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**University of  
South Wales  
Prifysgol  
De Cymru**

**Individual Differences in Selfie Taking, Photo  
Manipulation and Filter Use Amongst Young Adults**

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## **Abstract**

With over 3.5 billion people accessing social networking sites, selfie taking and sharing has become a widespread practise among social media users. It is crucial to understand the motivations underpinning how people interact with selfies and how our individual differences may influence the relationship with selfie taking, selfie sharing and photo manipulation. Using young adults aged between 18 and 30 years old ( $n = 104$ ), this study explored the potential relationship between participants individual differences (Gender, Self-esteem, Narcissism, Personality, Attachment) and selfie related behaviours. Findings showed that women are more likely to share photos of themselves online and use beauty filters compared to men. Moreover, results showed that lower levels of self-esteem appear to correlate with more frequented filter use. Multiple regression analysis also demonstrated a significant positive relationship between Narcissism and two subscales of the Photo Manipulation Scale (PMS) (Cosmetic and Structural) whilst Agreeableness was found to be positively correlated with the Cosmetic component of the PMS. These findings highlight the popularity and pervasiveness of selfies in modern day society and the impact that selfie related behaviour has on social media users' behaviours and attitudes. Considerations surrounding the negative impact of selfie editing and filter use should be further investigated in future studies.

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**Candidate declaration**

*This is to certify that, except where specific reference is made, the work described in this thesis is the result of my own research. Neither this thesis, nor any part of it, has been presented, or is currently submitted, in candidature for any other award at this or any other University.*

**Signed**            *Jessica Bardsley (Candidate)*

**Date**             *21/06/2023*

## **Introduction**

Smartphone use has become a part of our modern day lives. We use our phones to keep in contact with friends and family, stay updated on current affairs, navigate our lives using GPS and access other helpful tools – the opportunities are now seemingly endless. One particular use that has gained plenty of attraction and notoriety in our 21<sup>st</sup> century world is social media. Social media has enabled the widespread of information and digital word of mouth, both good and bad, to circulate across the globe (Zhang et al., 2011). Social media, or sometimes known as social networks, has enabled us to build an online ‘world’, in which we live as a separate version of our ‘real’ self, creating a digital identity that is customisable from our usernames to our avatars (Gündüz, 2017).

Whilst social networking sites have expanded opportunities for its users and audience alike, there is one modern element that took the internet by storm – the selfie. Selfies are images usually taken on a handheld device, like a smartphone or camera. The Oxford Dictionary defines ‘selfie’ as a photograph that one has taken of oneself, typically with a smartphone or webcam and uploaded to a social media website (Oxford English Dictionary, 2022). In a world dominated by social media, the internet is saturated with selfies. With such commonplace viewing and regular consumption of selfies, it’s sensible to consider how selfies may shape our interactions and views about ourselves and others – or, how we shape selfies.

However, the activity of selfie taking and sharing isn’t limited to the sole act of snapping the picture and uploading. Social media and its many integrated platforms and additional apps, allow for a step further in the world of selfies – including editing and manipulation of images. The fashion industry casually retouches their images frequently (Donovan, 2012), and historically, image retouching and editing was reserved mostly for high end, glossy magazine front covers, mainly to nip and tuck models for advertising purposes (Brändlin, 2015). Whilst this has been common for the last two decades, image retouching was usually done using professional software such as Photoshop. Little has been done in the arena of psychological research regarding the impacts of photo editing and mental health, however Akram and Kumar (2017) describe the negative impact on mental health created by the mainstream and popular use of Photoshop in everyday images. They suggest that Photoshop cultivates opportunity to hide imperfections and presents ‘perfect people’, allowing for distorted body image amongst teenagers. Moreover, whilst scientific research into the impacts of Photoshop is yet to gain traction amongst academics, the general public and social media are addressing the harmful effects of editing images. Social media influencers are waging a war against the filter culture

and using their platforms to encourage people to find happiness in their own skin – such as Sasha Pallari, a beauty activist who created the #FilterDrop campaign in June 2020 (Coole, 2021).

Photo manipulation is now increasingly easy to do outside of Photoshop and similar professional software. An editing novice can easily manipulate their images using a wealth of apps and software available to anyone, regardless of skill or profession. This is further exasperated by the availability and access to beauty filters, often found on platforms such as Instagram and Snapchat, where applying a premade augmented reality filter is done in as easy as one click. This online enhancement has become increasingly popular over the last few years, and particularly more so during the Covid-19 pandemic (Haines, 2022).

Whilst there is a wealth of evidence that people of all ages are subject to the occasional selfie, including Pope Francis (Saltz, 2014), young people appear to be the most engaged demographic when it comes to taking and sharing selfies, evidenced by Katz and Crocker's (2015) findings that showed 96% of young adults had taken a selfie in their life. Qiu et al. (2015) also found that compared to older adults, young people were more likely to take selfies. With a large number of young people taking and sharing selfies, the present study will look to include young adults aged between 18 and 30 years old.

With this in mind, it's reasonable to draw attention to how individual differences in young people influence the activity of selfie taking. Therefore, the consideration of gender is also particularly prevalent to the activity of selfie taking and sharing. Whilst previous studies have used gender to explain predictor behaviours in selfie-taking, few have used gender in conjunction with other individual differences such as personality differences or self-esteem in selfie-taking. Previous findings investigating gender have provided mixed results, including no significant difference in gender observed by Koterba et al. (2021) – whilst other findings suggest that there is a difference in gender and selfie taking behaviours, such as the observation that women tend to be more active in their selfie taking and sharing behaviours (Sorokowski et al., 2015; Dhir et al., 2016). Therefore, it feels appropriate to examine how gender plays a mitigating role in individuals selfie taking and sharing behaviours.

As social media use has increased in the last decade, how this impacts our wellbeing has also been observed. Akram and Kumar (2017) suggest that social networks are particularly impactful on young people, where an increase in social media use can affect wellbeing. Social media allows for opportunities to compare one's self with others, including friends, peers, and complete strangers (Perloff, 2014). These comparisons can be harmful to our self-esteem and

ultimately may impact our relationship with social media and its nuances, such as selfie taking, sharing and posting for example. These considerations have been further investigated in previous literature and produced some varied findings. It has been observed that lower levels of self-esteem were seen in undergraduates who share selfies (Mills et al., 2018), whilst contrasting literature suggests there is no significant relationship between selfie posting behaviours and levels of self-esteem (Barry et al., 2017; Pawar et al., 2020). Whilst current literature is varied, the present study looks to examine whether any significance is observed in the relationship between self-esteem and selfie taking, sharing and editing of selfies.

In popular press, self-esteem and narcissism have become key considerations in the wake of selfie culture (e.g. Roberts, 2018; Walker, 2013). Social networks, and in particular selfies, allows promotion of social comparison amongst online users, which has contributed to rising levels of narcissism being observed online (Poe, 2015). Previous selfie related research has highlighted a relationship between trait narcissism and selfie-posting (Sung et al., 2016; Weiser, 2015), and it is thought that narcissism influences selfie production, and in turn, over time this behaviour increases levels of narcissism (Halpern et al., 2016). Whilst previous findings have highlighted a clear significance between narcissism and selfie taking, little has been done to explore the role narcissism plays in the adjacent activity of photo manipulation. The present study looks to explore whether the narcissism, and other individual differences, are predictors in these aforementioned behaviours of selfie culture – including taking, sharing and editing selfies.

Whilst much of the current selfie related research has focused generally on how either, or both, self-esteem and narcissism might predict or explain selfie related behaviours, other potential predictors should be considered. This includes the role of personality, where Paris and Pietschnig (2015) argue that limiting the scope of selfie related research to self-obsessed, narcissistic motivators, neglects the critical depth of complexity surrounding the selfie phenomenon. However, there is evidence to suggest that personality traits are related to selfie behaviours, including the findings of Paris and Pietschnig (2015), which highlighted that more extraverted and emotional individuals appear to hold more positive attitudes towards general selfie-taking, whilst agreeable individuals appeared to exhibit more positive attitudes towards selfie-taking while travelling. Additional research exploring personality has observed a consistent link between Extraversion and greater numbers of selfies posted online (Guo et al., 2018; Kim and Chock, 2017; Sorokowska et al., 2016). As current literature surrounding this focuses heavily on selfie taking and sharing, the present study includes the photo manipulation element of selfie related behaviour and how personality may influence this, which is lacking in previous research.



Finally, the present study will look to explore how attachment types influence selfie-related behaviours. Attachment has gained little notoriety in the field of selfie related research, with only a handful of academics investigating a possible relationship. Current findings focus largely on how attachment may play a mediating role in social media use, such as the findings from Oldmeadow et al. (2013) who suggest SNSs are likely to appeal to those who have higher levels of attachment anxiety. Furthermore, previous literature indicates that intense social media use is associated with attachment anxiety and symptoms of addiction (Blackwell et al. 2017; Eroglu 2015; Reed et al. 2016). One of the few studies that explores selfies and attachment comes from Yue, Toh and Stefanone (2017), who report that selfie posting was found to be positively correlated with attachment insecurity, particularly in older, female participants. Due to the lack of research surrounding selfie related behaviours and attachment, it felt important to include adult attachment as one of the five predictors.

Whilst the above noted evidence is key in understanding how several individual differences may help predict selfie taking and/or social media use, more needs to be done to understand how other relational behaviours such as photo manipulation are explained. Few studies have investigated the relationship using a multifactorial lens where a number of possible predictors are explored – such as personality, self-esteem, narcissism and attachment.

This study is particularly interested in how young people aged between 18 and 30 years old interact with and use selfies, share and post selfies and how they manipulate their images (for example, through the use of filters or editing software). There are several challenges to note, including the infancy of current research surrounding selfies, reporting measures in which data is captured (i.e., self-reporting) and representative samples used in present research (such as larger focus on young people and women).

This thesis aims to draw upon the above noted background and explore how the impacts of our individual differences, shape our engagement and decisions surrounding selfie taking, sharing, filter use and photo manipulation.

## **1. Literature Review**

### **1.2 Social media and self-presentation**

Social media is a popular and powerful tool that has amassed a community of more than 4.62 billion users worldwide, with 424 million of these joining in the last year (Chaffey, 2022). Social media allows us to communicate with others, access entertainment (such as videos) and update our own profiles with pictures, content, and personal information. In the UK, there are more than 53 million active social media users, which is over 77% of the British population (Zivkovic, 2022). According to findings from the Pew Research Centre, roughly seven-in-ten Americans say they have engaged in using social media platforms (Auxier and Anderson, 2022).

Whilst social network sites (or SNSs for short) have become a valuable tool for interaction, and identity formation influence (Antheunis et al., 2016; Clarke, 2009; Quinn and Oldmeadow, 2013; Shin et al., 2012), SNSs also provide a significant opportunity for self-expression and self-presentation. SNSs can be used to promote and/or maintain self-presentation, including on the common platform, Facebook, where users are driven to post updates to fulfil their need for self-presentation by uploading pictures, profile content and status updates (Mehdizadeh, 2010; Zhao, Grasmuck and Martin, 2008). Nadkarni and Hofmann (2012) suggest that using SNSs, such as Facebook, fulfils two basic societal needs – the need to belong and the need for self-presentation. Whilst their social media review of Facebook allowed them to explore this assumption by developing a 2-factor model, the research is limited to one form of social media (Facebook) and does not use personality factors to explain motivations behind the desire to fulfil these needs – for example, does individualistic childhood attachment impact users fulfilment needs on social media. This model could be further strengthened by reviewing other social media platforms such as Instagram and Twitter.

Self-presentation, which has been defined as a means of ‘impression management’, is a goal-directed process where an individual usually aims to leave a favourable impression of themselves on others (Chua and Chang, 2016; DeAndrea and Walther, 2011; Goffman, 1959). When an individual engages in self-presentation, they will often strictly control what information they reveal about themselves, and withhold or disclose certain aspects of the self, in order to influence the ideal they wish to present (DeAndrea and Walther, 2011; Goffman, 1959). Chua and Chang (2016) works support the above notion. The authors conducted twenty-four interviews with Singapore school girls to explore the relationship between self-presentation and peer comparison on social media. Their results demonstrated that low self-

esteem and insecurity emphasised efforts to manipulate their self-presentation online. Whilst the research uses a sample outside of usual white, Western norms, the study is limited in the participant age group and gender. This could be strengthened by testing age differences between younger and older teenager girls, and could look to include teenage boys to examine gender differences.

However, as Boyd (2008) notes, a crucial developmental task as we age is learning how to present ourselves to others, and in recent years this process is largely taking place online (Valkenburg and Peter, 2011). Antheunis and Schouten (2011) suggest presenting a good image of oneself to others is now more important than ever to pre and early adolescents. Their research investigated cues on SNSs that influence perceived popularity and attractiveness of adolescents, sampling 497 high school students between the ages of 12 and 15 in the Netherlands. Their results showed that profiles that hosted attractive friends and positive wall postings were perceived as being more attractive to participants. While the study uses a large sample of students, the research employs Facebook as its only source of information and fails to explore further than one form of SNS, much like Nadkarni and Hofmann's (2012) study discussed earlier. The study could also be strengthened by comparing age differences in teenagers and adolescences, as opposed to just high school students.

While self-presentation is key to identity development (Boyd, 2008; Chua and Chang, 2016), the ability to control and present our own version of our selves online is becoming increasingly easier, and in turn self-presentation seems particularly appropriate for social media. Despite individuals frequently maintaining self-presentation in face-to-face interactions, it is increasingly easier to create an 'ideal' identity online (Bij de Vaate et al., 2018) – one that might differ substantially from an individual's offline identity when paired with digital enhancing techniques, such as editing apps (Mendelson and Papacharissi, 2010; Turkle, 1995). It is also important to consider the notion of Asynchronicity – online users have the opportunity to review and edit responses/actions before pressing send on a message, for example. This level of editing responses is not available in face-to-face communication, and although helpful for those who are shy or self-conscious (Chan, 2011), the editability opportunity online can be misused and allows adolescents the chance to optimise their self-presentation online (Walther, 2007).

Different from other Internet or computer use, social media is unique in its capacity to be 'ever present' – ultimately allowing social pressure to be available at all times of the day and respond to new content and notifications immediately (Thomé et al., 2010). This is seen in our ability to access selfies or images of ourselves, whenever we wish. Immediately available access to

a 'digital mirror' via smartphone cameras may heighten individuals' consciousness about their appearance – particularly if someone is using an app such as Snapchat that allows users to communicate through images of themselves (Katz and Crocker, 2015).

