to create a positive self-presentation on their social media profiles, engaging in more photo-enhancement behaviours (Haferkamp et al. 2012). Approximately 62,2% of young women admit engaging in selfie editing *sometimes* and *very often* (Cohen, Newton-John, and Slater 2018) and according to Statista (2021), 84% of 13 years-old Brazilian female teenagers used filters of apps to change their appearance in photos.

Research has been made regarding manipulated selfies being associated with greater intentions to undergo a facial cosmetic procedure (Beos, Kemps, and Prichard 2021). This phenomenon, that leads people to request procedures to resemble their manipulated image has been referred to as "Snapchat Dysmorphia" (Hunt 2019). In addition, there are studies that report a relation between social media use and body-image related outcomes (Holland and Tiggemann 2016). This review found that the use of social media was associated with greater body dissatisfaction and body concern. However, the emergence of filters on selfies on social media platforms demands deeper research within the area of state self-esteem and highlights the lack of critical insights into the role of filtered images in social media practices (Leclercq 2016). Kim and Li (2020) refer that "It is an ongoing discussion whether the impacts are positive or negative on self-esteem and self-worth with use of these apps. The biggest problem is people are failing to remember what they actually look like". A question arises: may this inconsistency between one's true facial appearance and their manipulated photos lead to lower state self-esteem in women? And do women try to fill that gap through the purchase (and consequent use) of make-

up? A great part of women's self-esteem is focused on appearance, and many use make-up to improve their looks according to societal beauty ideals (Miller and Cox 1982). Women have the tendency to evaluate and value themselves based predominantly on appearance, rather than other, internal qualities of the self (Fredrickson and Roberts 1997). The objectification theory bases itself on a premise that women often see their outer appearance as objects that are continually monitored and evaluated by others (Fredrickson and Roberts 1997). Hence, women constantly evaluate their bodies and, as a consequence, have negative feelings of their outward appearance (Fredrickson et al. 1998).

Having this in mind, the aim of this research is to study whether taking filtered selfies affects women's make-up buying behaviours, due to lower state self-esteem regarding their real image. To my knowledge, there is yet no research regarding the relationship between the use of enhanced selfies by women and their state self-esteem, leading to greater intentions to buy make-up, in order to bring that desired self to reality. This research will contribute to the understanding of these relations and will be useful to provide managers with information, so that they can better target their customers and position their brands, as they will provide the consumers with the right products to attain the desired image that the filters provide.

2. Literature Review

2.1 Social media as a representation of the self

Self-presentation is defined as the use of tactics to convey one's impression, disclosing information in a controlled way (Goffman and Erving 1959). Social media platforms allow individuals to represent themselves to a great number of friends or followers, in a selective way (Zhao, Grasmuck, and Martin 2008). Technological advancements provided people the opportunity to compose, edit and send contents, making it easier to emphasize positive self-images and desirable impressions of themselves (Hancock and Toma 2009). Social media users

engage in selective self-presentation when they choose to upload images where they believe they look attractive or ideal (Bergman et al. 2011). One of the most popular forms of online self-representation is selfie-posting (Chua and Chang 2016). A selfie is defined as "a photograph that one has taken of themself, typically with a smartphone or webcam and shared via social media"(Oxford Dictionary). In contrast to regular photographs, selfies are not taken as a way of preserving a memory, but instead to post on social media platforms for other users to view them (Çadırcı and Güngör 2019). Self-presentation strategies involve hiding or supplanting certain personal information to be consistent with the self they aspire to be (Kelly and McKillop 1996). If users intend to seek admiration from others, selfies exhibit a positive identity, showing attractive self-images (Sung et al. 2016). These strategies are commonly applied by social media users since many platforms such as Instagram allow them to edit their pictures in order to best present their appearance (Hong et al. 2020). In fact, researchers found that attracting attention, being acknowledged by others, and gaining self-confidence from other users' interactions are the main motivations for posting selfies (Sung et al. 2016). To be able to enhance one's attractiveness in physical appearances, selfies are regularly posted with additional filters (Hong et al. 2020). For instance, the greatest part of selfie postings on Chinese social media include modification of appearance, which leads to the belief that rather than a common self-presentation tactic, selfies are a presentation of the "ideal-selves" (Ma and Yang 2016).

2.2 The use of filters on selfies

Photo editing was almost exclusively for professionals that used expensive software editing tools, until nowadays, with the advances of artificial intelligence (AI) that allows photo enhancement in the various social media platforms (Tremblay, Essafi Tremblay, and Poirier 2021). The emergence of selfie filters initially produced playful forms of editing (i.e., dog face filter), that later shifted to subtler forms of editing, making the modification not always clear,

leading users to frequently asking what people really look like (Lavrence and Cambre 2020). The visibility created by posting pictures on social media leads to vulnerability, which filters may help to manage – "for example, women describe sending men filtered selfies when they do not have makeup on" (Lavrence and Cambre 2020).

A study conducted by Bakhshi et al. (2015) found that filtered photos have a 21% higher possibility to be viewed and are 45% more likely to be commented on. Most filters narrow users' noses, lighten and smooth skin (slightly blur faces to make facial features more difficult to discern), remove wrinkles and make lips fuller, which leads to wondering about the depersonalizing and homogenizing effects of filters (Lavrence and Cambre 2020). When compared to male social media users, females were found to engage more in taking selfies - personal and group – cropping photos and using filters (Dhir et al. 2016), another reason for focusing this research on women only. 90% of women between 18 and 30 years report to sometimes using a filter when posting a selfie, and out of these, more than 50% admit that they filter their photos half of the time or more (Gill 2021). Previous research conducted by Kleemans et al. (2018) found that girls aged between 14 and 18 years old reported lower body satisfaction when exposed to manipulated Instagram selfies of others, when compared to the display to non-manipulated photos, leading to the question: is women's state self-esteem affected negatively as well, when using filters on their own selfies ?

2.3 The effects of social media and filters on women's self-esteem

Rosenberg (2015) defines self-esteem as "an individual's self-evaluation of oneself". It indicates the way people feel and think about their value, worth, importance or abilities (Rosenberg 2015). Nonetheless, situational factors may lead to momentary changes in the way how individuals evaluate themselves (Baumgardner, Kaufman, and Levy 1989). James (1990) highlighted that people's overall sense of self-esteem derives from averaging feelings about themselves throughout different social situations, while momentary self-esteem might be

context dependent. The concept of state self-esteem emerges from this notion that self-esteem can be temporarily altered (Heatherton and Polivy 1991).

Previous research has investigated how social networks may influence individual's self-esteem: when using social media, women strive for unrealistic standards of beauty, causing them to feel ashamed when they are not able to achieve it (Kim and Chock 2015). When users desire to boost their self-esteem, they engage in uploading selfies more frequently, and women aged between 16 and 25 years old can spend up to 5 hours weekly taking selfies and posting them on social media (Pounders, Kowalczyk, and Stowers 2016). Individuals engage in taking, selecting, and editing selfies so they can present the better version of themselves (Chua and Chang 2016). This suggests that selfies, when compared to photographs taken by others, are preferred regarding self-representation, leading to positive illusions of oneself which helps to construct positive feelings about self-image and satisfy the desire to perceive one's worthiness (Chua and Chang 2016).When compared to men, women were found to post photos on social media more frequently and have the tendency to spend more time updating, managing, and maintaining their personal profiles (Stefanone, Lackaff, and Rosen 2011). It was found that women who were concerned with selfie feedback have greater body image disturbance (Butkowski, Dixon, and Weeks 2019). Appearance pressure on women has been intensifying due to filters and photo editing, since the standards of what is a good enough picture to post have been raising (Gill 2021). In the last years, women have struggled by comparing themselves to flawless celebrities and models, but they now have to deal with their fake selves in social media (Kim and Li 2020). Taking and retouching selfies might become a risky behaviour since it may have the potential of negatively impacting the body image of young women (Mills et al. 2018): thus, the conclusion to this study showed that the fact that women were able to modify and retouch their photos did not result in better feelings regarding themselves, after posting it on social media.

The combination of all this information impelled two thoughts. The first one is that state self-esteem may be impacted differently when retouching a photo (oneself edits what they want to improve) or using a filter (the effect is already there prior to taking the picture). The second one is how do women cope with the impacts of such filters on their state self-esteem: this research has the intent of understanding if they will resort to make-up products to compensate this gap.

2.4 Wearing makeup as self-esteem booster

Facial attractiveness has an influence on how subjects evaluate overall physical attractiveness, as well as social desirability (Nielsen and Kernaleguen 1976). The application of cosmetics is one of the most relevant strategies women use to increase their perceived facial attractiveness, allowing them to conform to feminine beauty standards through the artificial modification of the appearance of facial features (Korichi et al. 2008). People perceive women who wear makeup as healthier and more confident, implying potential for greater earnings (Nash et al. 2006). However, Korichi et al. (2008) believe that makeup can act as "camouflage" when women are more anxious, defensive, and unstable or as "seduction" when they have more sociable, extroverted, and assertive traits. The usage of makeup has an influence on women's self-esteem, social interaction, performance, and physical attractiveness: it boosts acceptance, confidence, and respectful feelings towards themselves (Al-Samydai et al. 2021). The positive stimulations of the three senses that make-up provides (touch, smell and sight) can induce psychological pleasure (Korichi et al. 2008). A study conducted by Cash, Walkercash, and Dominion (1982) suggest that, on a self-perceptual side, there is a correlation between the use of cosmetics and better feelings of social confidence, body image and effectiveness: subjects described being more self-confident and sociable when wearing their usual cosmetics as opposed to not wearing. It is also proposed that physical appearance is partially self-created, probably according to situational norms, self-presentational goals for social image, body image and mood states (Cash, Rissi, and Chapman 1985).