Diefenbach and Christoforakos (2017) suggest that the front-facing, or 'selfie' camera may act as mirror or means of reflection which in turn allows individuals to readily monitor themselves, resulting in highly controlled self-presentation on SNSs. 238 females living in Germany, Austria, and Switzerland participated in the online survey. Diefenbach and Christoforakos study measured selfie behaviours and preferences using a 6-point and 5-point Likert scale to assess the frequency in which participants took selfies and received them from friends. The researchers then utilised the Positive and Negative Affect Schedule (PANAS; Watson et al., 1988), translated to German (Krohne et al., 1996) to measure Selfie-Related Affect, where Cronbach's Alpha was observed as 0.80 for Positive Affect and 0.68 for Negative Affect. Assessment of individual self-presentation strategies involved the use of selected items from Merzbacher's (2007) habitual self-presentation scales ( $\alpha$  = self-promotion 0.84, self-disclosure 0.78, understatement 0.78). Employing scales provides a standardized approach to assess individual self-presentation strategies, fostering consistency in data collection across diverse studies and researchers. Nevertheless, it's crucial to note that Merzbacher's scales, utilized in Diefenbach and Christoforakos' research, were developed a decade prior, raising the potential concern of their relevance and currency. Furthermore, the utilisation of self-reporting methods presents its own set of challenges and considerations, such as potential for social desirability bias which can compromise the accuracy and authenticity of the data collected.

While their research did encompass a representative age group spanning 18 to 63, it is noteworthy that the study exclusively involved female participants. Additionally, the study's sole reliance on a European sample poses limitations in delving into intercultural variations. For instance, a cross-cultural analysis comparing individualistic and collectivist societies could unveil distinct attitudes towards self-presentation through selfies. A comprehensive approach might involve comparing Western, individualistic societies—such as a US or UK sample—with Eastern, collectivist societies, like those in China or Korea.

### **1.3 Cosmetic surgery, Covid-19 and Filters**

Cosmetic (or sometimes referred to as plastic or aesthetic) surgery has gained huge notoriety in the last few decades, however its origins are thought to be far older. Documentation suggests that reconstructive surgery was taking place as early as 600 B.C in Ancient India (Backstein and Hinek, 2005). Some of the first entries in cosmetic surgery related literature

can be seen around the early 1900's, including that of Chicago born practitioner Charles Conrad Miller who wrote his first article in 1906, exclusively discussing excessive skin around the eyes and how to extract it (Rogers, 1971). By the year 2000, over 5.7 million cosmetic surgical and nonsurgical procedures were performed in the millennium year in the US (American Society for Aesthetic Plastic Surgery, 2001).

Today, non-invasive and minimal cosmetic surgery procedures are on the rise, and recipients are getting younger (Wang, Akintilo and Geronemus, 2020). A comprehensive review of medical records at a private dermatology clinic between 2016 and 2019 found that a quarter of all cosmetic procedures performed on millennials (patients born between 1981 and 1996 at the time of the research) received injectable neurotoxins, such as Botox (Wang, Akintilo and Geronemus, 2020). According to a 2017 study by the American Academy of Facial Plastic and Reconstructive Surgery, 55% of plastic surgeons noted that patients sought surgery to improve their appearance, for the ultimate purpose of improving their selfies (Rajanala et al., 2018).

One of the largest UK polls about filler by VICE magazine, found that over 51,000 respondents (59%) admitted they viewed enhancing procedures like lip filler, equivalent to get a manicure or going for a haircut (Tsjeng, 2019). VICE also found that out of 47,000 people, 68% declared that at least one or more of their friendship group had already had a facial cosmetic procedure. Further data was gathered on users of Snapchat between the ages of 13 and 24 in the UK, equally split between male and female respondents, alarmingly from this sample almost 50,000 people admitted they would like to change their facial features (Tsjeng, 2019).

Moreover, an increase in public interest has caused a surge in the practice of aesthetic beauty procedures, such as facial fillers (i.e. lips, jaw). Previous research has attributed this to the seismic and global disturbance, that is the Covid-19 Pandemic. During the first four months of the pandemic, where face-to-face communication was limited to video calling and image sharing, an increase in Google searches for terms such as 'plastic surgery' and 'aesthetic surgery' was observed (Chandawarkar et al., 2020). Furthermore, results from a cross-sectional survey regarding time spent video calling and related features, found that more than half of respondents reported feeling more aware of their appearance since the pandemic, and over 62% of participants were more likely to consider pursuing aesthetic surgery as a result of seeing themselves more frequently in video calls (Chen et al., 2021). Enhanced feelings of over observing may be due to more frequent opportunities to see ourselves during the pandemic – Jenny et al. (2020) suggests individuals may be seeing themselves more at home

(i.e. in a mirror, or on platforms like Microsoft Teams) due to lockdown restrictions, resulting in an increased interest in cosmetic surgery.

The intense pressure to look beautiful offline, is being seen in interactions online. A number of studies have investigated how traditional media, such as adverts, can impact women's relationship with cosmetic surgery – whilst other variables such as body dissatisfaction were amongst predictors, excessive media exposure was found to positively correlate with motivations for cosmetic surgery in women (Sharp et al., 2014; Slevic and Tiggemann, 2010; Swami, 2009).

However, more recently, social media is being considered as a catalyst in motivating women to move towards cosmetic surgery. Walker et al. (2019) investigated the role of social media in young women's consideration of cosmetic surgery. 180 young women aged between 18 and 29 years were asked to indicate their social media use, followed by a task in which half of the participants viewed images of facial cosmetic enhancements, and the other half saw images of travel. Findings showed that viewing images of women who had undergone cosmetic enhancements impacted the desire for surgery in young women, particularly if they were less satisfied with their appearance, followed many social media accounts, and spent considerable amounts of time using social media (Walker et al., 2019). Furthermore, important research from Eldaly and Mashaly (2021) highlights how an increase in social media use contributes to the acceptance of cosmetic surgery. They observed that selfie posting and taking increased the desire to undergo cosmetic surgery, as well as heightened social anxiety.

Whilst cosmetic surgery may seem like an ideal or attractive solution for some, it does not come without consequence. Procedures can be expensive, and some have long, painful recovery periods that span over many months (Davis, 2013; Lusted, 2010). Furthermore, cosmetic procedures and surgery are primarily viewed as a permanent change, that bare a commitment for many years, or even a lifetime. Cosmetic procedures can also come with complications, including scarring, nerve damage and infection and in severe cases can be fatal (Khunger, 2015).

While the commitment of surgery or aesthetic augmentation may be an easy decision for some individuals, others may struggle to afford the costly expenses or may simply feel too nervous to go through with the surgery or procedure. A 21<sup>st</sup> century alternative to this is being seen in social media use – filters. A feature common on social media platforms is that of 'augmented reality', also known as AR and defined as our real-life environment with a digitally augmented overlay ("What Is Augmented Reality?", 2022). On platforms such as Instagram and Snapchat,

the purpose of AR is seen in a facial recognition function that allows users to hold the camera to their face (or another person's face) and let the application find the person's key features, such as their eyes, nose and mouth. These pre-determined computer-generated effects can then alter an individual's features. As sites such as Instagram rely heavily on communication via images and visual content (Choi and Sung, 2018; Kostyk and Huhmann, 2021), it's easy to understand how 600 million social media users access AR filters each month on Facebook or Instagram (Bhatt, 2020). As AR facial filters are focused intensely on the face and augmentation of the *person*, rather than augmenting the surrounding, (in games such as Pokémon Go – see Hamari et al., 2018) it is plausible to understand how using these features are associated with self-presentation. Javornik et al. (2021) suggest that facial filters allow for unique opportunity to contribute to self-presentation, whilst additional findings suggest filters generate positive online connections and act as a 'social lubricant' in the form of likes, comments or emojis (Sheldon et al., 2017).

However, there is growing concern surrounding the use of filters and the impact this has on wellbeing. Whilst experimenting with one's looks may allow individuals to feel more authentic about their appearance (Smith et al., 2021), previous research suggests that AR filter use motivated by ideal self-presentation negatively impacts self-acceptance (Javornik et al., 2021) and heavy filtering can create a disconnect from reality (Raypole, 2018).

AR filters on SNSs are accessible in many different forms, including Snapchat's seemingly harmless animal themed filters that give users big dotting eyes, or puppy snouts, can still harness drastic changes by shrinking features to dainty, feminine proportions (Liquido, 2016). Despite Snapchat's claims that these features are 'playful' (Barker, 2020), a newly coined term has emerged, known as 'Snapchat Dysmorphia', outlining concerns regarding edited and filtered selfies and the impact this has on psychological wellbeing (Rajanala et al. 2018; Raypole, 2018).

In their study, Yang et al. (2020) investigated the potential relationships between selfie-viewing behaviours on SNSs, facial dissatisfaction, and the role of appearance comparisons among 481 university participants. Selfie-viewing was assessed through three items, with one specifically gauging participants' frequency of viewing selfies on social media using a 6-point Likert scale (developed by Diefenbach and Christoforakos, 2017) and two 7-point Likert scales were employed to assess the extent to which individuals view selfies of others on social media (Choi et al., 2017; Lee and Sung, 2016). Participants' inclination to compare their appearance with others on social media was evaluated using a revised edition of the Physical Appearance Comparisons Scale (PACS; Fardouly and Vartanian, 2015), originally developed by

Thompson et al. (1991). For this study, Cronbach's  $\alpha$  was observed as 0.84. To assess the degree of self-objectification, Noll et al., (1998) Self-Objectification Questionnaire (SOQ) was introduced. Finally, to measure facial dissatisfaction, the researchers used the Facial Appearance Concern (FAC) subscale of the Negative Physical Self Scale (NPSS; Chen et al., 2006), comprising of 11 items. The FAC subscale demonstrates both good reliability and validity and a stable factor structure (Chen et al., 2006). For this study, good internal reliability was observed at  $\alpha = 0.92$ .

Results found that more frequent selfie viewing on social media was associated with higher facial dissatisfaction, and appearance comparisons were found to play a mediating role in this relationship. In this case, it is plausible to suggest that heightened appearance concerns may actively play a role in the motivators behind using filters in order to soften or pronounce certain features an individual may like or dislike about themselves in real life.

A heavy stream of selfies that promote unattainable appearance ideals can cause individuals to feel worse about their own appearance (Fardouly and Vartanian, 2015; Hogue and Mills, 2019), and opportunities to manipulate images to fit these standards can be damaging (Javornik et al., 2021). Research over a number of decades has demonstrated that women who are exposed to images of idealised bodies, internalise this ideal and in turn may experience shame or body dissatisfaction when they are unable achieve the same body (Tiggemann and Slater, 2013). Previous findings suggest sites such as Instagram that expose its users to images of thin, idealised body types increases dissatisfaction amongst young women, including exposure to variety of user images, such as celebrities, influencers, strangers, and same-age individuals known to the participant (Brown and Tiggemann, 2016; Fardouly and Holland, 2018; Hogue and Mills, 2019).

Rosalind Gill from City University London produced a report outlining the findings from their investigation into the observed negative effects of filters on mental health. Gill (2021) reported findings that demonstrated a striking number of 90% of the 175 young women and non-binary participants involved in the study, admitted to using filters or editing their photos. Gill also unearthed which filters were most popular amongst this group – the five most common editing techniques or filters used were those able to even out skin tone, bronze and/or brighten skin, whiten teeth and slim down features to appear thinner. Moreover, results showed that participants used social media filters to make their lips look fuller, eyes look wider/bigger, and reshape features such as their jaws or nose. The present research looks to draw upon the use of similar types of photo manipulation and editability of selfies.



Tiggemann et al. (2020) also conducted an investigation into the impacts of selfie editing on mental wellbeing. Their study involved 130 young women, split into the control group (who viewed images of average sized women) and the experimental group (who viewed images of the 'thin ideal' body type), both groups were then asked to take a selfie on an iPad and were given 10 minutes to edit it however they wished. They reported that both taking and editing selfies resulted in increased facial dissatisfaction and negative mood amongst the two groups of participants. Furthermore, it appears that the extent to which the participants edited the images in the study, further predicted the intensity of facial dissatisfaction. Tiggemann et al. concluded that being heavily invested in one's online appearance, and editing this, can be detrimental to young women's mental health.

However, findings show not all women will feel worse about themselves after exposure to the thin ideal (Mills et al., 2002). Similarly, not all social media use negatively impacts its users – findings from a meta-analysis revealed that the majority of social media use is positive (Boulianne, 2015). Filter use also has positive impacts when used to reflect true self-presentation (Javornik et al, 2022) and has positive links for older or LGBT users (Fox and Ralston, 2016; Pera et al., 2020).

Whilst filters are a quick and easy way to provide a freshen up on selfies being taking at that present moment, more skilled and committed selfie takers may opt to use manipulation apps and tools such as Photoshop or a mobile phone app known as FaceTune. Chen et al. (2019) observed lower levels of self-esteem in participants who reported using Photoshop and suggest that an increase in acceptance of cosmetic surgery may be associated with photo editing applications. Furthermore, results from Ozimek et al. (2022) indicate that photo editing behaviours can have a negative impact on self-perceived attractiveness and self-esteem and suggest that social media users should consider the negative consequences associated with photo editing applications and filters.

## **1.4 Selfies**

As outlined above, a part of online self-presentation is 'selfies'. Sites such as Instagram, Facebook and Snapchat allow users to engage in selfie posting – The Oxford Dictionary defines 'selfie' as 'a photograph that one has taken of oneself, typically one taken with a smartphone or webcam and uploaded to a social media website' and in 2013, it was declared 'Word of the Year' (Oxford English Dictionary, 2022). Selfie-taking and other related behaviours largely contribute to how individuals visually present themselves on SNS (Bij de

Vaate et al., 2018). Millions of selfies are uploaded and shared on SNSs across the world. In 2015, Instagram held over 238 million posts with the hashtag #selfie and over 128 million photographs included the hashtag '#me' (Weiser, 2015). As social media grows rapidly, personal photography has become a large part of how individuals construct their online identities (van Dijck, 2008). The concept of the 'technoself' has been explored in previous studies (defined as a "changing state of human identity in society"; Luppicini, 2013, p.2) which emphasises the relationship between individuals and technology, highlighting the notion that identities are constructed and adaptive alongside the advancing of technology.

The actions of taking and sharing selfies has become commonplace amongst smart phone users and across social media (Sung et al., 2016). With an advancement in technologies and the development of the smart phone it's easy to understand how selfie sharing has gained notoriety and demand in keeping users' friends and followers up to date – photo sharing platforms such as Instagram and Snapchat allow individuals to present themselves in the digital social environment, faster and easier than ever before (Belk, 2013). This notion of persistent engagement with social media may lead to obsessional behaviour and preoccupation on appearance, including engaging in appearance related photo activities (such as selfie taking). This is supported by the works of Cohen, Newton-John and Slater (2017), who found that appearance focused social media use was related to body image concerns in young women. Whilst the research investigated appearance related SNS use across both Instagram and Facebook, the study identifies limitations in its sample where participants were predominately Caucasian. The study also fails to draw comparisons between men and women and could be strengthened by further examining gender differences.

After an individual has taken selfies, there is then a conscious selection process in which a person will decide on the picture they would most like to post online (Siibak, 2009). Although taking and sharing selfies is common, research suggests that being socially conscious of how these appear to others when posted online is an important part of selfie taking and sharing behaviour. Katz and Crocker (2015) conducted a cross-cultural study in the US, UK and China to investigate attitudes towards selfies and selfie taking. The researchers employed a number of measures in the study, including an initial online survey consisting of several statements that could be answered using a 6-point Likert scale, which received 117 useable responses. This was then followed by interviews with 18 individuals, as well as informal observations of participants and discussions in public online forums regarding the topic. While employing a mixed-methods design that integrates both quantitative and qualitative approaches allows for a more cohesive and comprehensive understanding of the research problem, the absence of

standardised scales introduces the potential for a lack of standardisation and reliability when attempting to replicate the study.

They found that staging a selfie required careful balance between not appearing too vain or self-absorbed whilst also considering how an image presents the individual publicly and online. Although it was found that many participants took selfies, they were aware of how their information and images can be shared and viewed online, and the implications of this. Whilst the research demonstrates good cultural variance in the participants sampled across Western and Eastern cultures, the authors interestingly note there were differences in how both the UK and US samples viewed selfies as a means of conversation on the platform Snapchat. 41% of UK sample respondents did not agree that they would respond to selfies with a comment and 56% disagreed they would send a selfie in return, compared to the US sample, where nearly 60% of students agreed or strongly agreed to sending a selfie in response of receiving one. It is important to note however, that the study in discussion undertook data collection in March 2014, and these attitudes across the UK and US might have changed since then. Furthermore, the study focuses on the exchange of selfies in conversation means rather than generally across SNS and could be reinforced by the inclusion of other casual selfie sharing on platforms like Instagram.

Whilst selfies sharing can be seen across many platforms, an individual has the opportunity to edit or manipulate the image before posting it online – including manipulation in the form of filters (Fox and Rooney, 2015). Previous research into selfie/photo manipulation defines the act of manipulation as an alteration and/or enhancement of photos and selfies achieved through use of editing software or smartphone apps before sharing to social media (Chae, 2017; McLean et al., 2015). Chen et al. (2019) suggested SNSs allow endless opportunities for individuals to share what they feel is their ‘own best self’ which is often digitally modified/edited, and in turn may alter their perception of what is authentic and acceptable (Diefenbach and Christoforakos, 2017; Rajanala et al., 2018). Interactions that take place offline are partly constrained, because individuals are unable to manipulate themselves in such a way as they would online, they are unable to claim identities that are inconsistent with their physical appearance, such as body shape or facial structure and texture. Furthermore, editing or manipulating selfies appears to fulfil the need to create an ideal online-self in the form of virtual makeovers (Chae, 2017; Lowe-Calverley and Grieve, 2018).

## 1.5 Age and young people

An age group who are particularly engaged and attracted to social media are young people (Perloff, 2014). According to previous research, young people spend 54% of their online time using social media (Thompson and Loughheed, 2012). 84% of adults aged 18 to 29 years old say they have used SNSs whilst less than 50% of adults over 65 reported using social media sites (Auxier and Anderson, 2022). Previous findings indicate that over 95% of college students manage their social media profiles regularly (Stefanone et al., 2011).

According to Statista, 91% of adults in the UK aged 35 to 44 had a social media profile as of 2020, however it appears younger adults aged 18 to 34 years old are drifting away from platforms such as Facebook toward sites like Instagram and Snapchat ("Social network profile ownership by age UK 2015-2020 | Statista", 2021). Many Americans report using YouTube and Facebook, while use of Instagram, Snapchat and TikTok is especially common among adults under 30. (Auxier and Anderson, 2021).

Qiu et al. (2015) observed that compared to older people, younger people are more likely to take selfies. Findings from a 2013 poll of 3,000 18–24-year-olds, found that every third picture taken is a selfie (Hall, 2013). Weiser (2015) suggests that young people may take and share selfies in order to fulfil narcissistic goals during adulthood. Moreover, different age groups are likely to differ in their selfie-posting patterns (Sorokowski et al., 2016). Dhir et al. (2016) recruited 3,763 Norwegian participants to take part in their online survey and provide empirical evidence on how adolescents (between 12 and 19), young adults (between 20 and 30) and adults (between 31 and 50) differ regarding their selfie behaviours. The researchers used five-point Likert scales to assess two items of selfie-taking frequency (adapted from Sorokowski et al., 2015) one single item of selfie-sharing, (Weiser, 2015; Fox and Rooney, 2015) and two items to assess photo-editing behaviours (also adapted from Fox and Rooney, 2015). Using statements from earlier studies guarantees consistency in measurement between various studies and investigators, and also facilitates replication, allowing future researchers to easily reproduce the study and verify the findings.

They found that adolescents were more likely than young adults take individual and group selfies, post their own selfies, and use filters – similarly, young adults were more likely to take individual and group selfies, post and edit photos compared to older adults. Their research uses a wide variety of ages in selfie related research (from 12-50 years old), but the authors suggest further work in this area would benefit from exploring selfie related behaviours in older adults between 50 and 75 years old. Furthermore, the study used an online newspaper to

recruit its participants which the authors note may have yielded a larger proportion of young and older adults, compared to adolescences who are less likely to read an online newspaper.

The impact of social networks on young people is significant (Akram and Kumar, 2017). McLean, Jarman and Rodgers (2019) note how selfie taking is commonplace for adolescents and explored this further by conducting a narrative review of selfie practices and the related behaviours, and its impact on adolescents' well-being. From the studies reviewed, they found that elements of selfie-related behaviours appeared problematic when used to curate an ideal image and response from peers.

However, McLean et al. (2019) focus their work solely on the experiences of adolescences and would benefit from considering how this differs in young adults. As previous research indicates, anxious adolescents may tend to use social media more, agreeable with the notion that those with high levels of neuroticism indicate a preference for the social element of the internet (Hamburger and Ben-Artzi, 2000). Therefore, considering young adults (particularly those over the age of 18 and no longer considered a child) may yield contrasting results as some findings have shown self-esteem increases in these developmental periods and into adulthood (Erol and Orth, 2011; Huang, 2010; Pullmann et al., 2009). It should be considered however that the above-mentioned studies may be outdated as several took place before platforms such as Facebook and Instagram became universally popular and modern.

Despite some negative connotations associated with selfies, some empirical findings highlight the significance of selfies/selfie taking as a medium for self-expression and exploration amongst young people (Diefenbach and Christoforakos, 2017; Rutledge, 2013). Platforms such as Instagram and Facebook are thought to have extended and improved the opportunity for individuals to communicate and interact through self-expression (Wilson et al., 2012).

## **1.6 Gender**

Previous research suggests that women care more about their appearance than men (Öberg and Tornstem, 1999; Quittkat et al., 2019; Workman and Lee, 2011) and often promote this more than men (Walter et al., 2020). As self-presentation and a large proportion of our interactions move online, differences in our gender may directly impact our relationship with social media. This has already been observed in teenagers, where studies have shown that female adolescents tend to use SNSs more compared to their male counterparts and use image sharing platforms (i.e., Instagram) more often than boys (Barker, 2009; Lenhart, 2015).

Krasnova et al. (2017) investigated gender differences and motivations in social media use by surveying 488 German 18–34-year-olds, using an online survey. They employed several instruments to measure their data – these include the SNS Continuation Intention, and Satisfaction with SNS (Bhattacharjee, 2001), the Maintaining Ties with Close Friends, Broadening Social Network, Social Information on Close Friends and Social Information on Broader Network constructs (all based partly on the works of Joinson, 2008), General Information (adapted from Koroleva et al., 2011), and finally Self-Enhancement (Krasnova et al., 2010). All eight of the measures used in this study follow the same 7-point Likert scale. Despite the potential risk for measurement complexities and additional resource for collecting and managing data from 8 different scales, there is benefit in utilising several instruments, including opportunities for corroboration where different scales converge on similar findings.

Krasnova et al. (2017) uncovered that whilst men and women are both motivated by self-enhancement online, differences in desires to continue using SNSs were identified, for example, women are motivated by the ability to connect with others online, such as gaining social information and maintaining close ties. Men on the other hand, were motivated by the ability to seek and obtain general information, as opposed to relational information. While Krasnova et al. demonstrate gender differences in motivations behind social media use, their study is limited in resource as it opted to include only one form of social media, Facebook. The authors suggest this could be strengthened by exploring the inclusion of sites such as Instagram and Reddit, and whether this impacts the motivations previously identified.

Further research has highlighted gender differences in men and women's social media use and selfie taking behaviours. Compared to men, women appear to engage in more visual online self-promotion (Muscanell and Guadagno, 2012) whereas men were found to engage in written self-promotion – such as 'about me' profile sections (Buffardi and Campbell, 2008). Carpenter (2012) found that women engage in more selfie related behaviours than men, supporting the notion that females are more likely to engage in forms of visual self-promotion online. Furthermore, women are twice as likely to post varying types of selfies (alone, with their partners, etc) and post twice as many selfies on SNSs (Sorokowski et al., 2015), similar to the findings of Dhir et al. (2016), who discovered that not only are girls more likely to take personal selfies, but take group selfies, edit and crop them and also use filters.

However, similar to Sorokowski et al. (2015), Nguyen (2014) also found that young women aged between 18 and 29 years old share pictures of themselves, or selfies, in the hopes of receiving positive feedback (i.e. 'likes'), but in addition note that women may delete any selfies

they have shared should they potentially experience negative criticism. Furthermore, Abbott and Barber (2010) found that adolescent girls reported higher aesthetic values and aesthetic behavioural-investment compared to boys. Moreover, previous research has observed females are more active in manipulating images and using filters than males (Chae, 2017; Dhir et al., 2016; McLean et al., 2015, 2019; Mingoia et al., 2019).

Interestingly, in contrast to this Koterba et al., (2021) found that no gender differences existed in selfie taking behaviours between men and women but did note that taking selfies in groups was more common amongst women. While Koterba and authors found no gender differences in selfie taking behaviours, their findings interestingly both support and refute previous work from Dhir et al. (2016) – it could be suggested that the studies mentioned above fail to explore selfie related behaviours in a modern social networking era, whereas Koterba et al. use recent evidence to refute gender differences in selfie taking.

Therefore, the inclusion of both male and female experiences is important in reviewing and exploring selfie related behaviours. Research has shown both male and female adolescents edit their images – including the use of interactive filters, smoothing skin texture/blemishes and making body parts larger or smaller (Mascheroni et al., 2015). Furthermore, research suggests both males and females use selfies as an opportunity for self-presentation online (Guo et al., 2018; Dutta et al., 2016; Katz and Crocker, 2015) and McLean et al. (2019) argues that the inclusion of both males and females is vital in exploring gender differences in selfie related research. For this reason, this research will look to include both genders as a predictor, to explore whether differences exist in selfie related and filter behaviours between males and females.

**H1** – Females will engage in more frequented selfie sharing behaviours than males.

## **1.7 Self-esteem**

There is common agreement that theories of self-esteem provide evidence to support the universal desire for humans to uphold, defend, and develop their self-esteem (Rosenberg, Schooler and Schoenbach, 1989). It is not uncommon to find that issues with self-esteem is a common experience for many teenagers (Agam et al., 2015). As teenagers mature into young adults, findings have shown self-esteem increases in these developmental periods and into adulthood (Erol and Orth, 2011; Huang, 2010; Pullmann et al., 2009) and generally improves in the first decade of adulthood (Huang, 2010).

However, an increase in social media use can impact well-being and the effect of social networks on young people is significant (Akram and Kumar, 2017). This is consistent with previous findings that more frequent SNS use is associated with lower self-esteem (Jan, Soomro and Ahmad, 2017; Vogel et al., 2014; Woods and Scott, 2016). Whilst the above research demonstrates a relationship between lower levels of self-esteem and more frequent social media use on Facebook, Woods and Scott (2016) focus their research solely on the impact on secondary school children (aged 11-17 years old) and sleep quality in relation to social media, whilst Jan et al. (2017) use 18-25 year olds, and Vogel et al. (2014) use undergraduates (mean age 19 year olds). As previously noted, a large proportion of online users on sites like Facebook are young adults ("Social network profile ownership by age UK 2015-2020 | Statista", 2021), Woods and Scott (2016) would benefit from considering how young adults compare to school aged children in sleep quality in relation to social media as a means to draw comparisons against ages. Furthermore, Jan, Soomro and Ahmad, (2017) and Vogel et al. (2014), draw on Facebook as their only means of information for impacts on self-esteem and could strengthen their research by exploring other forms of social media. It is also important to consider that whilst young people make up the largest proportion of online users on sites like Facebook, 91% of adults in the UK aged 35 to 44 had a social media profile as of 2020, and younger adults aged 18 to 34 years old appear to be drifting away from platforms such as Facebook toward sites like Instagram and Snapchat ("Social network profile ownership by age UK 2015-2020 | Statista", 2021). Therefore, the inclusion of older adults may produce diverse results.

Despite previous literature demonstrating a relationship between frequent social media use and lower levels of self-esteem, many studies neglect to consider the further actions associated with social media use, including selfie taking and sharing behaviours. Lower levels of self-esteem are being seen in female undergraduates who are active in sharing selfies (Mills et al., 2018). However, Shin et al. (2017) suggests that simply saving selfies to a person's smartphone rather than posting them to social media, can negatively impact self-esteem. In contrast to this, Biolcati (2019) surveyed 692 Italian women between 18 and 28 years old and observed that women with lower self-esteem posted significantly fewer types of selfies compared to women with higher levels of self-esteem. The researchers employed the Rosenberg Self-Esteem Scale (RSES; Rosenberg, 1965) to measure self-esteem, one of the four subscales of the Body Investment Scale (BIS; Orbach and Mikulincer, 1998) to measure body satisfaction, where both tools use a 5-point Likert scale. They then utilised a 6-point Likert scale to assess frequency of selfie taking using a single statement (developed in earlier works by Biolcati and Passini, 2018). Given its extensive use in psychological research, the



RSES can be relied upon as a valid instrument for measuring self-esteem, which provides assurance in the researchers results. Moreover, the choice to use a scale developed in earlier works by Biolcati and Passini (2018) provides comparability and consistency across studies, and further promotes replication by other researchers. Whilst the findings from Biolcati disputes findings from Mills et al. (2018), both studies restrict their samples to females only and the inclusion of male participants could strengthen findings. Additionally, the inclusion of both genders in future research would provide deeper insight in helping explain gender differences and self-esteem in selfie-taking and sharing.

Self-presentation online seems particularly relative to self-esteem in the context of likes for pre and early adolescence – Meeus et al., (2019) found positive correlations between levels of self-esteem and an individuals perceived online popularity, where users need for popularity was negatively related with self-esteem. Similarly, in a study using a sample of 100 Facebook users, where 50% were women, results showed a negative relationship between self-esteem and self-promotion – particularly, low levels of self-esteem were correlated with higher levels of self-promotion in their Facebook profile pictures (including posed pictures and edited images) (Mehdizadeh, 2010).