3. Hypotheses

Taking into consideration what was previously discussed, the hypotheses for this study are formalized as follows:

H_1: Taking selfies with filters (vs. not using filters) would lead to lower self-esteem amongst women.

H_2: Women's lower state self-esteem, resulted from taking selfies with (vs. without) filters, increases make-up purchase intention.

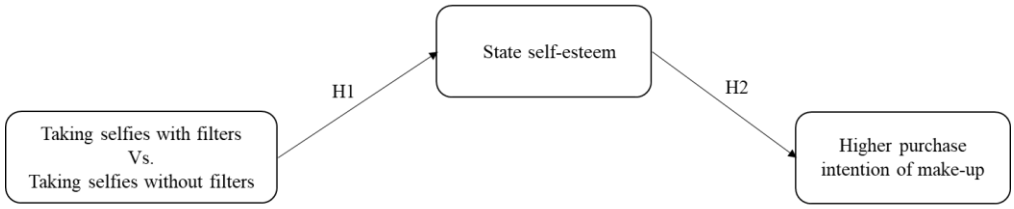

Figure 1 Overview of the conceptual framework

4. Methodology

4.1 Sample

The sample consisted of 263 participants ($N = 263$) that were randomly assigned to one of the two groups of the independent variable, i.e taking a selfie with filter or taking a selfie without filter, in order to have a balanced number of participants in each group. All participants are female, as it was a pre-requisite to answer the survey. Regarding age distribution, a major concentration was found in the 21-30 year-old group, which represented 77.3% of the total sample, followed by 18-20, 31-40, 41-50 and >50 age groups that indicated a 15%, 5.5%, 1.8% and 0.5% distribution respectively (see appendix 2.1). Furthermore, 61.8% of the participants live in an urban zone, 21.8% in a suburban zone and 16.4% in a rural zone (see appendix 2.2).

4.2 Design and Procedure

To test the hypotheses, the experimental method of single factor 2 (taking a selfie with filter vs. no filter) between-subjects design was used. Participants were asked to answer a survey (see appendix 1), where they were randomly assigned to taking a selfie with or without filter. In the first block of the survey (see appendix 1.1), subjects were assured that their data would be collected anonymously and that the picture they were asked to upload would be used for academic purposes only and would be destroyed after the end of this research. Participants checked that they understood the information given and confirmed to be females and older than 18 years old.

For the filter condition a brief explanation was given, regarding the type of filter they were expected to use, i.e., beauty filters instead of fun filters (see appendix 1.4). All participants were then asked to answer some questions about their appearance self-esteem at that moment, followed by their purchase intention on various make-up items. Furthermore, they were required to give their opinion on other topics such as which make-up products they already owned, their selfie behaviours, how they feel when using filters and their self-esteem on their physical appearance as a whole. All the items used for measuring these scales will be described in detail below.

State self-esteem: in order to measure participants' state self-esteem and inspired by Heatherton and Polivy's (1991) State Self-esteem Scale, they were shown 4 sentences about how they were feeling at that moment (after taking the selfie): "I feel satisfied with the way my face looks right now"; "I feel good about myself"; "I am pleased with my appearance right now" and "I feel unattractive" (which was later reverse coded). Participants were asked to rate their opinion regarding those sentences on a 7-point scale (1- "Not at all"; 7- "Extremely") (see appendix 1.5).

Make-up purchase intention: subjects were inquired whether they would buy different make-up products in the following couple of months. These 8 products (foundation, concealer, blush/bronzer, eyeshadow, eyeliner, mascara, and lipstick/lip gloss) are considered the basics of make-up. A brief explanation regarding each product was given, so that participants could imagine the final effect of each of those products on the way they look, e.g., "Foundation is a liquid or powder makeup applied to the face to create an even, uniform colour to your skin, cover flaws and, sometimes, to change the natural skin tone". They were then asked to rate their opinion regarding the purchase of each item on a 7-point scale (1- "Strongly disagree"; 7- "Strongly agree") (see appendix 1.6).

Control variables: Lastly, the different characteristics of the individuals were measured. The first control variable is *products owned*, where participants were asked to check the products they already owned, since there might be an interference in their intention of buying products if they already possess them. The items for this variable are: foundation, concealer, blush or bronzer, eyeshadow, eyeliner, mascara and lipstick or lip gloss (see appendix 1.7). In the second control variable, *selfie behaviours*, individuals were required to indicate the frequency of some behaviours on a 7-point scale (1-"Never";7-"Always"), such as how often they use filters when taking selfies, if they think the selfies taken with filters reflect their true appearance and if they would like their real-life appearance to be similar to the selfies with filters. These behaviours may have also affect the relationship amongst the independent variable (using filter vs not), the mediator (state self-esteem) and the dependent variable (make-up purchase intention): for example, if subjects believe the selfies taken with filters reflect their true appearance, that may mean their *state self-esteem* is not affected and consequently have no intention of buying make-up. In the *feelings* variable, participants were also asked about what they felt when taking selfies (fun, creative, enjoy the process) and about what other reasons lead them to taking selfies with filters, meaning there might exist other motives for using filters besides beauty. In addition, the

physical appearance control variable was measured on a 7-point scale (1- "Strongly disagree";7- "Strongly agree"). It regards subjects' opinion on their appearance, by using Crocker and Wolfe's (2001) Physical Appearance Subscale of the Contingencies of Self-Worth. The scale items are: "My self-esteem does not depend on whether or not I feel attractive "; "My self-esteem is influenced by how attractive I think my face or facial features are"; "My sense of self-worth suffers whenever I think I don't look good"; "My self-esteem is unrelated to how I feel about the way my body looks" and "When I think I look attractive, I feel good about myself". Lastly, *age* and *residence* were also considered as control variables.

5. Data Analyses

5.1 Outliers and Missing Data

SPSS (version 28) was the chosen software to analyse the data. Firstly, participants were removed when crucial data to measure the dependent variable was missing. In total, 43 individuals were excluded, which resulted in the 220 responses leading the data set ready for further analysis. Regarding the outliers' analyses, in the *state self-esteem* variable, 11 outliers were found in the item "I am pleased with my appearance right now" (see appendix 3.1). There were no outliers in the *make-up purchase intention* variable (see appendix 3.2). In the control variable *selfie behaviours*, in the item "I think the selfies I take with filters reflect my true appearance", 4 outliers were found (see appendix 3.3). Regarding the control variable *feelings*, no outliers were found (see appendix 3.4), however, in the *physical appearance* variable, 11 outliers were found in the item "My self-esteem is influenced by how attractive I think my face or facial features are" (see appendix 3.5). Despite existing, the outliers found were not eliminated, in order to preserve the sample size, since all variables were measured on a closed 7-point scale. These outliers did not change the results and did not violate any assumptions for the further analyses.

5.2 Reliability Analyses

In order to check the consistency of the scales used, a reliability analysis was conducted. For a scale to be considered reliable, Cronbach's alpha should be ideally bigger than 0.7 (DeVellis and Thorpe 2003). In the *state self-esteem* scale, the 4th item "I feel unattractive" was reversed before checking for reliability, since it was negatively worded (Pallant 2020), as well as items 2 and 3 from the *physical appearance* scale. All the scales resulted in a Cronbach alpha coefficient equal or above to 0.7, except the *selfie behaviours* scale (Cronbach alpha = 0.558) (see appendix 4.3) and the *physical appearance* scale (Cronbach alpha = 0.573) (see appendix 4.5). Whenever a scale has less than 10 items, Cronbach alpha values can be small (DeVellis and Thorpe 2003). On the first case, the scale has very few items (only 3) and deleting one of them would not have a significant impact on the Cronbach alpha coefficient. However, another way of verifying reliability lies in the mean inter-item correlation (DeVellis and Thorpe 2003), which has a value of 3.1 and lays in the optimal range (0.2 and 0.4) presented by Briggs and Cheek (1986). Thus, on the second case, the item "When I think I look attractive, I feel good about myself" was deleted, in order to increase the reliability of the scale, leading to a Cronbach alpha coefficient to 0.741, which makes this scale reliable.

5.3 T-test and Mann-Whitney

The independent variable *filter* was dummy-coded (0 = No filter; 1 = Filter) and the items "I feel satisfied with the way my face looks right now", "I feel good about myself", "I am pleased with my appearance right now" and "I feel unattractive" (reverse-coded), were averaged to form a composite index of *state self-esteem* (as a dependent variable). Applying the same rationale, all the items related to participants' willingness to buy make-up were averaged to form a composite index of the *make-up purchase intention* (dependent variable).

In order to verify whether there is a significant difference between the two groups (using filter vs control), two independent-samples T-tests were performed: if the p value is equal or less

than .05, the difference is significant. Assumptions for this parametric technique such as the homogeneity of variance were verified. The normality was not tested since the groups are composed by more than 30 participants and according to the Central Limit Theorem the sample tends to be normally distributed.

Results in the first T-test presented that participants that took a selfie with filter, when compared to the ones that did not use it, do not have significant less state self-esteem ($M_{filter} = 4.87$ vs. $M_{no\ filter} = 4.66, t(218) = -1.28\ , p = .20$) (see appendix 5.1).

The same happened in the second T-test, where it was possible to check that participants in the filter group did not seem to have higher purchase intention when compared to those in the control group, once there was no significant difference in scores ($M_{filter} = 3.60$ vs. $M_{no\ filter} = 3.64, t(218) = .23\ , p = .82$) (see appendix 5.2).

To get a better insight of the obtained results, more tests were performed to compare the multiple items of *state self-esteem* and *make-up purchase intention*, for the two different groups of participants. The non-parametric Mann-Whitney test was used, since the items from the dependent variables are ordinal (Marôco 2021). However, the p values found were always greater than .05, meaning there is no significant difference between the participants who used filters and the ones who did not (see appendix 5.3).

Concerning the four items of the *state self-esteem* scale, results indicate that there are marginally significant differences regarding the item "I feel satisfied with the way my face looks right now", ($Z = 1.83; p = .067$), revealing that participants that took a selfie with filter ($M_{rank} = 118.49; n = 104$) are more satisfied with the way their face looks at the moment than those who did not use a filter when taking the selfie ($M_{rank} = 103.34; n = 116$). However, the same was not verified for the other items in the *state self-esteem* variable (see appendix 5.4).

In addition, the last Mann-Whitney test performed compared all items of the *make-up purchase intention*, for each of the groups of participants. The item with the highest difference between the two groups was purchase intention of lipstick or lip gloss. It is possible to verify that participants that did not use filter ($M_{rank} = 104.77; n = 116$) have lower willingness to buy lipstick or lip gloss than participants that took a filtered selfie ($M_{rank} = 116.89; n = 104$). Despite this, results show that the differences are not statistically significant ($Z = 1.43; p = .153$) (see appendix 5.5).

5.4 One-way ANCOVA: State self-esteem and Make-up purchase intention

Succeeding the T-tests and Mann-Whitney, two one-way ANCOVAs were performed, to better explore the differences between the groups (use of filter vs control), while controlling additional variables (control variables) that are suspected to have an influence on the dependent variables (Pallant 2020). The control variables for the analyses of covariance (ANCOVA) were previously mentioned: all items from *products owned*, *feelings*, *physical appearance*, *age* and *residence*. Assumption of normality is reported in the T-test and the homogeneity of variances is verified for both dependent variables in study (*state self-esteem* and *make-up purchase intention*) in the Leven's Test of Equality of Error Variances.

The first ANCOVA has as dependent variable *state self-esteem*. It is possible to conclude that there is not a significant difference in the *state self-esteem* scores for participants who used a filter when compared to subjects who did not use it ($M_{filter} = 4.79$ vs. $M_{no\ filter} = 4.73$, $F\ (1, 218) = .15, p = .698, \eta^2 = .001$), even after controlling for individual differences. However, it is possible to check that both *feelings* ($p = .016$) and *physical appearance* ($p < .001$) were significant predictors of *state self-esteem*, meaning that these covariates and the dependent variable (*state self-esteem*) have a significant relationship. In fact, the *physical appearance* explained 13.1% of the variance of *state self-esteem* (see appendix 5.6).

The second ANCOVA has as dependent variable *make-up purchase intention*. The items related to the *state self-esteem* variable were also added as covariates in order to check their relation with the dependent variable. Just as the previous test, the conclusion is that there are no significant differences in *make-up purchase intention* between the groups of participants ($M_{filter} = 3.60$ vs. $M_{no\ filter} = 3.65$, $F\ (1, 218) =\ .10,\ p = .756,\ \eta^2 = .000$). On the other hand, results showed that the items *Foundation* ($p = .058$) and *I feel satisfied with the way my face looks right now* ($p = .056$) were marginally significant predictors of *make-up purchase intention*, implicating a marginally significant relationship between these covariates and the dependent variable (see appendix 5.7). Overall, these results corroborate the findings of the T-tests and Mann-Whitney.

5.5 Mediation Analysis

After the conclusions taken from the previous tests, it would not make sense to run a mediation analysis with the variable *state self-esteem* as the mediator, since it is known that the independent variable (using filter vs. not using filter) does not have a significant impact neither on *state self-esteem*, nor *make-up purchase intention* (dependent variable) (Baron and Kenny 1986). However, with the results from the Mann-Whitney test showing the marginally significant differences between the groups, regarding the item "I feel satisfied with the way my face looks right now", and the ANCOVA for the *make-up purchase intention* showing a marginally significant relationship with this item as well, a mediation analysis (model 4) (Hayes 2013) was conducted in order to check if the effect of the independent variable (using filter vs. not using filter) on the dependent variable (*make-up purchase intention*) was mediated by the item of *state self-esteem* "I feel satisfied with the way my face looks right now".

The path from the independent variable (using filter vs. not using filter) to the mediator ("I feel satisfied with the way my face looks right now") (*a* path) is significant ($\beta = .44, SE = .20, t = 2.19, p = .0298$). In addition, the path from the mediator to the dependent variable (*make-up*

purchase intention) is only marginally significant ($\beta = .11,\ SE = .06, t = 1.95, p = .0525$) ($b$ path). All in all, the indirect effect of the item "I feel satisfied with the way my face looks right now" on *make-up purchase intention* was not significant ($95\%\ CI: .1309; .0021$) ($a \times b$) since the bootstrap confidence interval includes zero (see appendix 5.8). The direct effect of the mediation (from the independent variable to dependent variable) is not significant ($\beta = .01, SE = .17, t = .05, p = .9563$) (c path).

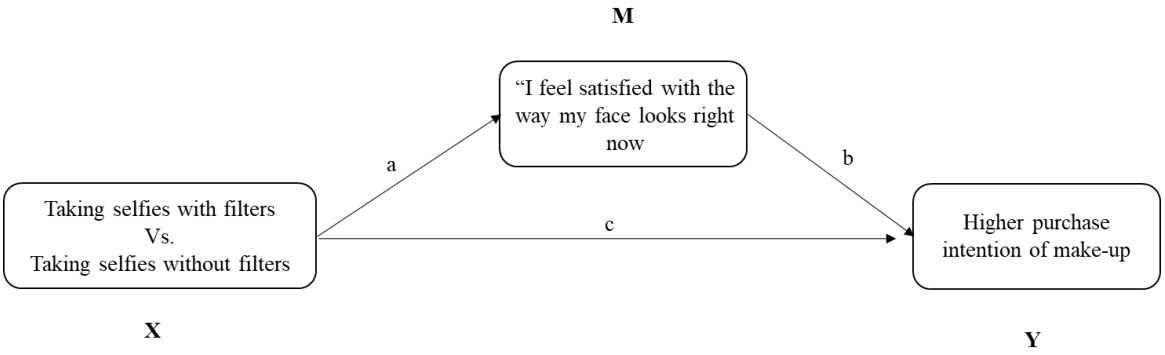

Figure 2 Mediation Analysis Model 4

6. General Discussion

6.1 Summary of findings

The findings of the present study show that the predicted hypotheses were not found to be true, meaning there is no relation between the use of filters in selfies and make-up purchase intention in women. Despite the difference in the means being small, the control group (not using filters) surprisingly showed even a slightly lower *state self-esteem* than those who did use a filter, when the expectations were exactly the opposite. The same conclusion may be taken, regarding *make-up purchase intention*. No significant differences were found in the means for this variable between the control group and the group that took a selfie with filter. However, one result that stood out were the marginally significant differences regarding the item "I feel satisfied with the way my face looks right now", that showed that the participants who took a selfie with a

filter were more pleased with their face at that moment, than those who did not use a filter. It makes sense that this was the item that stood out, since it was the only item on *state self-esteem scale* that evaluated the facial features exclusively (see appendix 1.5), which is where filters act on. The reason for this opposite direction of what was expected (i.e., it was higher for individuals that used a filter when it was expected to be lower) might be related to the fact that what was being evaluated was *state self-esteem*, rather than self-esteem in the long run. This will be discussed in more detail in the Limitations and Future Research Directions section.

ANCOVA analyses were then performed, in order to have a deeper look at the relationship between the independent (using filter vs. not using filter) and the dependent variables (*state self-esteem* and *make-up purchase intention*). Once again, no significant differences between the subjects from the two groups were found, even when controlling for individual differences (each item of *products owned*; the averaged items from *feelings* and *physical appearance*; *age* and *residence*). Nonetheless, a significant relation between *state self-esteem* and the covariates *feelings* and *physical appearance* was found. These findings may be due to the similarity of what the scales for *state self-esteem* and *physical appearance* evaluate, which are considerations that individuals have of themselves. *Physical appearance* included items based on the Contingencies of Self Worth Scale (Crocker and Knight 2005) where participants were led to analyse their perception on their appearance. Regarding the *feelings* variable, it may be due to the fact that individuals who have higher *state self-esteem* find other reasons to take selfies with filters beyond facial beauty, such as feeling fun, creative and enjoying the process. Moreover, when ANCOVA was performed with the variable *make-up purchase intention* as a dependent variable, the individual items from the *state self-esteem* scale were added as covariates. Results showed that both *Foundation* and the item "I feel satisfied with the way my face looks right now" were marginally significant predictors of the willingness to buy make-up.