Furthermore, Perloff (2014) suggests that women who have generally higher levels of perfectionism, and/or low self-esteem are likely to dedicate time on appearance-focused online comparisons and are unlikely to practice 'self-protective' downward appearance comparisons (such as comparing themselves to less attractive friends or peers). Obsessional image comparisons can be dangerous for individuals with a risk of developing body dissatisfaction and is correlated with negative views of their body image, depression, and low self-esteem (Meier and Gray, 2014; Tiggemann and Miller, 2010; de Vries et al., 2014). Additionally, in reports where individuals were dissatisfied with the quality of their selfies, extremes such as attempted suicide was documented (Senft and Baym, 2015).

Whilst previous research suggests that males tend to have higher levels of self-esteem than females (Kling et al. 1999; Magee and Upenieks, 2019), men's self-esteem is also impacted by the wake of social media. Men's experiences of online exposure to the muscular body ideal were thematically analysed, and results showed that despite some men in this community finding the humorous side to negative comments, many acknowledged the danger this could cause to men's mental well-being (Piatkowski et al., 2020).

Despite this, current literature regarding selfie related behaviour is varied. Whilst Pounders, Kowalczyk and Stowers (2016) analysis suggests self-posting for women is an attempt to

increase levels self-esteem, other studies report no significant relationship between individual self-esteem and selfie-posting behaviours (Barry et al., 2017; Forest and Woods, 2012). In order to further explore the relationship between self-esteem and selfie taking behaviours, this study will include self-esteem as a predictor.

**H2** – Individuals with low self-esteem will exhibit more frequented selfie sharing behaviours.

**H3** – Females with low self-esteem will score higher in photo manipulation compared to males.

## **1.8 Narcissism**

Narcissism is strongly related to online self-presentation (Buffardi and Campbell, 2008; DeWall et al., 2011; Lee et al., 2014; Wang et al., 2012) and is a widely explored concept in selfie related research, where previous findings suggest a relationship exists between trait narcissism and selfie-posting (Sung et al., 2016; Weiser, 2015). As the use of SNSs promotes a form of social comparison amongst online users, rising levels of narcissism are being observed (Poe, 2015). Halpern et al., (2016) found that narcissism influences selfie production, and in turn, over time this behaviour increases levels of narcissism – it is possible that individuals who practice selfie sharing online are likely to feel rewarded by sharing images of themselves which ultimately enhances levels of narcissism. Moreover, Biolcati and Passini (2018) found a significant correlation between narcissism and importance attached to receiving likes on participants images, where narcissistic individuals were found to be more active in posting selfies on their own (as opposed to selfies with partners or in a group) and placed more emphasis on receiving likes on selfies alone. This is consistent with previous research that suggests narcissism does not correlate with all forms of selfies (i.e with partners or in groups), but primarily selfies that are taken alone (e.g., DeWall et al., 2011; Weiser, 2015).

Furthermore, Salafia and Rimzhim (2020) investigated grandiose and vulnerable narcissistic traits and whether they differ in premeditated use of social media – their results found that both grandiose and vulnerable narcissism were positively correlated with selfie-posting but noted that the relationship for grandiose narcissism was stronger. Likewise, findings from March and McBean (2018) found higher levels of grandiose-exhibitionism narcissism were associated with posting more selfies – interestingly, lower levels of self-esteem were observed as a moderator in this relationship. March and McBean (2018) also used the NPI-40 as their model for measuring narcissism. A condensed version of the NPI-40, named the NPI-16, is used in this research to measure narcissism. Arpaci et al. (2018) also used the NPI-16 in their

investigations into narcissism and selfie-related behaviours and found that gender was a significant variable in their study, where narcissism and selfie posting behaviour were significant for men, but not for women. Using condensed versions of the original Narcissistic Personality Inventory (NPI; developed by Raskin and Hall, 1979), such as the NPI-40 or NPI16, has provided time-saving efficiencies compared to the original 80-item scale. This allows for quicker data collection and can also attempt to mitigate participant burnout from answering arduous and time-consuming questionnaires, which can sometimes result in lower quality data.

Likewise, Sorokowski et al. (2015) found links between narcissism and selfie-posting were stronger among men than women, and previous findings from Reyes et al. (2021) showed a positive correlation between narcissism and selfie behaviours, where men were statistically more narcissistic than females. Reyes et al. note however that their research is limited to adults aged between 18 and 38 and would benefit from the inclusion of older adult age brackets, such as 39 to 58 and 59+, for example. As suggested by the researchers, the measure of self-reporting method is limiting, and further research would benefit from qualitative interview data as self-reporting may be exaggerated or bias in various ways.

Moreover, findings from Fox and Rooney (2015) suggests a circular relationship exists between narcissism and selfie related behaviours. Their study of 1000 US men identified a correlation where higher levels of narcissism result in increased levels of selfie behaviours, and an increase in these behaviours subsequently increased levels of narcissism. The authors note that self-objectifying men are more likely to spend time on SNSs and often edit photos to enhance their appearance, and narcissistic men tend to share edited images and frequently post selfies. The researchers opted to use several varying measures in order to assess self-presentation on SNS's. These include the Self-Objectification Questionnaire to measure trait-level self-objectification (SOQ; Noll and Fredrickson, 1998), one open-ended item that asked participants to identify how many hours they spent on SNS's (extreme values were winsorized to three standard deviations beyond the mean and used for analysis), one item that assessed selfie taking frequency where participants answered between 0 (min) and 30 (max), and selfie editing was assessed on a 5-point Likert scale where participants answered the frequency in which they cropped images, used filters, and Photoshop or other editing software. In addition to this, The Dark Triad was also assessed, used a 12-item instrument coined 'The Dirty Dozen' (Jonason & Webster, 2010). Four of these items derived from the NPI (Raskin and Terry, 1988) to measure narcissism, four originated from the Psychopathy Scale (Paulhus, et al., 2010) to assess subclinical psychopathy, and four were derived from the Mach IV scale (Christie & Geis, 1970) to assess Machiavellianism. While the diverse range of measures

provides flexibility in data collection and supports triangulation, incorporating various measures can increase the complexities of collecting, analysing, and interpreting data.

While Fox and Rooney (2015) sample a large number of participants to demonstrate a correlation between narcissism and selfie taking, the researchers could strengthen their findings by comparing gender differences by including females and exploring beyond their original measure of ages between 18 and 40 years old – a more representative sample may yield a fuller picture of how such behaviour might change with age. Furthermore, the authors suggest a male specific measure for self-objectification in future research may provide evidence that men and women self-objectify differently.

Whilst the above research outlines a positive correlation between narcissism and selfie related behaviours, contrasting literature exists. Research examining the relationship between narcissism and undergraduates Instagram posts suggests there is no significant association between levels of narcissism and posting selfies on Instagram (Barry et al., 2019; 2017). Furthermore, Etgar and Amichai-Hamburger (2017) also reported no significant findings between narcissism and motivations for selfie taking. Their study included two phases, of which stage one comprised of 117 communications undergraduates, and stage two comprised of 191 psychology undergraduates (mean age for phase one was 23, data for stage two was not available). Participants were asked to report what they felt were some of the motivators for taking selfies. Exploratory factor analysis confirmed three distinct selfie motivations – including self-approval, belonging, and documentation. Etgar and Amichai-Hamburger (2017) also use the NPI-16 as a measure of narcissism. Their results found that none of the three motivators were associated with narcissism, nor did regression analysis provide a significant result with gender as a moderator between narcissism and selfie motivations. Whilst Etgar and Amichai-Hamburger provide good contrasting evidence to a wealth of literature that suggests narcissism plays a mitigating role in selfie related behaviours, their research is limited. The authors suggest the age group of participants as undergraduates may limit their sample representation, and self-reporting methods used are not always reliable.

Despite previous research exploring the relationship between selfie related behaviours and narcissism, current literature is yet to explore the impact of photo manipulation on this relationship. This gap in the literature is the rationale to investigate this further.

**H4** – Narcistic individuals will demonstrate higher levels of photo manipulation.

## 1.9 Personality

Personality is a comprehensive notion that embodies many aspects of individual and social differences and has been investigated most notably using the Five Factor or 'Big Five' Model (Costa and McCrae, 1992; Goldberg, 1999; Goldberg et al., 2006; McCrae and Costa, 1997).

In personality research, this model has been used widely by researchers investigating selfie related behaviours, where Extraversion and Neuroticism have been found to have the strongest correlations with online image-related activities (i.e., Amichai-Hamburger and Vinitzky, 2010; Eftekhar et al., 2014). Research has previously indicated a positive relationship between Extraversion and Neuroticism and the number of images posted on SNSs (Eftekhar et al., 2014) as well as evidencing higher levels of Neuroticism in those who posted more personal images, such as selfies (Amichai-Hamburger and Vinitzky, 2010). Furthermore, previous findings appear to consistently link the Extraversion trait to a greater number of selfies posted online (Guo et al., 2018; Kim and Chock, 2017; Sorokowska et al., 2016).

In contrast, findings from Kim and Chock (2017) indicated no significant association existed between Neuroticism and the frequency of editing selfies or the number of self-images posted to social media. Interestingly, the Agreeableness trait highlighted a positive correlation between the types of selfies posted (i.e. more likely to post group selfies/images) whilst Conscientiousness was found to negatively correlate with editing occurrence (Kim and Chock, 2017).

Research investigating behavioural aspects of selfies (particularly travel selfies) and personality traits from Paris and Pietschnig (2015), observed that traits such as emotionality and extroversion were positively associated with optimistic attitudes towards selfies, whilst positive opinions of travel selfies (e.g. pictures taken during a trip and then shared to exhibit someone's travel experiences) were positively associated with the agreeableness trait. Furthermore, negative associations were identified between humility and selfie-taking behaviour, which the authors suggest may be due to a lack of desire for self-presentation in high-humility individuals. The authors used the HEXACO (Honesty-Humility (H), Emotionality (E), eXtraversion (X), Agreeableness (A), Conscientiousness (C), and Openness to Experience (O) model of personality to measure personality traits, and the RSES (Rosenberg, 1965) was employed to measure self-esteem. The HEXACO model is a beneficial tool used in personality research, particularly as it has been designed with consideration for cross-cultural application, taking into account cultural differences in personality expression and language (e.g. Thielmann et al., 2019). Moreover, the inclusion of the Honesty-Humility feature

is a unique element of the HEXACO model, providing a more comprehensive understanding of personality as it captures traits related to modesty, sincerity, and fairness. However, it should be noted that the complexity of the HEXACO model does make it more time consuming than alternative personality measures such as the 'Big Five' (Costa and McCrae, 1992; Goldberg, 1999; Goldberg et al., 2006; McCrae and Costa, 1997).

Whilst the findings of Paris and Pietschnig present some of the first insights into personality traits and attitudes towards selfies, especially that of travel selfies, the research presents some limitations. For example, using 131 university students (mean age = 20.39), limits the sample to young adults and the inclusion of older adults could strengthen the findings, as older adults may view travel selfies differently. Furthermore, future research would benefit from exploring different types of selfies, as opposed to just travel selfies, and could include for example, celebrational selfies (such as birthdays, Christmas, graduations etc).

Recent investigations into motivations to take selfies from Etgar and Amichai-Hamburger (2017) outline how personality could play a mediating role in individual's selfie taking behaviours. They observed that the Big Five Traits used in their personality measure were able to distinguish between potential selfie motivators – including self-approval, belonging and documentation. They found that extraversion and agreeableness were positively associated with the documentation motivator of selfie taking, whilst self-approval motivations were found to be negatively correlated with conscientiousness and emotional stability. Both self-approval motivations and belonging motivations were found to be negatively associated with openness to new experiences. Whilst this evidence is key in understanding how personality may help predict selfie taking, the study focuses primarily on the taking and sharing of selfies, as opposed to general selfie related behaviour, which can include activities such as filter use and/or photo manipulation. The inclusion of these wider behaviours would provide more in-depth context about motivations and strengthen potential future research.

Furthermore, the relationships observed between selfie related behaviours and personality traits has shown to be different when measured by objective criteria as opposed to self-reporting measures. This was demonstrated by Amichai-Hamburger and Vinitzky (2010), who found a relationship between personality differences and Facebook use was significant in their research when a two-phase design was employed using both a questionnaire in the initial phase and then a period of coding and measuring user-uploaded content, unlike the earlier study conducted by Ross et al., (2009) that used only a questionnaire. Whilst this highlights the importance of study design in personality research, the initial study conducted by Ross et al. included only 97 students from an American university, whereas Amichai-Hamburger and

Vinitzky sample 237 Israeli students in their study. The sizeable difference in research participants, and the significant difference in cultures may contribute to the difference in findings.

The Mini International Personality Item Pool (Mini IPIP; Donnellan et al., 2006) is another common model used to measure personality in selfie-related research and is the condensed version of the original IPIP Five Factor Model (IPIP-FFM; Goldberg, 1999; Goldberg et al., 2006). Research using the Mini IPIP from Gilliland et al., (2018) found that Extraversion positively correlated with the number of selfies taken per month. However, no association was found between Neuroticism and selfie posting frequency. Conscientiousness exhibited no relationship with selfie editing frequency but did reveal positive association to less frequent editing behaviours. Gilliland et al. sampled 235 participants (183 females), ranging from ages 18 to 60 (mean age = 25) and included a demographic breakdown, where 85% of the sample were Caucasian. Participants were invited to respond via online survey methods. While the study uses a representative age sample of teenagers from 18 right up to older adults aged 60, the study predominately sampled young Caucasian females. The study could be strengthened by employing a more representative sample across ethnicities and look to attract more male participants, in order to limit generalisability of the results.

Whilst research into personality has been explored in areas of selfie related research previously, many have failed to explore how individual differences may impact selfie-taking behaviours and photo manipulation. Therefore, this research hopes to bridge some of the existing gaps in this area of personality research, by including a personality measure as one of the five predictors.

**H5** – People low in extraversion will engage in lower levels of photo manipulation.

### **1.10 Attachment**

Attachment is defined as a “lasting psychological connectedness between human beings” (Bowlby, 1969, pp. 194) and is often established during infancy with a child’s primary caregiver(s). Ainsworth et al. (1978) historically classified infant attachment into three types, including secure attachment, avoidant attachment and anxious/ambivalent attachment. The latter two styles are defined as poor, or insecure attachment types, and are described as “attachment-related anxiety” (anxiety surrounding rejection, abandonment and feelings of being unloved) and “attachment-related avoidance,” (an avoidance of dependency and

intimacy with others) (Brennan et al., 1998). Secure attachment on the other hand is classified as healthy attachment, where individuals are able to form flexible and reciprocal relationships (Ainsworth and Bowlby, 1991), and are generally more trusting in others (Mikulincer, 1998). Whilst attachment was historically developed by observing infants, there is evidence that attachment style extends into adulthood (Hazan and Shaver, 1987, 1990). It is important to therefore consider what impact this has on adult attachment, and how insecure attachments might influence social media use amongst those who do not experience secure attachment types. For example, we understand that the attachment types noted above present slightly differently in adulthood, such as Preoccupied Attachment (referred to as 'anxious' when referring to children) and Dismissive Attachment (referred to as 'avoidant' in children). These terms were originally developed by Bartholomew and Horowitz (1991) as part of their four-group model of adult attachment, comprised of four prototypic attachment patterns (including 'Secure' and 'Fearful').