These results led to the idea that the item "I feel satisfied with the way my face looks right now" could potentially be studied as a mediator, instead of the variable *state self-esteem*. In order to take conclusions, a Hayes Mediation Process, model 4 was performed, being the independent variable the use of filters vs. control, the mediator being the item "I feel satisfied with the way my face looks right now" and the dependent variable *make-up purchase intention*. Despite this attempt, the conclusion was that the indirect effect of the item "I feel satisfied with the way my face looks right now" was not significant on the dependent variable. It is, however, significant, the path from the independent variable (using filter vs. control) to the mediator - which corroborates with the findings from the Mann-Whitney – and it is possible to assume that it is also significant from the mediator to the dependent variable (*make-up purchase intention*). However, the coefficient of this second relation is negative, meaning the higher the mediator (the more satisfied women feel with the way their face looks at that moment), the lower their willingness to buy make-up.

6.2 Managerial Implications

Based on the findings of this study, some recommendations may deserve attention from managers. Despite the analyses made not confirming the suggested hypotheses, previous research shows that the use of filters when taking selfies is a very common practice amongst women (Gill 2021). It is also known that women often compare themselves to flawless celebrities (Y. A. Kim and Li 2020) and strive for unrealistic standards of beauty (Kim and Chock 2015). With the research, it was also possible to conclude that the use of filters has a positive effect on the satisfaction of subjects with the way their face looks, which has a marginally significant impact on their intention of buying make-up.

In this sense, and gathering the information stated, a suggestion for managers would be to make use of influential women, especially on social media, to advertise their products. One idea would be for brands to come up with a filter that reflected the effect of their make-up products,

all together and applied in a certain way. Celebrities would then be invited to post two selfies: one without make-up but using the brand's filter and another one without the filter but using make-up from the brand. This is supposed to show women that they can indeed bring to reality the effect of the filters if they use the right make-up items and know how to apply them strategically. This would likely lead to an increase in the sales of those make-up products, specially from the women that felt satisfied with the effects of the filter. In addition, since previous studies show that filtered selfies have been leading to greater intentions to undergo facial cosmetic procedures (Beos, Kemps, and Prichard 2021) and this phenomenon was even named "Snapchat Dysmorphia" (Hunt 2019), there might exist a window of opportunity for managers to take advantage of this occurrence and emotionally advertise their products as bringing to reality the desired effect of filters. Brands that boost this action may benefit from what is called "First Mover Advantage", leveraging their products in a market by being the first to establish (Lieberman and Montgomery 1988). On the other hand, in order to attract customers with higher state self-esteem that have lower make-up purchase intention, communication should be done towards the further benefits that the products might offer. In this case, to clearly establish the points of parity that must be met so that the consumers perceive the product as a legitimate and credible (Keller, Sternthal, and Tybout 2002) (e.g., "this foundation will create an even, uniform colour to your skin and cover flaws"), but also highlighting the points of difference, which are the favourable, strong and unique associations that distinguish a brand from others (e.g., "this foundation also has a fragrance and hydrates your skin").

7. Limitations and Future Research Directions

There are several limitations in this study. To begin with, the data was collected from direct message to women through social media platforms such as Facebook and Instagram. This may have an impact since many of these women are acquaintances, may have shared information about the survey, were mostly Portuguese and 77% were from the same age group. Therefore,

a more diverse sample could be beneficial to have a wider variety of responses. Secondly, it is likely that people who usually use filters were allocated to taking a selfie without filters that day and the other way round as well, which may have an impact on their answers to the subsequent questions. There was an attempt to study this with a covariate (*selfie behaviours*). However, this control variable did not enter the ANCOVA analyses for not being a reliable enough scale. For future research it is suggested doing a longitudinal study, asking participants to take a selfie every day for a longer period of time (for example two weeks) and take some time to appreciate the photo they have taken: some subjects would be allocated to always take the selfie with filter and others without (control group). There would have to be some kind of compensation for the participants to commit to the study.

Besides this, despite the reminder of this study's confidentiality, it is likely that some participants felt uncomfortable uploading a selfie, for not looking their best. As it is known from the literature review, women have more motivation to create a positive self-presentation, when compared to men (Haferkamp et al. 2012) and they might have felt pressured to make a good impression on the selfie they were uploading. However, the main goal was for subjects to be confronted with their looks, whether the real one or the filtered one. This might have had an impact on their answers to the following questions, especially the ones regarding *state self-esteem*. The items for this variable were supposed to be answered regarding what participants were feeling at that exact moment, as the instructions stated "Please answer these questions as they are true for you RIGHT NOW. There is of course, no right answer for any statement. The best answer is what you feel is true of yourself at the moment" (see appendix 1.5). Probably, in future research, instructions must refer to answer specifically according to what they were feeling at the moment, regarding the selfie taken.

Another limitation found regards the reliability analysis. The Cronbach's alpha for the *selfie behaviour* scale was below the recommended threshold of 0.70. This may have to do with the

fact that this scale is not based on prior research and had only 3 items. A future suggestion would be to add items to this scale and try to understand better what leads people to using filters and what impacts does that bring to the subjects' *state self-esteem* and *make-up purchase intention*. This led to the discard of this scale in the various analysis made, when it could have had a significant impact on the variables: a result that would be visible in the ANCOVA tests. In addition, one item from the *physical appearance* scale was dropped to improve reliability.

Moreover, it is advised that future research studies the effects of trait (vs. state) self-esteem, as this may have significant impacts on the results: it is possible that the use of filters affects self-esteem more in the long run than momentarily. Results showed that, despite the differences not being significant, the means were higher in *state self-esteem* and "I feel satisfied with the way my face looks right now" for participants who took a selfie with filter. The use of the filter might make them feel better that moment. However, as hypothesised, literature review leads to the belief that this should be the opposite, though this may only be clear in the long run, resulting in the suggestion of studying trait self-esteem instead of state self-esteem.

All in all, in order to get more results and deepen the findings, it would also be a good suggestion to use the within-subjects design, where the same participants take part in each condition of the independent variable. In this case, all participants would answer the survey taking selfies with and without filters. This way it would be possible to see the impact of the use of filters on each participant. However, it is fundamental to have in mind that there might exist order effects, meaning there may be an effect on the participants' behaviour according to the order of the conditions. In this case, to decrease this effect, the order of the conditions for the participants should be alternating.

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Appendices

Appendix 1: Survey

The influence of filters on make-up purchase intention

Start of Block: Information Block

Appendix 1.1: Survey Information

Dear Participant,

My name is Joana Aquino and I am a Master's in Management student at Nova SBE. This following questionnaire aims to collect data for the purpose of my master's thesis regarding the filters and make-up purchase.

This survey is aimed at WOMEN, older than 18 years old. Your participation is voluntary, and all data will be collected anonymously and remain like that. You will be asked to **upload a picture of yourself**, which will be used for academic purposes only and will be destroyed after this study.

Only me and my advisor (Professor Natalie Truong) will have access to this picture and we assure its destruction as soon as we finish this study.

It will not take you longer than **6 minutes** to complete it. Thank you in advance for your help.
If you have any questions don't hesitate to ask (Joana Aquino, 29045@novasbe.pt)

○ I am a female, older than 18 years old and understand and accept the information provided previously

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Appendix 1.2: Survey Introduction

Have you ever heard of Selfies?

*Selfie - a photograph that one has taken of oneself, typically with a smartphone or webcam and uploaded to a social media website (Oxford dictionary) *

Everyone has taken a selfie at some point in their lives and the use of selfies has become increasingly popular over the last few years.

In this section I will ask you to upload a selfie, since I am interested in seeing how taking selfies has an influence in women's behavior.

(I remind you that only me and my advisor - Professor Natalie Truong - will have access to this picture and we assure its destruction as soon as we finish this study)

End of Block: Information Block

Start of Block: Upload NO FILTER

Appendix 1.3: No filter

Please take a selfie of yourself, without any filters, and upload it

End of Block: Upload NO FILTER

Start of Block: Upload FILTER

Appendix 1.4: Filter

Filters that are used in selfies allow you to add effects. Some filters are used for fun, like the dog filter, and others are used to enhance the way you look.
On this research I would like you to **focus on the second type of filter**.

Please take a selfie of yourself, with a filter of your choice and upload it

End of Block: Upload FILTER

Start of Block: State Self-Esteem

Appendix 1.5: State self-esteem

Q4 Please answer these questions as they are true for you RIGHT NOW. There is of course, no right answer for any statement. The best answer is what you feel is true of yourself at the moment.

	1. Not at all (1)	2. A little bit (2)	3. Slightly (3)	4. Somewhat (4)	5. Moderately (5)	6. Very Much (6)	7. Extremely (7)
I feel satisfied with the way my face looks right now (1)	○	○	○	○	○	○	○
I feel good about myself (2)	○	○	○	○	○	○	○
I am pleased with my appearance right now. (3)	○	○	○	○	○	○	○
I feel unattractive (4)	○	○	○	○	○	○	○

End of Block: State Self-Esteem

Start of Block: Make-up purchase intention

Appendix 1.6: Make-up purchase intention

Having in mind the selfie you took in the beginning of this survey, please indicate to which extent do you agree with the following sentences:

	1.Stongly Disagree (1)	2. Disagree (2)	3. Somewhat Disagree (3)	4. Neither Agree nor Disagree (4)	5. Somewhat Agree (5)	6. Agree (6)	7. Strongly Agree (7)
I would likely buy make-up during the next couple of months (1)	○	○	○	○	○	○	○

Page Break

For the next questions, I would like you to indicate how likely are you to buy each of the following products in the next couple of months.