Whilst the present study uses the Revised Adult Attachment Scale (RAAS) developed by Collins (1996), evidence suggests that adults who demonstrate a preoccupied attachment style long for complete emotional intimacy with others, but worry that this will not be reciprocated as they would like (Collins and Read, 1990; Feeney and Noller, 1990; Simpson et al., 1992). Preoccupied individuals are also more likely to experience varying fluctuations of self-worth depending on perceived acceptance or rejection from others (Collins and Read, 1990), and are often characterised as reliant on others, highly emotionally expressive and self-disclosing (Bartholomew and Horowitz, 1991). Conversely, those with Dismissive Attachments appear to experience discomfort in the reliance and closeness with others and according to Feeney and Noller (1990) use distrust as a way to mitigate attachment distress - for example, reports of never feeling that they have experienced being in love (Feeney and Noller, 1990). Moreover, those with dismissing attachments tend to be characterised as colder towards others, less intimate and less emotionally expressive (Bartholomew and Horowitz, 1991). However, it is important to note that there is evidence to suggest that attachment styles are in fact fluid and can demonstrate fluctuations across an individual's lifespan (Waters et al., 2000). The existing literature regarding adult attachment is an interesting and fitting opportunity to explore where social media and selfie taking may play a mediating role.

Current literature surrounding adult attachment and social media is still in its infancy, with only a handful of studies examining the relationship. As attachment is largely centred around our relationships with others, and social media can be used as a tool for maintaining relationships online and offline, it seems appropriate to consider whether there is relationship between the two. Previous research has highlighted that social media use may function as a way for those



with high attachment anxiety to seek comfort from other online and endorse feelings of belonging, and may heavily rely on this outlet to mitigate any painful emotions (Costanzo et al., 2021). Moreover, those who are high in attachment avoidance may rely on SNSs as a preferred method of communication where the environment is highly controllable and allows for emotional distance (i.e. responding to messages when they are comfortable doing so) (Stockdale and Coyne, 2020).

Oldmeadow et al. (2013) also suggest SNSs provide opportunity to endorse attachment functions and likely appeal to those who have higher levels of attachment anxiety. Findings from 617 adult Facebook users, where the mean age was 27.63, showed that individuals who exhibited higher levels of attachment anxiety used the Facebook platform more frequently, were more likely to turn to it when feeling negative emotions and were more concerned with others users perceptions of them on Facebook. Conversely, individuals who were found to have higher levels of attachment avoidance were less likely to use Facebook and felt less positively about the site (Oldmeadow et al., 2013). Previous research also suggests individuals who have higher levels of attachment anxiety are more likely to display jealousy and surveillance behaviours on Facebook, whilst those who were classified with higher levels of attachment avoidance, were less likely to display such behaviours (Marshall et al., 2013). Whilst both Oldmeadow et al., and Marshall et al., evidence a relationship between attachment types and social media use, both pieces of research fail to explore how other forms of social media (such as Twitter, Instagram or Snapchat) impacts attachment types. To strengthen future findings, research should look explore comparability between SNS's and whether particular attachment types are more prevalent on specific platforms than others – for example, do anxious attachment types use a certain SNSs more often than avoidant attachment types?

D'Arienzo, Boursier and Griffiths (2019) systematically reviewed social media related evidence of addiction and attachment styles in papers published between 2000 and 2018. Their findings demonstrated a more intense and dysfunctional use of SNSs in individuals with insecure attachment styles (anxious and avoidant) and those with insecure attachment appear to use SNSs as a means of compensating and substituting for a lack of affection from those around them (such as parents or friends). Liu and Ma (2019) also observed that attachment anxiety positively predicted SNS addiction, where emotion regulation was found to play a mediating role in the relationship. These findings are consistent with previous research that also suggests intense social media use is associated with attachment anxiety and symptoms of addiction (Blackwell et al. 2017; Eroglu 2015; Reed et al. 2016).

Historically in image related research, there has been little exploration into the impacts of attachments on selfie related behaviours. However, Yue, Toh and Stefanone (2017) hypothesised a relationship would exist between attachment insecurity and selfie taking – whilst their regression analysis showed no significant relationship between selfie taking, attachment insecurity was found to be positively correlated with selfie posting, particularly in older, female participants. More recent findings from a cross-cultural study from Yue and Stefanone (2021), investigated indirect effect of attachment anxiety in selfie related behaviours through approval based contingency self-worth (CSW), using more than 500 participants across the United States and Singapore. The study employed several measures in order to assess attachment anxiety and selfie behaviours. These include Brennan, Clark, and Shaver (1998) Attachment Anxiety 7-point Likert scale comprised of 18 items, Approval Based CWS scale developed by Crocker et al, (2003), a single item to assess frequency of selfies taken in the past week, a single item to assess the number of selfies posted as a result of the selfies taken, and finally to measure the extent to which participants edit their images, a 7-point Likert scale assess whether participants manipulate the overall image to enhance or correct brightness, contrast or saturation effects (derived from a measure in earlier works from Stefanone, Yue, and Toh, 2019). Whilst it is recognised as beneficial to build on the works of earlier measures, such as the scale extracted from earlier works of Yue and Stefone, both the Attachment Anxiety scale (Brennan, Clark, and Shaver, 1998) and Approval Based CWS scale (Crocker et al., 2003) are 20+ years old. This may raise concerns around appropriateness of the scale, due to potentially outdated content and misalignment of contemporary suitability.

Findings from Yue and Stefanone (2021) demonstrated a significant positive relationship between approval based CSW and selfie capturing. Furthermore, attachment anxiety was found to predict approval based CSW across both US and Singapore samples. Despite strong cross-cultural validity in the authors work, the research samples purely university students from both Singapore and the US. Interestingly, the US sample included more men than women (57.2%) and in the Singapore sample, participants were majority female (75%). To further strengthen the research from Yue and Stefanone, older adults could look to be recruited to the sample, as well as exploring the gender differences in attachment types across cultures to investigate whether this is a mediator in the relationship between attachment and selfie taking.

As there is a clear gap in current literature exploring the relationship between attachment types and selfie related behaviours, it has been included as part of the five predictors in this research. Current findings also focus largely on the impacts and attachments in women, rather than men.

**H6** – Individuals with an anxious attachment will manipulate their images more than those with a secure attachment.

## **1.12 Conclusion**

As filters and photo manipulation become increasingly popular in consumers social media use, the study looks to explore whether individual differences contribute to these behaviours.

Based on the above review of current and previous research, the present study suggests the following hypotheses:

**H1 – Females will engage in more frequented selfie sharing behaviours than males.**

Previous research has demonstrated evidence to suggest that females are more inclined to share selfies, and more frequently than males, therefore this study will look to investigate whether gender is a predictor in selfie sharing behaviours.

**H2 – Individuals with low self-esteem will exhibit more frequented selfie sharing behaviours.**

Social media and selfie use has previously demonstrated a relationship with self-esteem, where self-esteem has evidenced a mediating role in individuals selfie taking. For this reason, the study will examine whether there is a significant relationship between lower levels of self-esteem and selfie sharing will be observed.

**H3 – Females with low self-esteem will score higher in photo manipulation compared to males.**

Earlier findings have demonstrated those who are lower in self-esteem are more likely to take selfies. With this knowledge, the present study hypothesises that low self-esteem will also play a significant role in the photo manipulation element of taking and sharing selfies.

**H4 – Narcistic individuals will demonstrate higher levels of photo manipulation.**

A wealth of previous research has observed high levels of narcissism in selfie takers. The present study theorises that the same level of narcissism will be observed in those who are frequent in their photo manipulation.

#### **H5 – People low in extraversion will engage in lower levels of photo manipulation.**

As evidenced in previous research, those who are high in extraversion have been frequently observed as more engaged in taking and sharing selfies. Therefore, the current study proposes lower levels of extraversion, should demonstrate less engagement and activity in manipulating images.

#### **H6 – Individuals with an anxious attachment will manipulate their images.**

Whilst little to no previous research has attempted to confirm a relationship between photo manipulation and attachment types, research has suggested that anxious attachments are more likely to take and share selfies. For this reason, the present study speculates a significant relationship will be observed between photo manipulation and higher levels of attachment anxiety.

## **2. Method**

### **2.1 Design**

This study employs a cross-sectional study design to explore the potential relationship between individual differences and selfie taking, selfie sharing and photo manipulation behaviours. Using quantitative methods to collect data in the form of an online survey questionnaire over a fixed period of time (in the case of this study, it ran between the months of April and September 2022), the study uses social media platforms to advertise and recruit to the study.

### **2.2 Procedure**

Participants were recruited using volunteer, self-reporting methods via survey (using the platform JISC to create the survey on). This was distributed to social media platforms (including Facebook, Instagram and Twitter) due to large numbers of young people typically active on these sites. The survey was also uploaded to Survey Circle to capture further responses. Responses from 38 participants were excluded from the total data collection due to incorrect formatting in the initial build of the survey which allowed participants to select multiple answers on the Likert scale questions, whilst 1 response was excluded due to spam answering of the survey and 3 responses were excluded due to age outside of the inclusion criteria.

Ethics approval was granted by the University of South Wales Ethics Committee. Further ethical considerations were taken into account including the data storage of information gathered and preserving participants anonymity. This was achieved by collecting research codes in order to identify participants, instead of personal information, and was accessible to the only the lead researcher. A master list of all personal information and corresponding codes, along with all electronic data, was maintained and stored on password protector computer, accessed only by the researcher. Please see Appendix A for further detail.

## 2.3 Participants

Participants were 104 young adults aged between 18 and 30 years old, where (75%) were female and (25%) were male and the mean age for the sample was 24.96 (SD = 2.45). Inclusion criteria for the survey was limited to age only where the requirement was to be between the ages of 18 and 30. This age group was chosen due to larger numbers of users on platforms such as Instagram and Snapchat (Dixon, 2022) in which filters and selfie sharing are predominately observed. Both genders were included in the inclusion criteria as previous findings suggest the participation of both males and females is vital in exploring gender differences in selfie related research (McLean et al., 2019). Data on participants ethnicity, marital status or level of education was not collected at this time.

**Table 1 – Participant descriptive statistics (Gender and Age)**

<b>Gender</b>	<b>N = 104</b>	<b>Mean Age</b>
Male	26	24.88
Female	78	24.98

## 2.4 Measures

### 2.4.1 Self Esteem

Rosenberg’s Self Esteem Scale (RSES; 1965) was used to measure the self-esteem predictor and is regarded as one of the most extensively used tools to measure self-esteem amongst a variety of ages (Rosenberg, 1989). The RSE scale uses a four-point Likert scale where 1 = Strongly Agree, 2 = Agree, 3 = Disagree, and 4 = Strongly Disagree and is comprised of 10 items (i.e. ‘On the whole, I am satisfied with myself.’) The RSES was chosen to measure self-esteem as results have shown validity in assessing self-esteem amongst young adults from

varied ethnic backgrounds and incomes (Robins et al., 2001; Sinclair et al., 2010). The RSES scale has also been used in previous research that investigated social media and self-esteem (Vogel et al., 2014; Woods and Scott, 2016). Previous findings also suggest the scale has acceptable internal consistency and test–retest reliability, as well as good predictive validity (Schmitt and Allik, 2005; Torrey et al. 2000). Moreover, Cronbach coefficient has been observed to be high ( $M= 0.81$ ) which is supportive of the scale's internal coherence.

### **2.4.2 Narcissism**

In order to measure narcissism, a condensed version of Raskin and Terry's NPI-40 (1988), the NPI-16 (Ames et al., 2006) was used due to its comparable validity and shortened inventory, as the originally condensed 40-item questionnaire may discourage participants due to length of the survey. The NPI-16 has demonstrated respectable convergent and suitable overall reliability (Gentile et al., 2013) and has been used to measure narcissism in previous studies exploring correlations with social media (Alloway et al., 2014; Casale et al., 2016). The measure uses pairs of statements where participants are asked to indicate which statement of the two they agree with most – i.e. 'I really like to be the centre of attention' versus 'It makes me uncomfortable to be the centre of attention'. For data analysis, the pairs were scored either 0 or 1 (where 1 is a narcissistic statement) in order to score narcissism. Higher scores equal higher levels of narcissism identified. The inventory has shown meaningful discriminant, internal, face and predictive validity, where Cronbach's alpha was observed as .72 (Ames et al., 2006).

### **2.4.3 Personality**

Similarly, the 50 item IPIP Five-Factor Model measure (Goldberg, 1999) has been shorted to a 20 item Mini-IPIP scale by Donnellan et al., (2006) – using the shortened version significantly reduces participants time completing the questionnaire. The model measures five personality traits including Agreeableness (i.e. – 'I am not interested in other people's problems'), Conscientiousness (i.e. – 'I like order'), Extraversion (i.e. – 'I am the life of the party'), Neuroticism (i.e. – 'I get upset easily'), and Openness (i.e. – 'I have a vivid imagination'), on a five-point Likert scale (where 1 = Strongly Disagree and 5 = Strongly Agree). Previous studies exploring selfie taking behaviour use the Mini-IPIP as a measure for personality (Choi et al., 2017; Gilliland et al., 2018). Furthermore, the scale has shown good levels of internal consistency and CFA model fit that were comparable to earlier validation findings conducted within the general population (Perry et al., 2019). A number of studies have observed Cronbach's alpha to range from 0.69 to 0.79, where extraversion = 0.69; agreeableness, 0.79;

conscientiousness = 0.75; neuroticism = 0.70 and openness = 0.74 (Andreassen et al., 2014, Laverdiere et al., 2013, Li et al., 2012, Wittek et al., 2016, Kita and Luria, 2018).

#### **2.4.4 Attachment**

For attachment types, questions developed for the Revised Adult Attachment Scale (Collins, 1996) were sampled for the study. The scale is comprised of 18 questions that total three subscales (6 in each) that measure *a*) participants comfortability with closeness and intimacy (close subscale), *b*) participants comfortability with relying on others when needed (dependent subscale) and *c*) participants worry about being abandoned or rejected by others (anxiety subscale). A five-point Likert scale was used where 1 = Not at all characteristic of me and 5 = Very characteristic of me. Previous research using the Revised Adult Attachment Scale has often used young adult samples when a questionnaire is the method of data collection (Brenick, Flannery and Rankin, 2017; Fernández and Dufey, 2015; Stein et al., 2002). Previous findings demonstrate good discriminatory validity in anxiety and close-dependence dimensions for the Mini-IPIP, including values of Cronbach's alpha coefficients observed as close = 0.77, depend = 0.78, and anxiety = 0.85 for respective subscales. Moreover, the score of construct-related validity was found to be high (Wu et al., 2004).