Page Break

Foundation is a liquid or powder makeup applied to the face to create an even, uniform color to your skin, cover flaws and, sometimes, to change the natural skin tone.

	Strongly disagree (1)	Disagree (2)	Somewhat disagree (3)	Neither agree nor disagree (4)	Somewhat agree (5)	Agree (6)	Strongly agree (7)
I would buy foundation in the next couple of months. (1)	○	○	○	○	○	○	○

Page Break

A concealer or color corrector is a type of cosmetic that is used to mask dark circles, age spots, large pores, and other small blemishes visible on the skin. It is similar to foundation, but thicker and used to hide different pigments by blending the imperfection into the surrounding skin tone.

	Strongly disagree (1)	Disagree (2)	Somewhat disagree (3)	Neither agree nor disagree (4)	Somewhat agree (5)	Agree (6)	Strongly agree (7)
I would buy concealer in the next couple of months. (1)	○	○	○	○	○	○	○

Page Break

Blush is used to add a flush of color to the cheeks, while Bronzer is intended to make the skin look sun-kissed or tan. As a result, Blush tends to come in variations of pink (sometimes with peach or plum undertones), where Bronzer is typically brown or gold in color.

	Strongly disagree (1)	Disagree (2)	Somewhat disagree (3)	Neither agree nor disagree (4)	Somewhat agree (5)	Agree (6)	Strongly agree (7)
I would buy blush or bronzer in the next couple of months. (1)	○	○	○	○	○	○	○

Page Break

Eyeshadow is a cosmetic applied primarily to the eyelids to make the wearer's eyes stand out or look more attractive. Eye shadow can add depth and dimension to one's eyes, complement one's eye color, make one's eyes appear larger, or simply draw attention to the eyes.

	Strongly disagree (1)	Disagree (2)	Somewhat disagree (3)	Neither agree nor disagree (4)	Somewhat agree (5)	Agree (6)	Strongly agree (7)
I would buy eyeshadow in the next couple of months. (1)	○	○	○	○	○	○	○

Page Break

Eyeliner can be drawn above upper lashes or below lower lashes or both. Its primary purpose is to make the lashes look lush, but it also draws attention to the eye and can enhance or even change the eye's shape.

	Strongly disagree (1)	Disagree (2)	Somewhat disagree (3)	Neither agree nor disagree (4)	Somewhat agree (5)	Agree (6)	Strongly agree (7)
I would buy eyeliner in the next couple of months. (1)	○	○	○	○	○	○	○

Page Break

Mascara is a cosmetic commonly used to enhance the eyelashes. It may darken, thicken, lengthen, and/or define the eyelashes

	Strongly disagree (1)	Disagree (2)	Somewhat disagree (3)	Neither agree nor disagree (4)	Somewhat agree (5)	Agree (6)	Strongly agree (7)
I would buy mascara in the next couple of months. (1)	○	○	○	○	○	○	○

Page Break

Lipstick and Lip Gloss allow you to color your lips and make them look bigger and more defined.

	Strongly disagree (1)	Disagree (2)	Somewhat disagree (3)	Neither agree nor disagree (4)	Somewhat agree (5)	Agree (6)	Strongly agree (7)
I would buy Lipstick or Lip Gloss in the next couple of months (1)	○	○	○	○	○	○	○

Appendix 1.7: Products Owned

Q23 What make-up products do you already own? (Please tick in all products you have)

- ☐ Foundation (1)
- ☐ Concealer (2)
- ☐ Blush or Bronzer (3)
- ☐ Eyeshadow (4)
- ☐ Eyeliner (5)
- ☐ Mascara (6)
- ☐ Lipstick or Lip Gloss (7)

Appendix 1.8: Selfie Behaviours

In this section I would like to ask you general questions regarding your selfie behaviours

Please indicate the frequency you engage in the following behaviours, from 1 (never) to 7 (always)

	1. Never (1)	2. (2)	3. (3)	4. (4)	5. (5)	6. (6)	7. Always (7)
I use filters when taking selfies (1)	○	○	○	○	○	○	○
I think the selfies I take with filters reflect my true appearance (2)	○	○	○	○	○	○	○
I would like my real-life appearance to be similar to the filtered selfies I take (3)	○	○	○	○	○	○	○

Appendix 1.9: Feelings

	1. Strongly disagree (1)	2. Disagree (2)	3. Somewhat disagree (3)	4. Neither agree nor disagree (4)	5. Somewhat agree (5)	6. Agree (6)	7. Strongly agree (7)
I feel fun (1)	○	○	○	○	○	○	○
I feel creative (2)	○	○	○	○	○	○	○

I enjoy the process (3)	○	○	○	○	○	○	○

What do you feel when you take selfies with filters?

What other reasons lead you to take selfies with filters?

_____

Appendix 1.10: Physical Appearance

Please indicate to which extent do you agree with the following sentences

	1. Strongly disagree (1)	2. Disagree (2)	3. Somewhat disagree (3)	4.Neither agree nor disagree (4)	5. Somewhat agree (5)	6. Agree (6)	7. Strongly agree (7)
My self-esteem does not depend on whether or not I feel attractive (1)	○	○	○	○	○	○	○
My self-esteem is influenced by how attractive I think my face or facial features are (2)	○	○	○	○	○	○	○
My sense of self-worth suffers whenever I think I don't look good (3)	○	○	○	○	○	○	○
My self-esteem is unrelated to how I feel about the way my body looks. (4)	○	○	○	○	○	○	○
When I think I look attractive, I feel good about myself (5)	○	○	○	○	○	○	○

End of Block: Covariates

Start of Block: Demographics

Appendix 1.11: Age

What is your age?

- 18-20 Years Old (1)
- 21-30 Years Old (2)
- 31-40 Years Old (3)
- 41-50 Years Old (4)
- > 50 Years Old (5)

Appendix 1.12: Residence Zone

Q22 What is your residence zone?

- Urban Zone (1)
- Suburban Zone (2)
- Rural Zone (3)

End of Block: Demographics

Appendix 2: Demographics

Appendix 2.1: Age Distribution

What is your age?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	18-20 Years Old	33	15,0	15,0	15,0
	21-30 Years Old	170	77,3	77,3	92,3
	31-40 Years Old	12	5,5	5,5	97,7
	41-50 Years Old	4	1,8	1,8	99,5
	> 50 Years Old	1	,5	,5	100,0
	Total	220	100,0	100,0	

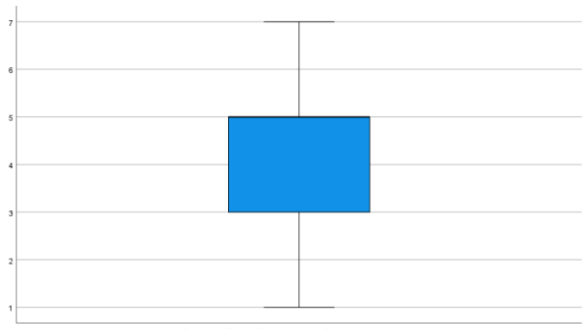
Appendix 2.2: Living zone distribution

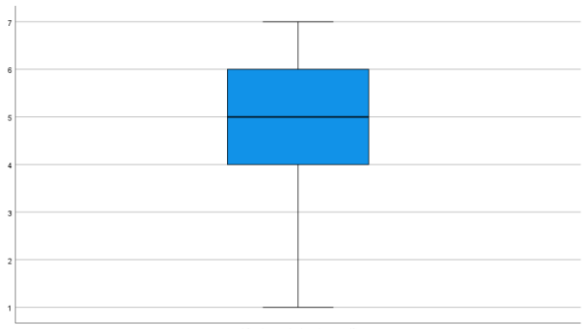
What is your residence zone?

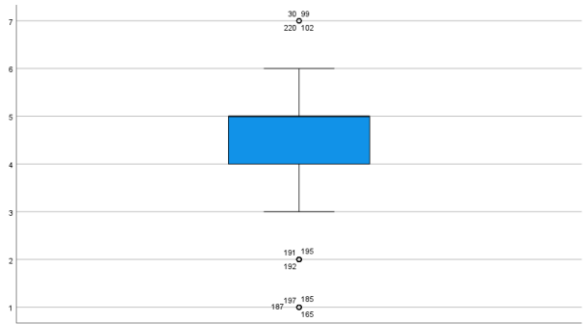
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Urban Zone	136	61,8	61,8	61,8
	Suburban Zone	48	21,8	21,8	83,6
	Rural Zone	36	16,4	16,4	100,0
	Total	220	100,0	100,0	

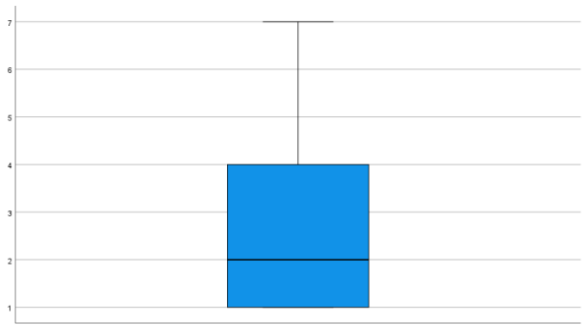
Appendix 3: Outliers

Appendix 3.1: State self-esteem

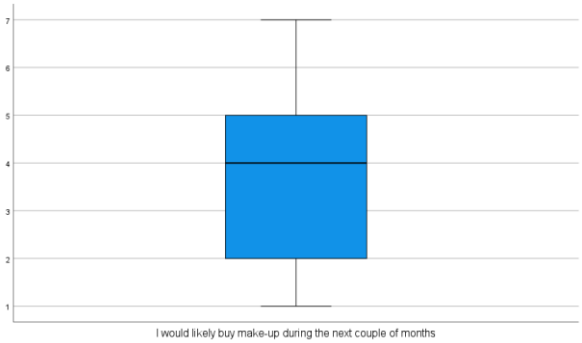


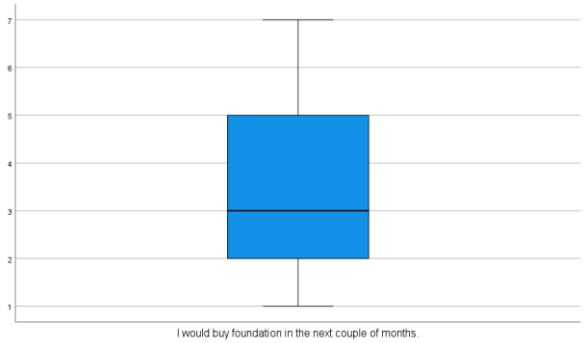


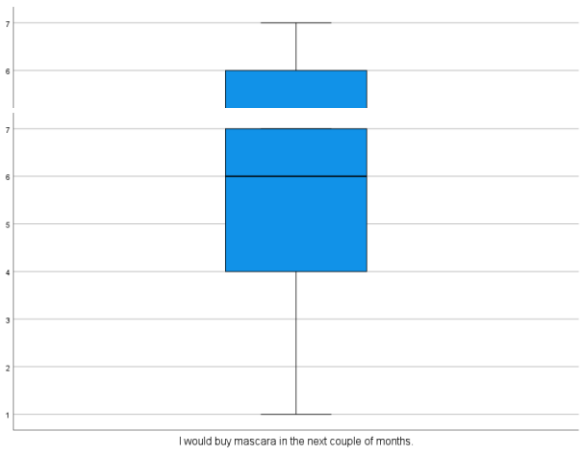


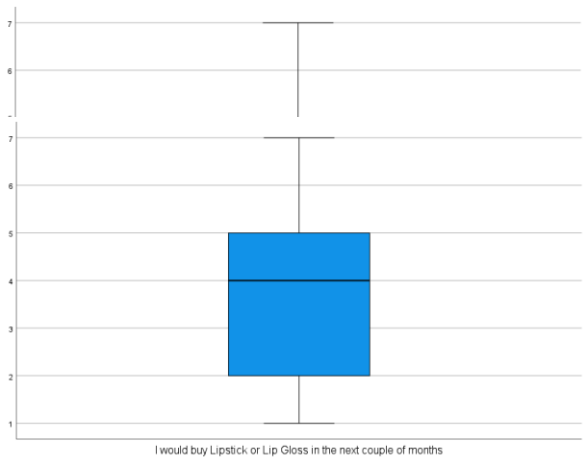


Appendix 3.2: Make-up purchase intention

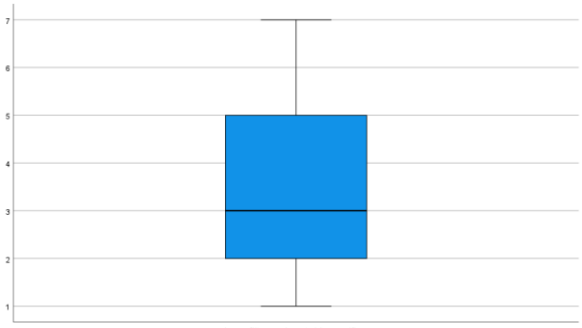


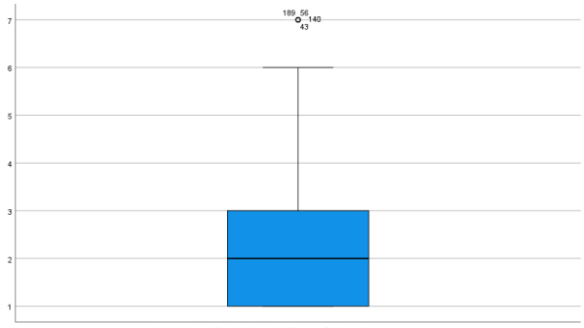


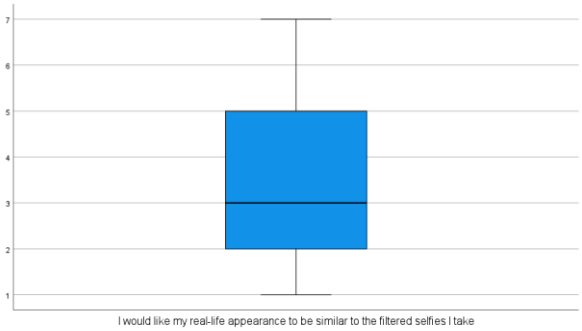




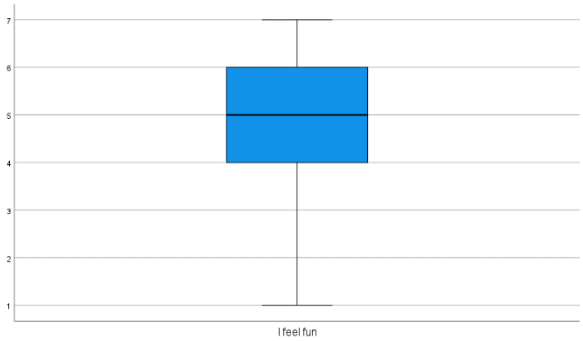
Appendix 3.3: Selfie Behaviours

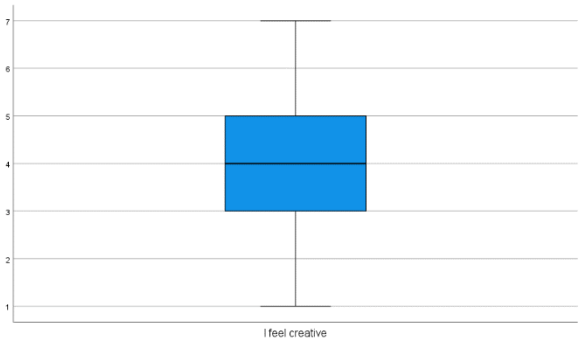


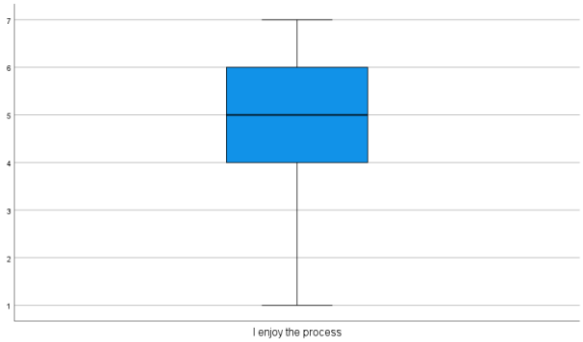




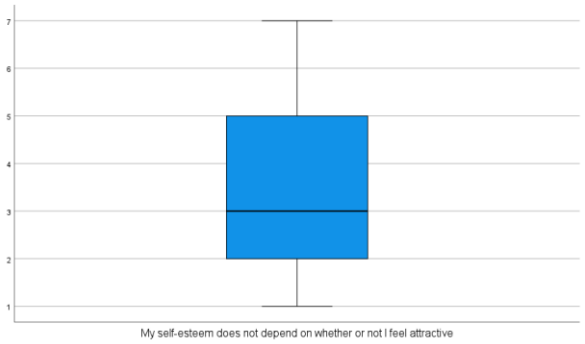
Appendix 3.4: Feelings

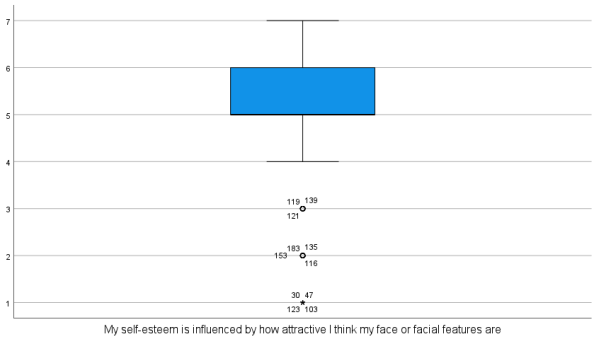


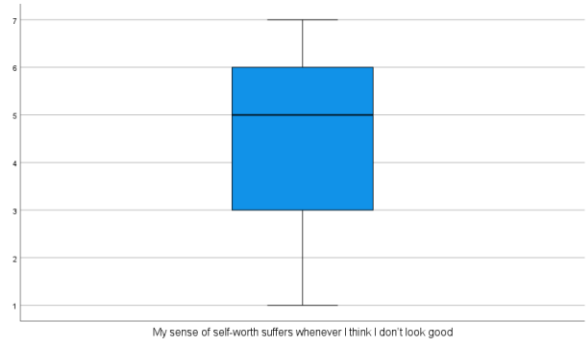


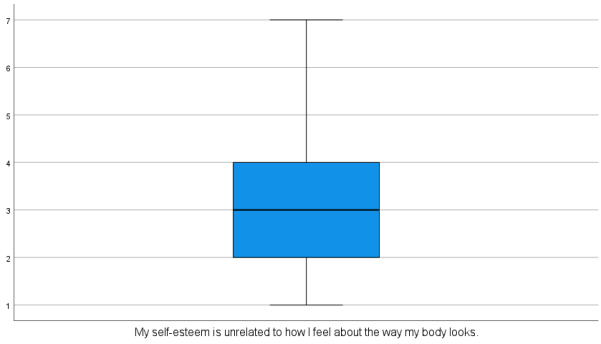


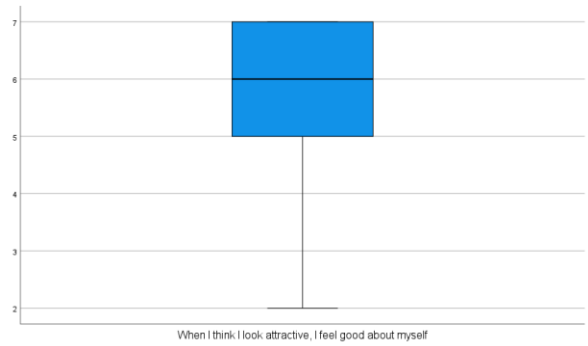
Appendix 3.5: Physical appearance











Appendix 4: Reliability Analysis Outputs

Appendix 4.1: State self-esteem

Reliability Statistics

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
,869	,871	4

Summary Item Statistics

	Mean	Minimum	Maximum	Range	Maximum / Minimum	Variance	N of Items
Item Means	4,757	4,355	5,373	1,018	1,234	,204	4

Item-Total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Squared Multiple Correlation	Cronbach's Alpha if Item Deleted
I feel satisfied with the way my face looks right now	14,67	14,705	,695	,563	,843
I feel good about myself	14,22	14,320	,802	,724	,800
I am pleased with my appearance right now.	14,53	13,529	,866	,791	,772
I feel unattractive	13,65	16,081	,544	,329	,902

Appendix 4.2: Make-up purchase intention

Reliability Statistics

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
,806	,807	8

Summary Item Statistics

	Mean	Minimum	Maximum	Range	Maximum / Minimum	Variance	N of Items
Item Means	3,626	2,814	4,955	2,141	1,761	,483	8

Item-Total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Squared Multiple Correlation	Cronbach's Alpha if Item Deleted
I would likely buy make-up during the next couple of months	25,27	76,983	,682	,483	,760
I would buy foundation in the next couple of months.	25,57	81,999	,476	,303	,790
I would buy concealer in the next couple of months.	24,84	80,317	,518	,323	,784
I would buy blush or bronzer in the next couple of months.	25,65	83,425	,453	,309	,793
I would buy eyeshadow in the next couple of months.	26,11	78,996	,619	,454	,769
I would buy eyeliner in the next couple of months.	26,19	84,657	,412	,220	,799
I would buy mascara in the next couple of months.	24,05	80,194	,528	,314	,782
I would buy Lipstick or Lip Gloss in the next couple of months	25,35	82,611	,472	,370	,791

Appendix 4.3: Selfie Behaviours

Reliability Statistics

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
,558	,555	3

Summary Item Statistics

	Mean	Minimum	Maximum	Range	Maximum / Minimum	Variance	N of Items
Item Means	3,097	2,391	3,532	1,141	1,477	,381	3

Item-Total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Squared Multiple Correlation	Cronbach's Alpha if Item Deleted
I use filters when taking selfies	5,76	7,152	,454	,209	,315
I think the selfies I take with filters reflect my true appearance	6,90	9,378	,284	,090	,572
I would like my real-life appearance to be similar to the filtered selfies I take	5,92	7,094	,377	,168	,446

Appendix 4.4: Feelings

Reliability Statistics

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
,773	,773	3

Summary Item Statistics

	Mean	Minimum	Maximum	Range	Maximum / Minimum	Variance	N of Items
Item Means	4,465	4,059	4,709	,650	1,160	,125	3

Item-Total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Squared Multiple Correlation	Cronbach's Alpha if Item Deleted
I feel fun	8,69	6,801	,610	,374	,693
I feel creative	9,34	6,179	,631	,399	,669
I enjoy the process	8,77	6,955	,585	,343	,719

Appendix 4.5: Physical appearance

Reliability Statistics

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
,573	,470	5

Summary Item Statistics

	Mean	Minimum	Maximum	Range	Maximum / Minimum	Variance	N of Items