#### **2.4.5 Photo Manipulation Scale**

To measure participants editing of images, McLean et al. (2015) 10 item Photo Manipulation Scale (PMS) was used. Participants answered on a 5-point Likert scale between 1 (never) and 5 (always) to examine to what extent individuals edit their selfies before sharing them online. Examples of the statements included 'Edit to hide blemishes like pimples' and 'Whiten your teeth'. Cronbach's alpha was observed as 0.85 (McLean et al., 2015).

#### **2.4.6 Selfie taking frequency and filter use**

For the criterion variables, 'selfie taking' and 'filter use', two self-developed measures for selfie taking and filter use were developed to ask participants to indicate the frequency in which they share images of themselves, or 'selfies' – 'I share photos of myself on my social media platforms (including Snapchat, Instagram and Facebook)' on a five-point Likert scale ranging from never (1) to always (5). Secondly, a specific filter related measure has been designed to assess facial recognition filters found on social media platforms and also uses a five-point Likert scale ranging from never (1) to always (5) to ask a single item scale including "I use social

media filters that recognise my face and enhance my appearance, e.g. make my lips or eyes bigger, teeth whiter, skin smoother or face chiselled/defined’.

### **3. Results**

This study set out to explore whether individual differences influence selfie taking frequency, selfie filter use and photo manipulation in social media users aged between 18 and 30 years old. In order to observe any potential relationships between the predictor variables, chi-square analysis was used to assess individuals’ frequency in using selfie filters and sharing of selfies online against Gender and Self-esteem. Moreover, to investigate the relationship between photo manipulation and several individual differences, this study employed a multiple linear regression analysis to explore how Narcissism, Self-esteem, Attachment, and Personality influence photo manipulation. From here, exploratory factor analysis was completed to uncover any underlying subscales in the Photo Manipulation Scale. This uncovered two subscales that indicated the types of effects that photo manipulation produces and how this ultimately manipulates the individual’s selfie.

Furthermore, IBM SPSS Statistics version 28.0.0.0 (190) was used to compute the data analysis of the survey results.

#### **3.1 Data Analysis**

##### **3.1.1 Outliers**

Before conducting any analysis on the data collected, it was essential to investigate any outliers or discrepancies in the data set. To determine this, a box plot analysis was performed to provide a clear picture of any outliers present. The box plot analysis results showed that self-esteem (SEtotal), attachment (Anxiety and Avoidance) and narcissism (NPI) demonstrated no outliers, however, two of the personality subscales, ‘Agreeableness’ and ‘Openness’ demonstrated outliers (see Figure 1). To mitigate the outliers discovered, a mean score of each trait was calculated as a result of the outliers, where the mean score of Agreeableness was 16.80 and mean score of Openness of was 14.78.

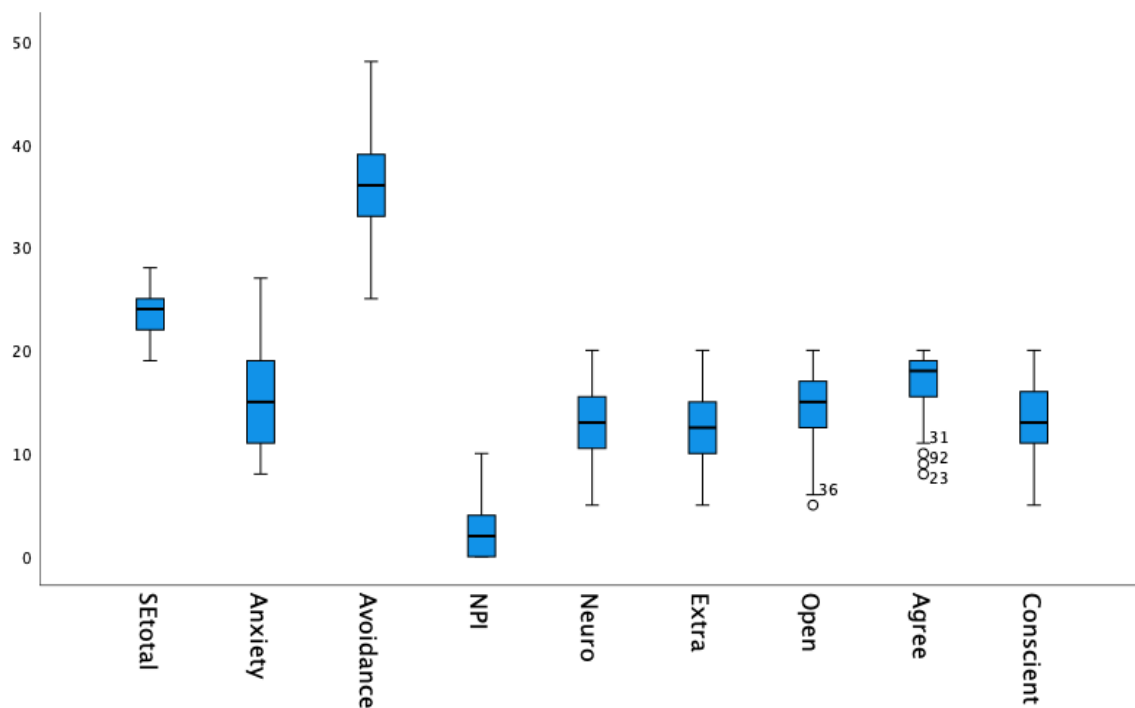
To further explore the data set, a review of skewness was performed. Whilst results showed no skewed data on self-esteem, attachment, and four of the five personality subscales, results



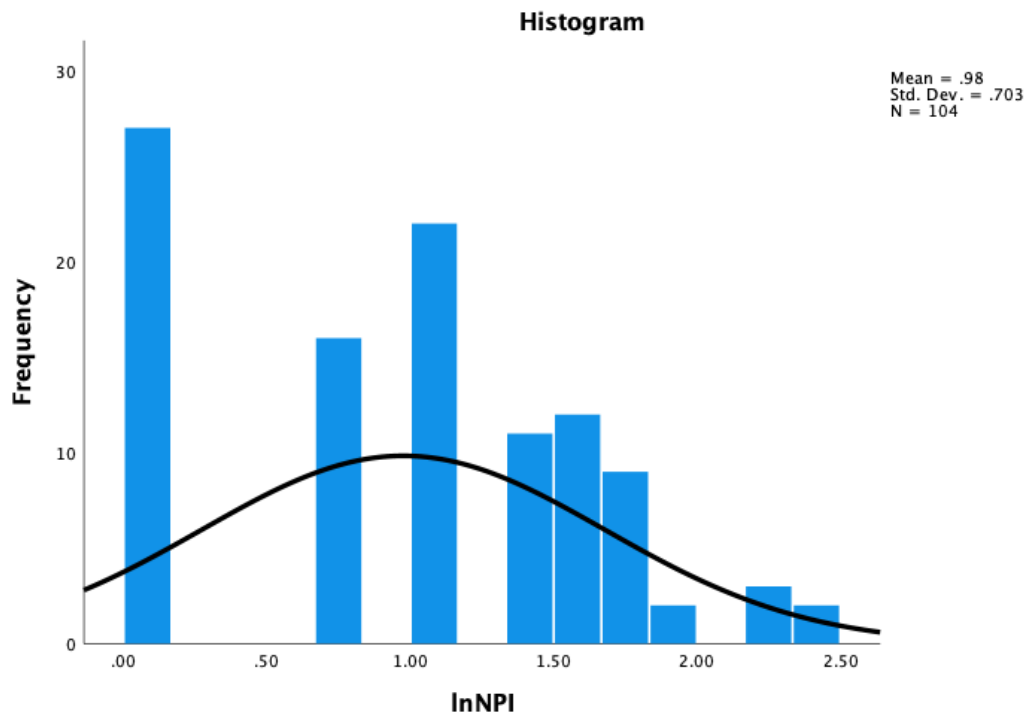
did show that narcissism was found to be +1.300, indicating that the distribution was positively skewed. Moreover, results showed that agreeableness was found to be -1.088, indicating that the distribution was negatively skewed. From here, a log transformation was performed on the narcissism value in an attempt to normalise the data. Please see Figure 2.

Furthermore, a review of kurtosis revealed narcissism to be +1.889. The results showed no further discrepancies in the distribution of the remaining IV's.

**Figure 1 – Box plot diagram demonstrating all predictors used in the study, Self-Esteem (SE Total), Anxious Attachment (Anxiety), Avoidant Attachment (Avoidance), Narcissism (NPI) and Personality (including the five sub variables in the personality predictor – Conscientiousness, Agreeableness, Openness, Extraversion and Neuroticism)**



**Figure 2 – Log transformation performed on Narcissism variable in attempt to mitigate skewness**



### **3.2 Selfie sharing frequency and filter use**

Next, to explore whether selfie sharing frequency and use of filters shared a relationship with gender or self-esteem, and to address assumptions made in hypothesis 1 and 2 which suggested:

**H1 – Females will engage in more frequented selfie sharing behaviours than males.**

**H2 – Individuals with low self-esteem will exhibit more frequented selfie sharing behaviours.**

Four 2x5 chi-squared analysis tests were performed against the two independent questions created to assess selfie sharing frequency (“I share photos of myself on my social media platforms - including Snapchat, Instagram and Facebook”) and selfie filter use (“I use social media filters that recognise my face and enhance my appearance, e.g. make my lips or eyes bigger, teeth whiter, skin smoother or face chiselled/defined”) (DV’s), both using the same five-point Likert scale as the PMS (where 1 = Never and 5 = Always). Chi-square analysis was

chosen due to its ability to offers understanding of relationships between various categories and helps compare how the categories are distributed between groups.

Results found that gender was significant in selfie sharing frequency ( $p = .018$ ), where females were found to share images of themselves more often than men. 32% of women ( $n = 25$ ) answered that they often share images of themselves on social media. Gender was also found to be significant in filter use ( $p = .018$ ), where women indicated more frequent filter use. Whilst self-esteem was not found to be significant in selfie sharing frequency ( $p = .390$ ), self-esteem was found to be significantly correlated with filter use ( $p = .037$ ) where lower levels of self-esteem demonstrate a relationship with filter use.

### 3.4 Principal Component Analysis (PCA)

Principal component analysis was performed to identify potential subscales within the Photo Manipulation Scale (PMS). This test was performed to explore whether McLean et al. (2015) PMS could further explain and identify important features in the data set. PCA is crucial for uncovering trends or clusters within the data, making it key for exploration in this analysis.

Principal Component Matrix (PCM) with a Varimax rotation using Kaiser Normalisation of 10 questions extracted two components, the Cosmetic subscale (1) and the Structural subscale (2). The factors were extracted on the basis of eigenvalues greater than 1.

**Table 2 – Factor Component Loadings**

<i>Items</i>	<i>Factor loadings</i>
<b>1. Cosmetic Photo Manipulation (1)</b>	
Adjusting the light/darkness of the photo	.814
Edit to hide blemishes like pimples	.713
Edit or use apps to smooth skin	.684
Use a filter to change the overall look of the photo, e.g. making it black and white, or blurring or smoothing images	.671
Highlight facial features, e.g. cheekbones or eye colour/brightness	.566
Get rid of red eye	.490
<b>2. Structural Photo Manipulation (2)</b>	

Make yourself look skinnier	.896
Make specific parts of your body look larger or look smaller	.817
Whiten your teeth	.635
Make yourself look larger	.532

As demonstrated in the above table, six items loaded into the Cosmetic component of the 10 questions asked in the PMS and the remaining four items loaded into the Structural component (see Table 2). Items loaded into the Cosmetic component were identified as so due to the superficialness of touching up a blemish for example. These examples of photo manipulation could be appreciated as minor cosmetic touch ups to the individual's appearance, or simple enhancing of the image for a more professional look (such as smoothing images or removing red eye). It could be argued that this type of photo manipulation is more believable, and simply enhancing features that this individual already holds – for example, touching up a blemish would not significantly impact the individual's overall appearance. The items loaded into the Structural component were categorised as more extreme enhancements and may be more noticeable changes. For example, increasing or decreasing parts of an individual's body would not be an easy fix in regard to real life enhancements, including an increase in breast size in women or muscle size in men, and would be noticeable offline and in person.

The percentage of variance for component 1 was observed as 44.62% (the Cosmetic subscale). For component 2, the percentage of variance was observed to be 12.95% for (the Structural subscale).

**Table 3 – Pearson's r Correlation for Narcissism, Personality, Attachment, Self Esteem and Photo Manipulation (both Cosmetic subscale and Structural subscale)**

	Narcissism	Neuroticism	Extraversion	Openness	Agreeableness	Conscientiousness	Anxiety	Avoidance	Self Esteem
<b>Cosmetic Subscale</b>	.235	.184	-.002*	.011*	.198	.124	.181	.091	-.025*
<b>Structural Subscale</b>	.380	.172	.027*	-.089	-.055	.081	.207	.077	.082
<b>Narcissism</b>		-.020*	.222	.019*	-.331	.092	.109	.018*	-.048*
<b>Neuroticism</b>			-.215	-.012*	.176	-.113	.472	.155	.197
<b>Extraversion</b>				.151	.193	.077	-.232	-.120	-.158
<b>Openness</b>					.303	.068	-.226	-.066	-.081

<b>Agreeableness</b>						.180	-.123	-.049*	-.124
<b>Conscientiousness</b>							-.274	-.157	-.167
<b>Anxiety</b>								.473	.187
<b>Avoidance</b>									.114

\* $p < .05$

In the above correlation table, several significant relationships were observed between variables. Neuroticism and narcissism demonstrated a negative correlation ( $r(103) = -.020, p = 0.05$ ), whilst extraversion was found to be positively correlated with the Structural subscale ( $r(103) = .027, p = 0.05$ ) but negatively correlated with the Cosmetic subscale ( $r(103) = -.002, p = 0.05$ ). Furthermore, Openness was found to be positively correlated with the Cosmetic subscale ( $r(103) = .011, p = 0.05$ ) and Narcissism ( $r(103) = .019, p = 0.05$ ), but demonstrated a negative correlation with Neuroticism ( $r(103) = -.012, p = 0.05$ ). Avoidance and Narcissism were found to be positively correlated ( $r(103) = .018, p = 0.05$ ) whilst Agreeableness presented a negative relationship with Avoidance ( $r(103) = -.049, p = 0.05$ ). Moreover, Self-esteem demonstrated negative correlations with both the Cosmetic subscale ( $r(103) = -.025, p = 0.05$ ) and Narcissism ( $r(103) = -.048, p = 0.05$ ). Conscientiousness and Anxiety did not present any significant relationships in the data.

### 3.5 Multiple regression analysis

Following this, four of the predictor variables Narcissism, Self Esteem, Attachment and Personality (Conscientiousness, Agreeableness, Openness, Extraversion and Neuroticism) were inputted into linear multiple regression analysis, in order to examine how effectively each IV predicts the two subscales of the Photo Manipulation Scale. Two multiple regression tests were run in order to account for each of the previously identified subscales – subscale 1 (the Cosmetic subscale – see Table 4) and subscale 2 (the Structural subscale – see Table 5). For each predictor variables taken separately, the beta values can be found below in Table 4 for Cosmetic subscale and Table 5 for Structural subscale:

**Table 4 - Unstandardised and standardised regression coefficients for Cosmetic subscale**

	<b>B</b>	<b>Std Error</b>	<b>Beta</b>	<b>t</b>	<b>Sig.</b>
<b>Narcissism</b>	.799	.249	.348	3.212	.002*
<b>Neuroticism</b>	.070	.154	.051	.456	.650
<b>Extraversion</b>	-.158	.169	-.098	-.935	.352
<b>Openness</b>	-.093	.163	-.057	-.571	.570
<b>Agreeableness</b>	.659	.224	.341	2.947	.004*
<b>Conscientiousness</b>	.142	.162	.088	.876	.383
<b>Anxiety</b>	.154	.142	.138	1.086	.280
<b>Avoidance</b>	.033*	.125	.028*	.262	.794
<b>Self Esteem</b>	-.030*	.262	-.011*	-.115	.909

**Table 5 - Unstandardised and standardised regression coefficients for Structural subscale**

	<b>B</b>	<b>Std Error</b>	<b>Beta</b>	<b>t</b>	<b>Sig.</b>
<b>Narcissism</b>	.436	.116	.404	3.762	.000*
<b>Neuroticism</b>	.064	.072	.099	.887	.377
<b>Extraversion</b>	-.010*	.079	-.014*	-.131	.896
<b>Openness</b>	-.076	.076	-.099	-.990	.325
<b>Agreeableness</b>	.092	.104	.101	.883	.379
<b>Conscientiousness</b>	.068	.076	.089	.894	.374
<b>Anxiety</b>	.058	.066	.112	.882	.380
<b>Avoidance</b>	.002*	.058	.003*	.029	.977
<b>Self Esteem</b>	.099	.122	.078	.813	.418

\*p<.05

Multiple regression analysis was selected as the chosen statistical test due to its ability to analyse combined effects of predictors which in this case included the above noted variables - Narcissism, Self Esteem, Attachment and Personality (Conscientiousness, Agreeableness, Openness, Extraversion and Neuroticism). Moreover, multiple regression analysis helps

identify and quantify relationships – In order to better understand how changes in one variable may affect the result, multiple regression offers a quantitative method of evaluating the strength and direction of correlations between each predictor variable and the dependent variable. This test was performed in order to explore assumptions made in hypothesis 4, 5 and 6, which suggested:

**H4 – Narcistic individuals will demonstrate higher levels of photo manipulation.**

**H5 – People low in extraversion will in engage in lower levels of photo manipulation.**

**H6 – Individuals with an anxious attachment will manipulate their images**

Result showed that the Cosmetic subscale was found to be overall statistically significant ( $R^2 = .197$ ,  $F(9,94) = 2.558$ ,  $p = .011$ ). It was found that Narcissism was significantly correlated with the Cosmetic subscale ( $\beta = .348$ ,  $p = .002$ ), as was the Agreeableness trait of personality ( $\beta = .341$ ,  $p = .004$ ). None of the remaining IV's were found to be significant and therefore did not provide significant results with the Cosmetic subscale.

Furthermore, the Structural subscale was also found to be statistically significant ( $R^2 = .210$ ,  $F(9,94) = 2.779$ ,  $p = .006$ ). Whilst results showed that Narcissism was significantly correlated with the Structural subscale ( $\beta = .404$ ,  $p = <.001$ ), the Agreeableness trait was not ( $p = .379$ ), unlike the Cosmetic subscale. Moreover, Narcissism was the only significant correlation in the Structural subscale.

To address potential concerns regarding multicollinearity, an assessment of tolerance levels was conducted. Tolerance was scrutinised for each predictor used in the multiple regression analysis, and results showed that none of the values presented below the accepted threshold of 0.2, therefore confirming no multicollinearity present in the data.

### **3.6 Factorial ANOVA**

A factorial ANOVA was conducted to compare the main effects of self-esteem and gender on levels of photo manipulation in both the overall scale, and the two subscales (Cosmetic and Structural) uncovered as part of the above factor analysis extraction. Factorial ANOVA was chosen to analyse the data to understand how each factor and their interactions influence the dependent variable(s). In the case of this study, it was a sensible choice when exploring effects between the two factors, gender, and self-esteem. This test was performed in order to explore assumptions made in hypothesis 3 which suggested:

### **H3 – Females with low self-esteem will score higher in photo manipulation compared to males.**

A median split of total scores collected against self-esteem was conducted to obtain values of high levels of self-esteem and low levels of self-esteem (median = 23). Values of 23 and below were coded as 1 and values above 23 were coded as 2. Gender was inputted as 1 for male and 2 for female. The revised categorical data was used to perform a between participants ANOVA analysis on both the PMS overall, and both the Cosmetic and Structural components. The main effect for self-esteem yielded an F ratio of  $F(1,100) = .267$   $p = .606$ , indicating no significance in the overall Photo Manipulation Scale and neither subscales of the PMS, Cosmetic ( $p = .686$ ) and Structural ( $p = .548$ ). However, gender was found to be significantly associated with the PMS where F ratio was found to be  $F(1,100) = 10.21$   $p = .002$ ). It was also found that the Cosmetic component of the scale was significant ( $F(1,100) = 15.03$   $p = <.001$ ).

As the present study deals with several multiple comparisons, Bonferroni corrections were applied during the statistical analysis. This correction method was used to adjust the significance threshold for hypothesis tests and post-hoc comparisons to mitigate the increased risk of Type I errors. The Bonferroni-corrected significance level ( $0.05/9$ ) was set at 0.005 to account for the nine predictors in the multiple regressions analysis. When applying this correction to the significant results of both the Cosmetic subscale and the Structural subscale, both NPI (for the Cosmetic and Structural subscales) and Agreeableness (Cosmetic subscale only) remained significant. This provides further robustness of the study findings.

The above results demonstrate a significant relationship between gender and selfie taking where females were found to be more frequent in their selfie sharing behaviours than males. 32% of women reported often sharing images of themselves on social media. Gender was also found to be significant in beauty enhancing filter use, where females reported often using filters to enhance their appearance. Moreover, results showed that lower levels of self-esteem appear to correlate with more frequented filter use.

The findings of the study suggest that women are not only more likely to share more photos of themselves online, but they also appear to use selfie filters more than men. This supports the proposed hypothesis that women would manipulate their images more than men. Furthermore, findings showed that those with low self-esteem were more likely to use filters.



## **4. Discussion**

As much of previous literature suggests, selfies are commonplace amongst internet users and are becoming more popular by the day (Srivastava et al., 2018). Whilst earlier findings have investigated the relationship between selfies, filters and online social media use in relation to individual predictors, few have succeeded in using several predictors to explain the relationship between individual differences and photo manipulation and filter use. This study set out to explore whether individual differences impact selfie taking frequency, selfie filter use and photo manipulation in social media users. Results showed that higher levels of narcissism is a key predictor in photo manipulation in young adults, and agreeableness demonstrated a relationship with the cosmetic element of photo editing. Furthermore, women were found to be more likely to share images of themselves online compared to men, as well as more likely to use selfie filters to enhance their appearance online. Whilst self-esteem did not demonstrate a relationship with selfie posting and frequency, it did indicate those who are more likely to have low self-esteem use more beauty filters than those with higher levels of self-esteem.

### **4.1 Gender, selfie sharing and filter use**

The present study aimed to explore whether gender plays a role in individuals selfie sharing and filter use. Findings showed that compared to males, females were more likely to not only share photos of themselves online, but also that they were more likely to use selfie filters that enhance the user's appearance, such as beauty filters.

Gender is a complex and controversial topic, and has long been used in psychological research to determine whether our innate biological differences of being either male or female is a predictor in behaviours. Gender appears to play a significant role in how we use and consume social media, and has been thought to affect the way we present ourselves online (Wu et al., 2015). Previous empirical research has suggested that both males and females use selfies as an opportunity for self-presentation online (Guo et al., 2018; Dutta et al., 2016; Katz and Crocker, 2015), where women are more likely to engage selfie related behaviours compared to men (Carpenter, 2012).

The collection of earlier research regarding gender differences and social media use indicated rationale to explore the potential relationship further in the context of filter use and selfie sharing frequency – as Mascheroni et al. (2015) reported that both male and female

adolescents edit their images, including the use of filters, blurring or smoothing skin and editing the size of body parts to appear larger/smaller. As a result of the existing literature regarding gender and its potential relationship with selfie-related behaviours, initial predictions resulted in the development of hypothesis 1:

**H1 – Females will engage in more frequented selfie sharing behaviours than males.**

The results from the present study supports the predicted hypothesis that females are more likely to engage in more frequented selfie sharing behaviours, compared to men. The findings also demonstrated a relationship between gender and filter use, which was not considered in the initial hypotheses, due to little evidence available to suggest that gender plays a role in shaping how people interact with filters. Despite this, the results provide critical insight into how gender can influence individuals' relationship with selfies and filter use.

The outcome of the present study does support previous findings in the general arena of selfie-sharing/taking and gender, including the findings of Dhir et al. (2016) who identified females are more likely to post selfies and personal images, as well as crop their selfies and use filters. Moreover, this further supports previous literature that has observed that females are more active in manipulating images and using filters than males (Chae, 2017; McLean et al., 2015, 2019; Mingoia et al., 2019). This may be explained by earlier suggestions that women care more about their appearance than men (Öberg and Tornstem, 1999; Quittkat et al., 2019; Workman and Lee, 2011) and often promote this more than men (Walter et al., 2020). As suggested previously, this could be amplified by societal beauty ideals (Hargreaves and Tiggemann, 2003) and fulfilling stereotypical gender roles (Chappetta and Barth, 2022).

Lavrence and Cambre (2020) suggest that some of the most heavily engaged with content on social media are filtered faces, whilst Bakhshi et al. (2021) found that filtered images attracted more engagement in the form of views and comments, compared to unfiltered images. In line with findings from Nguyen (2014), who found that young women shared images of themselves with the hopes of receiving positive feedback, it could be suggested that young women feel fulfilled and gratified upon experiencing high engagement of their selfie sharing.

It is important to draw inference to how modern social media operates, including the 'influencer culture' and 'content creator'. The UK Parliament released a report discussing and defining the phenomenon of the social media influencer. They note that the terms used for influencer is used interchangeably with content creator, 'TikTocker' 'YouTuber' and others, which makes a clear-cut definition more challenging. The Digital, Culture, Media and Sport Committee

(2022) for the House of Commons, report that it is common for influencers to airbrush, edit and use beauty filters to fit the aesthetic nature of the platform. The report also suggests that a survey from the Girl Guides in 2020 evidences the negative impact on girls and young women of influencers and their promotion of unattainable lifestyles and unrealistic beauty standards, with mounting pressures to appear 'perfect' online (Digital, Culture, Media and Sport Committee, 2022).

Females also heavily dominate the social media landscape in regards to followers of popular accounts, and 'influencers'. Collabstr (2023) recently compiled its latest report on influencer marketing, where it demonstrates the clear gender difference in social media influencing. After analysing 50,000 influencer profiles, it found that 77% of influencers were female, where an imbalance in gender is observed across nearly all social media platforms – including TikTok (76% female), Instagram (79% female), YouTube (69% female) and user generated content and content creation, such as advertisements and PR materials developed by the user (89% female). With this in mind, it is important to consider how girls and young women are consuming their social media – for example, if the majority of online influencing is done by women, it is almost impossible for non-influencing women not to compare what they see online, and potentially over-consume this. Therefore, it is understandable that women may feel more pressure to maintain and uphold their best selves, particularly if they continually engage with those women who present perfect lifestyles, skin, hair, makeup etc.

One possible explanation for this could be justified through Festinger's Social Comparison Theory (1954). Social Comparison Theory suggests that individuals base their own personal and social worth on the interactions and assessments they make of others' perceptions of them. It could be argued the validation online interactions and 'likes' provide give women a sense of worth and an 'impression' of how others view them. For example, a young female might share a selfie that is filtered and well reacted to, this in turn may provide an 'evidence-base' that other online users 'like' her and the filtered version of her selfie. It is also important to consider the notion of Asynchronicity – online users have the opportunity to review and edit responses/actions before pressing send on a message, for example. This level of editing responses is not available in face-to-face communication, and although helpful for those who are shy or self-conscious (Chan, 2011), the editability opportunity online can be misused and allows individuals the chance to optimise their self-presentation online (Walther, 2007).

Whilst the present study is able to demonstrate gender differences in selfie sharing, more needs to be done to explore the depth of both men and women's relationships with selfies and filter use. For example, the questions that participants answered is directed towards how often

an individual posts their selfies to social media. However, as we understand from previous research surrounding Snapchat for conversation purposes (Katz and Crocker, 2015) and simply saving a selfie to one's phone but not sharing (Shin et al. 2017), have different layers of selfie related behaviours – i.e., a man may physically take as many selfies as a woman, but might chose not to publicly promote this on social media platforms, or admit they frequently take selfies. Considerations such as the above will be crucial in future research around the impact gender has on selfie related behaviours.

#### **4.2 Self-esteem, sharing selfies and filter use**

This study also looked to explore whether there was a relationship between self-esteem and the use of filters, and self-esteem and selfie sharing frequencies. It was observed that whilst self-esteem and selfie sharing frequency did not demonstrate a significant relationship, low levels of self-esteem and the use of beauty filters exhibited a negative correlation.

Self-esteem functions as a self-evaluation tool and has been defined as the either favourable, or unfavourable attitudes we hold against ourselves (Rosenburg, 1965). Theories of self-esteem provide evidence to support the notion that there is a universal desire for humans to uphold, defend, and develop their self-esteem (Rosenberg et al., 1989). Self-esteem in the context of image and appearance is largely intertwined with our self-presentation, which is now being observed in our online interactions. Previous findings from Chau and Chau (2016) demonstrated that low self-esteem and insecurity emphasised individual's efforts to manipulate their self-presentation online.

In the present study, self-esteem was chosen as an independent variable as one of five individual differences due to previous research indicating a possible relationship exists between self-esteem and selfie-taking behaviours. Based on a number of studies that suggests self-esteem is negatively correlated with social media use (i.e. (Jan et al., 2017; Vogel et al., 2014; Woods and Scott, 2016), and a growing number that found low levels of self-esteem are associated with selfie taking and sharing (i.e. Mills et al., 2018; Perloff, 2014; Shin et al., 2017), initial predictions for the current study resulted in the development of the following hypothesis:

**H2 – Individuals with low self-esteem will exhibit more frequented selfie sharing behaviours.**

As mentioned previously, whilst there is evidence out there to suggest a relationship exists between low levels of self-esteem and more frequent selfie sharing, the present study does *not* support this. Instead, the results of the research indicated that there was no significance observed between levels of self-esteem and selfie sharing, refuting hypothesis 2.