Item Means	3,665	2,841	5,918	3,077	2,083	1,645	5

Item-Total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Squared Multiple Correlation	Cronbach's Alpha if Item Deleted
My self-esteem does not depend on whether or not I feel attractive	15,10	10,958	,490	,332	,410
My self-esteem is influenced by how attractive I think my face or facial features are	15,49	12,096	,560	,506	,390
My sense of self-worth suffers whenever I think I don't look good	14,89	11,888	,463	,336	,435
My self-esteem is unrelated to how I feel about the way my body looks.	15,42	11,706	,469	,258	,430
When I think I look attractive, I feel good about myself	12,41	21,275	-,340	,195	,741

Appendix 5: Main Analyses

Appendix 5.1: T-test for state self-esteem: average

Group Statistics

	Filter	N	Mean	Std. Deviation	Std. Error Mean
SSE_T	No	116	4,6552	1,31284	,12189
	Yes	104	4,8702	1,17000	,11473

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means							
						Significance				95% Confidence Interval of the Difference	
		F	Sig.	t	df	One-Sided p	Two-Sided p	Mean Difference	Std. Error Difference	Lower	Upper
SSE_T	Equal variances assumed	1,169	,281	-1,276	218	,102	,203	-,21502	,16845	-,54702	,11698
	Equal variances not assumed			-1,285	217,993	,100	,200	-,21502	,16739	-,54494	,11490

Appendix 5.2: T-test for make-up purchase intention: average

Group Statistics

	Filter	N	Mean	Std. Deviation	Std. Error Mean
WTB_T	No	116	3,6444	1,30578	,12124
	Yes	104	3,6046	1,23352	,12096

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means							
						Significance				95% Confidence Interval of the Difference	
		F	Sig.	t	df	One-Sided p	Two-Sided p	Mean Difference	Std. Error Difference	Lower	Upper
WTB_T	Equal variances assumed	1,191	,276	,232	218	,408	,817	,03983	,17179	-,29876	,37842
	Equal variances not assumed			,233	217,394	,408	,816	,03983	,17126	-,29771	,37737

Appendix 5.3: Mann-Whitney tests for each item of state self-esteem and make-up purchase intention

Hypothesis Test Summary

	Null Hypothesis	Test	Sig.[a,b]	Decision
1	The distribution of I feel satisfied with the way my face looks right now is the same across categories of Filter.	Independent-Samples Mann-Whitney U Test	,067	Retain the null hypothesis.
2	The distribution of I feel good about myself is the same across categories of Filter.	Independent-Samples Mann-Whitney U Test	,843	Retain the null hypothesis.
3	The distribution of I am pleased with my appearance right now. is the same across categories of Filter.	Independent-Samples Mann-Whitney U Test	,284	Retain the null hypothesis.
4	The distribution of I feel unattractive is the same across categories of Filter.	Independent-Samples Mann-Whitney U Test	,692	Retain the null hypothesis.

a. The significance level is ,050.

b. Asymptotic significance is displayed.

Hypothesis Test Summary

	Null Hypothesis	Test	Sig.[a,b]	Decision
1	The distribution of I would buy foundation in the next couple of months. is the same across categories of Filter.	Independent-Samples Mann-Whitney U Test	,792	Retain the null hypothesis.
2	The distribution of I would buy concealer in the next couple of months. is the same across categories of Filter.	Independent-Samples Mann-Whitney U Test	,803	Retain the null hypothesis.
3	The distribution of I would buy blush or bronzer in the next couple of months. is the same across categories of Filter.	Independent-Samples Mann-Whitney U Test	,665	Retain the null hypothesis.
4	The distribution of I would buy eyeshadow in the next couple of months. is the same across categories of Filter.	Independent-Samples Mann-Whitney U Test	,508	Retain the null hypothesis.
5	The distribution of I would buy eyeliner in the next couple of months. is the same across categories of Filter.	Independent-Samples Mann-Whitney U Test	,992	Retain the null hypothesis.
6	The distribution of I would buy mascara in the next couple of months. is the same across categories of Filter.	Independent-Samples Mann-Whitney U Test	,799	Retain the null hypothesis.
7	The distribution of I would buy Lipstick or Lip Gloss in the next couple of months is the same across categories of Filter.	Independent-Samples Mann-Whitney U Test	,153	Retain the null hypothesis.

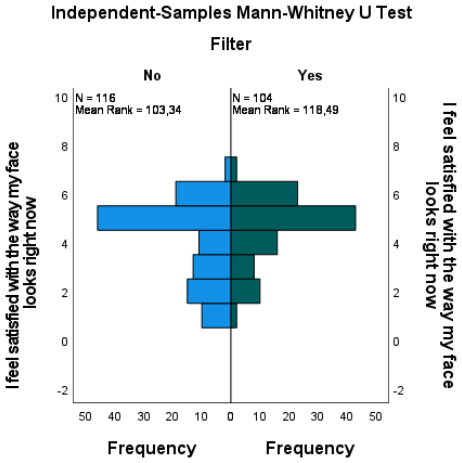
a. The significance level is ,050.

b. Asymptotic significance is displayed.

Appendix 5.4: Results of Mann-Whitney test for the item "I feel satisfied with the way my face looks right now"

Independent-Samples Mann-Whitney U Test Summary

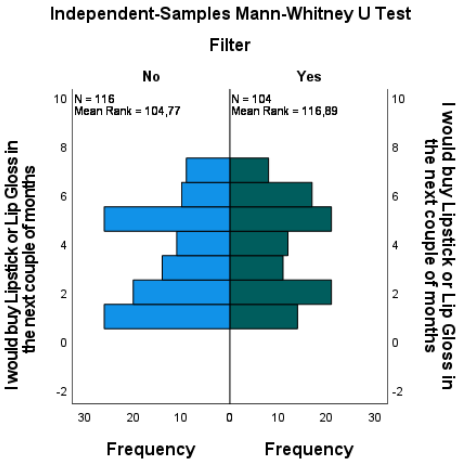
Total N	220
Mann-Whitney U	6862,500
Wilcoxon W	12322,500
Test Statistic	6862,500
Standard Error	452,725
Standardized Test Statistic	1,834
Asymptotic Sig.(2-sided test)	,067



Appendix 5.5: Results of Mann-Whitney test for the item "I would buy Lipstick or Lip Gloss in the next couple of months"

Independent-Samples Mann-Whitney U Test Summary

Total N	220
Mann-Whitney U	6697,000
Wilcoxon W	12157,000
Test Statistic	6697,000
Standard Error	464,920
Standardized Test Statistic	1,430
Asymptotic Sig.(2-sided test)	,153



Appendix 5.6: ANCOVA for State self-esteem

Levene's Test of Equality of Error Variances[a]

Dependent Variable: State.Self.Esteem_T

F	df1	df2	Sig.
,424	1	218	,516

Tests the null hypothesis that the error variance of the dependent variable is equal across groups.

a. Design: Intercept + Foundation + Concealer + Blush_Bronzer + Eyeshadow + Eyeliner + Mascara + Lipstick_LipGloss + Feelings_T + Physical.Appearance_T + AGE + RESIDENCE + Filter

Filter

Dependent Variable: State.Self.Esteem_T

Filter	Mean	Std. Error	95% Confidence Interval	
			Lower Bound	Upper Bound
No	4,728[a]	,108	4,514	4,941
Yes	4,789[a]	,114	4,564	5,015

a. Covariates appearing in the model are evaluated at the following values: Foundation = ,71, Concealer = ,64, Blush or Bronzer = ,61, Eyeshadow = ,67, Eyeliner = ,48, Mascara = ,90, Lipstick or Lip Gloss = ,79, Feelings = 4,4652, Physical Appearance = 3,1023, What is your age? = 1,93, What is your residence zone? = 1,55.

Tests of Between-Subjects Effects

Dependent Variable: State.Self.Esteem_T

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Corrected Model	66,343[a]	12	5,529	4,155	<,001	,194
Intercept	22,264	1	22,264	16,735	<,001	,075
Foundation	,201	1	,201	,151	,698	,001
Concealer	,139	1	,139	,105	,746	,001
Blush_Bronzer	,091	1	,091	,068	,794	,000
Eyeshadow	2,124	1	2,124	1,597	,208	,008
Eyeliner	,346	1	,346	,260	,611	,001
Mascara	,972	1	,972	,731	,394	,004
Lipstick_LipGloss	,000	1	,000	,000	,986	,000
Feelings_T	7,924	1	7,924	5,956	,016	,028
Physical.Appearance_T	41,529	1	41,529	31,215	<,001	,131
AGE	,995	1	,995	,748	,388	,004
RESIDENCE	1,924	1	1,924	1,446	,230	,007
Filter	,200	1	,200	,151	,698	,001
Error	275,397	207	1,330			
Total	5319,750	220				
Corrected Total	341,740	219				

a. R Squared = ,194 (Adjusted R Squared = ,147)

Appendix 5.7: ANCOVA for Make-up purchase intention

Levene's Test of Equality of Error Variances[a]

Dependent Variable: Purchase.Intention_T

F	df1	df2	Sig.
,821	1	218	,366

Tests the null hypothesis that the error variance of the dependent variable is equal across groups.

a. Design: Intercept + Foundation + Concealer + Blush_Bronzer + Eyeshadow + Eyeliner + Mascara + Lipstick_LipGloss + Feelings_T + Physical.Appearance_T + AGE + RESIDENCE + SSE_1 + SSE_2 + SSE_3 + SSE_4R + Filter

Filter

Dependent Variable: Purchase.Intention_T

Filter	Mean	Std. Error	95% Confidence Interval	
			Lower Bound	Upper Bound
No	3,650[a]	,112	3,430	3,870
Yes	3,598[a]	,118	3,365	3,832

a. Covariates appearing in the model are evaluated at the following values: Foundation = ,71, Concealer = ,64, Blush or Bronzer = ,61, Eyeshadow = ,67, Eyeliner = ,48, Mascara = ,90, Lipstick or Lip Gloss = ,79, Feelings = 4,4652, Physical Appearance = 3,1023, What is your age? = 1,93, What is your residence zone? = 1,55, I feel satisfied with the way my face looks right now = 4,35, I feel good about myself = 4,80, I am pleased with my appearance right now. = 4,50, I feel unattractive = 5,37.

Tests of Between-Subjects Effects

Dependent Variable: Purchase.Intention_T

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Corrected Model	68,643[a]	16	4,290	3,064	<,001	,195
Intercept	32,530	1	32,530	23,232	<,001	,103
Foundation	5,074	1	5,074	3,624	,058	,018
Concealer	4,028	1	4,028	2,876	,091	,014
Blush_Bronzer	,239	1	,239	,171	,680	,001
Eyeshadow	,413	1	,413	,295	,588	,001
Eyeliner	1,032	1	1,032	,737	,392	,004
Mascara	1,076	1	1,076	,768	,382	,004
Lipstick_LipGloss	,006	1	,006	,004	,950	,000
Feelings_T	3,308	1	3,308	2,362	,126	,012
Physical.Appearance_T	3,879	1	3,879	2,770	,098	,013
AGE	2,081	1	2,081	1,486	,224	,007
RESIDENCE	,298	1	,298	,213	,645	,001
SSE_1	5,193	1	5,193	3,709	,056	,018
SSE_2	,000	1	,000	,000	,993	,000
SSE_3	,864	1	,864	,617	,433	,003
SSE_4R	3,906	1	3,906	2,790	,096	,014
Filter	,136	1	,136	,097	,756	,000
Error	284,248	203	1,400			
Total	3244,734	220				
Corrected Total	352,891	219				

a. R Squared = ,195 (Adjusted R Squared = ,131)

Appendix 5.8: Mediation Analysis with Hayes Process Model 4

```
Run MATRIX procedure:

***************** PROCESS Procedure for SPSS Version 4.0 *****************

          Written by Andrew F. Hayes, Ph.D.       www.afhayes.com
    Documentation available in Hayes (2022). www.guilford.com/p/hayes3

**************************************************************************
Model  : 4
    Y  : WTB_T
    X  : Filter
    M  : SSE_1

Sample
Size:  220

**************************************************************************
OUTCOME VARIABLE:
 SSE_1

Model Summary
          R       R-sq        MSE          F        df1        df2          p
      ,1465      ,0215     2,2189     4,7841     1,0000   218,0000      ,0298

Model
              coeff         se          t          p       LLCI       ULCI
constant     4,1466      ,1383    29,9808      ,0000     3,8740     4,4191
Filter        ,4400      ,2012     2,1873      ,0298      ,0435      ,8365

**************************************************************************
OUTCOME VARIABLE:
 WTB_T

Model Summary
          R       R-sq        MSE          F        df1        df2          p
      ,1321      ,0175     1,5978     1,9282     2,0000   217,0000      ,1479

Model
              coeff         se          t          p       LLCI       ULCI
constant     4,1091      ,2656    15,4682      ,0000     3,5855     4,6327
Filter        ,0095      ,1726      ,0549      ,9563     -,3306      ,3496
SSE_1        -,1121      ,0575    -1,9498      ,0525     -,2253      ,0012
```

```
****************** DIRECT AND INDIRECT EFFECTS OF X ON Y ******************

Direct effect of X on Y
     Effect         se          t          p       LLCI       ULCI
      ,0095      ,1726      ,0549      ,9563     -,3306      ,3496

Indirect effect(s) of X on Y:
          Effect     BootSE   BootLLCI   BootULCI
SSE_1     -,0493      ,0355     -,1309      ,0021

************************ ANALYSIS NOTES AND ERRORS ************************

Level of confidence for all confidence intervals in output:
  95,0000

Number of bootstrap samples for percentile bootstrap confidence intervals:
  5000

------ END MATRIX -----
```