Whilst initial predictions about self-esteem and frequency of selfie sharing did not confirm hypothesis 2, the findings of the present study are supportive of previous research from Barry et al. (2017) who also reported finding no significant relationship between levels of self-esteem and self-posting. Similar to the present study, Barry et al. also used the Rosenberg Self Esteem scale as measure of self-esteem in their research, and sought to recruit undergraduates to their research sample. However, Barry et al. focused their research intently on Instagram as a platform alone, and coded the selfies uploaded to the site. Moreover, Forest and Woods (2012) undertook a similar study using the RSES as a measure of self-esteem, but instead used Facebook as their primary social media platform. They also found no differences between levels of self-esteem and selfie posting.

Whilst the above-mentioned research focuses on individual platforms and the images posted to the site, compared to the present study that uses the overall notion of social media platforms (giving the example in the questions; 'including Snapchat, Instagram and Facebook' as possible platforms), it appears neither specifying, nor broadening the potential platforms influences the possible relationship with self-esteem. Yet, previous research exploring self-esteem and selfie-posting has produced significant findings, where a relationship between the two was observed. For example, Mills et al. (2018) found that undergraduates who are active in sharing selfies demonstrated lower levels of self-esteem. Moreover, findings from Pounders, Kowalczyk, and Stowers (2016) led them to speculate that selfie uploading may be an attempt to boost women's feelings of self-esteem, which could suggest that those with low levels of self-esteem do not post their selfies to social media, unless they are using a beauty filter, or feel wholly comfortable with the selfie they are sharing.

Whilst the initial predictions were not supported by the findings of the present study regarding self-esteem and photo sharing, an interesting discovery by way of filter use was uncovered. Upon reviewing the available literature initially, there was little supporting evidence to suggest a relationship between self-esteem and filter use existed in research, and therefore no hypothesis was formed on the basis of initial predictions. However, in order to widen the scope of selfie related behaviours, and understanding filters are now a large part of online selfie related behaviours, it felt appropriate to at least attempt to gauge frequency of filter use amongst participants and thus a single question was formed to assess frequency of use.

Interestingly, the results did confirm a correlation between low levels of self-esteem and frequency of filter use when a chi square analysis was completed.

It is interesting that the findings yielded a significant result in filter use, and not in selfie sharing, as it would seem sensible to find low self-esteem in both selfie sharing and filter use, if levels of self-esteem play a mitigating factor in individuals' relationship with selfie-related behaviours. One explanation for this could be that those who are suffering with lower levels of self-esteem, and are using filters, but not sharing them, are less confident to share the altered images of themselves online. Therefore, they may be using them and potentially saving them to their devices but not necessarily sharing them more widely, for example, via Instagram or other social media platforms.

Interestingly however, research from Shin et al. (2017) noted that the simple action of saving selfies on a smartphone was enough to negatively impact women's self-esteem, without the further action of then sharing online. This could be explained by the observatory effects of taking and viewing selfies on a smartphone (i.e., Diefenbach and Christoforakos, 2017), as this acts as mirror and can be misleading due to the nature of capturing the image and then reviewing the snapshot as many times as one wishes, including all the most appealing angles of ourselves, which is not possible in a mirror. It could be suggested that the availability of viewing the 'picture perfect' image over and over, and then looking in the mirror and noticing differences, might be particularly impactful on individuals, especially if they use filtered images or retouch their selfies. This is then further exasperated by posting to social media, which allows for further validation in the form of interactions such as likes and comments, potentially worsening an individual's self-esteem depending on the result of interaction – i.e., lots of likes/reactions to the selfie.

Meeus, et al. (2019) found that positive correlations between levels of self-esteem and an individuals perceived online popularity, where users need for popularity was negatively related with self-esteem, which could explain the aforementioned notion that lower levels of self-esteem can be correlated with several aspects of selfie related behaviours. It may also indicate that obsessional viewing of selfies drives those with lower self-esteem to view themselves through the augmented lens of beauty filters – for example, if an individual experiences particularly low levels of self-esteem upon viewing their selfies, they may only wish to look at their selfies with a filter on, which may also be another possible explanation for the significant correlation observed in the present study between filter use and low levels of self-esteem.

Fastoso et al. (2021) reported findings that demonstrated those with low self-esteem were more active in selfie editing. Dutta et al. (2016) suggest that selfie editing could be used as a means to manage feelings of low self-esteem and insecurity, and could explain how those with low levels of self-esteem opt to enhance their images to portray their more favoured look or appearance, particularly if the user experiences high engagement upon posting online. Whilst the present study did not provide evidence to support a relationship between low levels of self-esteem and high levels of anxiety, it could be suggested that those with lower levels of self-esteem, are more anxious and therefore want to present a more favourable or likeable presentation of themselves. This is true when looking at the findings of Michikyan (2022), who reported that young adults with higher levels of self-esteem may present a more authentic version of themselves online, compared to those with lower self-esteem, who may be more deceptive in their online presentation in order to present as more socially desirable.

Conversely, research conducted by Biolcati (2019), demonstrates the alternative by noting that lower levels of self-esteem were more frequently associated with less selfie posting activity could be an indication that in fact, selfie sharing is not an attempt to increase lower levels of self-esteem, but instead an indication that those who feel good about themselves are more inclined/happy to share this with others. Those who are experiencing low self-esteem may wish to completely avoid advertising themselves online in a public way such as selfie sharing and posting. Within the present findings, no such relationship can be asserted as results were not significant in selfie sharing.

It is also important to draw attention to the way the questions were asked in relation to selfie sharing. Additional questions that were not captured in the data collection may have provided different results about how those with either high or low levels of self-esteem view selfie sharing general, as opposed to their own experiences of taking and sharing selfies – for example, asking questions about participants opinions/views on people who post selfies. It may be that whilst those who are low in self-esteem do not share images of themselves, but think highly of others that do, or vice versa.

### **4.3 Photo Manipulation**

Photo manipulation, or sometimes referred to as photo editing, is the digital process of transforming an image, usually with intent to enhance or improve upon the original condition of the image. Historically, photo manipulation is most commonly seen in popular print or advertisement, such as magazines and billboards, where slimmed down models with

airbrushed skin exist (Brändlin, 2015), while the fashion industry is particularly notorious for casually retouching its images (Donovan, 2012). According to Schirmer et al. (2018), many of the models featured in advertising are regularly digitally enhanced to an unachievable and unrealistic level of perfection.

Today, this modification can be done in several ways, but is most commonly done using Photoshop. A huge global market exists for photo editing software nowadays; forecasts from the year 2020 indicated that it may reach \$1.48 billion by 2027 (The National Science and Media Museum, 2021). Moreover, Photoshop, one of the most well-known programmes on the market, is now synonymous with image manipulation. In fact, the word "Photoshop" was added to the Oxford English Dictionary in 2006 and is now a common household term. Whilst Photoshop is a hugely popular option for photo editing, novice platforms are now at the general public's palm to edit to their hearts content. Facetune, an app developed for editing images on your smartphone, provides a more condensed and concise version of some of the features available on Photoshop, including tools such as teeth whitening, skin smoothing and reshaping of features – compared to Adobe Photoshop, which is home to a plethora of symbols and options that can take years to master (Jennings, 2019).

The commercialisation of casual editing apps and accessibility to these platforms is an interesting and modern phenomenon, with clear consequences. The idealisation of perfect bodies, faces and lives is impacting young people's mental well-being and Instagram perpetuates and romanticises the 'picture perfect' – Kleemans et al. (2016) reported that exposure to manipulated Instagram images negatively impacted levels of body esteem in adolescent girls. Given this, it might be suggested that people may use apps and editing platforms to conceal and manipulate flaws in an effort to combat low self-esteem, and the idealisation present on social media platforms may make this behaviour seem normal, particularly if celebrity or peer is noticeably editing and creating 'perfect' images online.

The present study aimed to explore whether individuals' innate differences contribute to the frequency of photo manipulation in photos of themselves shared to social media. Whilst the literature surrounding photo manipulation/editing and individual differences is in its infancy, a handful of previous findings allowed several theories to form.

Earlier research on editing behaviours provided a small body of evidence suggesting that photo manipulation plays a mediating role in women's attitudes towards their appearance and self-esteem (McLean et al., 2015; Lee and Lee, 2021). This resulted in the development of the following hypothesis:



**Hypothesis 3 – *Females with low self-esteem will score higher in photo manipulation compared to males.***

Whilst previous literature has suggested a relationship exists, no such association was found in the results of this study. This lack of relationship however is similar to the findings of Biolcati (2019) who reported that lower levels of self-esteem in their female sample were in fact predictive of less selfie taking behaviours, compared to females with higher levels of self-esteem. Moreover, research from both Barry et al. (2017) and Forest and Woods (2012) reported finding no significant relationship between individual self-esteem and selfie-posting behaviours.

Previous literature also suggests a relationship exists between trait narcissism and selfie-posting (Sung et al., 2016; Weiser, 2015), which appears to be more prevalent in those who take selfies alone (e.g. DeWall et al., 2011; Weiser, 2015). For these reasons, initial predictions for the present study saw the development of hypothesis 4:

**Hypothesis 4 – *Narcistic individuals will demonstrate higher levels of photo manipulation.***

Results showed that those who were statistically more narcissistic were more likely to manipulate their images. In both subscales derived of the McLean et al. Photo Manipulation Scale (2015), Cosmetic and Structural, narcissism showed strong correlations in both components. This result supports the hypothesis (H4), that 'Narcistic individuals will demonstrate higher levels of photo manipulation'. This would suggest that those who are generally more narcissistic individuals, are more likely to augment their appearance for the purposes of sharing enhanced images of themselves online. This is line with previous research that suggests those who report higher levels of narcissism are more likely to edit their selfies, and demonstrate more frequented selfie-editing behaviours (Wang, 2019). Inference can also be drawn upon the significance found in both subscales, indicating narcissistic individuals may be inclined to edit their photos to extremes, including enhancing or downplaying certain body parts, which may or may not be subtle. It could also be suggested that narcissist individuals are more frequent selfie takers, and thus sharers, due to motivators such as attention seeking and boredom (Biolcati and Passini, 2018). If boredom is a potential motivator in selfie taking, editing and therefore enhancing images could be an outlet for narcissistic individuals to spend time looking at themselves and creating their favoured image of themselves, and could explain

the higher numbers of narcissistic individuals who reported higher levels of photo manipulation.

According to research from Vazire et al., (2008) a narcissist's attitude, obsession with beauty, and drive to command attention are all reflected in their outward appearance. This could explain some of the observations gained from the present study surrounding image manipulation – for example, if narcissists care heavily about their outward appearances, the same may be true for their online representations and desire to be centre of attention. As mentioned previously, some of the most well-liked social media posts feature filtered faces (Lavrence and Cambre, 2020), and filtered photographs received more views and comments than unfiltered images (Bakhshi et al., 2021). For a narcissistic individual, this evidence (which is easily viewable on Instagram where the 'like' count can be made available for users to view) could act as a motivator to also filter and manipulate their images. The potential increase in likes and comments on their content, may in turn satisfy their needs to appear to be the best/most liked/most viewed.

As previously mentioned, a relationship between trait narcissism and selfie-posting has been observed in earlier studies (Sung et al., 2016; Weiser, 2015), which seems to be more common in individuals who take solo selfies (e.g. DeWall et al., 2011; Weiser, 2015). It could be suggested that this may be due to the fact that narcissists are primarily interested in enhancing their own appearances, and do not wish to devote time to improving the appearance of others in group selfies. Alternatively, these findings could be a result of narcissists desire to maintain good self-presentation and self-promotion (Hart et al., 2016), and would prefer to avoid being exposed as shamelessly altering only their appearance in group selfies so reserve the editing for their own selfies.

While there is still a lack of prior research into the impact of personality in selfie related research, previous findings in attachment related research have observed that high extraversion appears to be a predictor of selfie posting and time spent editing selfies (Wang, 2019). Gilliland et al., (2018) found that extraversion positively correlated with the number of selfies taken per month. Due to observations in several previous studies noting a consistent link between Extraversion and greater numbers of selfies posted online (Guo et al., 2018; Kim and Chock, 2017; Sorokowska et al., 2016) it felt appropriate to hypothesise that those low in extraversion would be less inclined to exhibit selfie editing behaviours, and therefore resulted in the development of the following:

**H5 – People low in extraversion will in engage in lower levels of photo manipulation.**

However, the findings of the research do not support hypothesis 5, as no such relationship between extraversion and photo manipulation could be established. The lack of association is surprising given extraversion and social media are often related (e.g., Seidman, 2013) and initial predictions were based on the assumption that the reverse would be true. However, findings from Marengo et al. (2020) also note the lack of significant relationship between extraversion and selfie-posting frequency. Whilst there is little evidence to confirm introverts are less likely to manipulate their selfies, it could be suggested that those who are lower in extraversion simply avoid selfie related behaviours online due to their reserved nature. Amichai-Hamburger and Vinitzky (2010) suggest that introverts transfer their social behaviours offline into their online interactions, including smaller social networks.

Whilst a relationship between levels of extraversion and photo manipulation could not be evidenced in the present findings, results showed that the Agreeableness trait was found to be significantly correlated with the Cosmetic subscale identified from the PMS, suggesting that those who report higher levels of agreeableness, are more likely to manipulate their images. However, unlike narcissism noted above, the agreeableness trait was only found to be significant in one of the two identified subscales. This provides notion to suggest that whilst those who may be narcissistic are inclined to enhance themselves in most ways available (including both less noticeable and extremer manipulations), those who are agreeable, scored higher on questions that relate to minor enhancements, such as smoothing or blurring images. It could be suggested that an agreeable individual wishes to maintain strong self-impression management online whilst not looking too unrealistic by changing their body shape or structure. This notion is in line with suggestions made by Hunt and Langstedt (2014), who found that the Agreeableness trait was most linked to motives for self-presentation.

Whilst the present study did not predict that the Agreeable trait would provide any significant findings, previous selfie related research has suggested that the agreeableness was positively associated with the documentation motivator of selfie taking (Etgar and Amichai-Hamburger, 2017). Furthermore, Paris and Pietschnig (2015) discovered that positive attitudes towards travel selfies (photos taken during a trip and subsequently shared to showcase someone's travel experiences) were positively associated with the agreeableness trait. It could be suggested that agreeable individuals are more likely to showcase agreeable parts of their life, such as travelling, and therefore need to maintain the perception or idea that their lives are appealing. Interestingly, Choi et al. (2017) observed that selfie posters high in agreeableness were found to be more involved in liking and commenting on other users' selfies, as well as more likely to be engaged in others' responses to their own selfies. This could be explained

by agreeable individuals desire and knack for maintaining good social connections, which is prevalent in both offline and online settings. For instance, Seidman (2013) discovered that high levels of agreeableness were substantially responsible for motivations to maintain a sense of belonging and connection with others on Facebook.

For agreeable individuals in real life settings, this could be seen as a potential harmful lifestyle behaviour in desires to appear continually agreeable in both offline and now online settings. This could be further examined in conjunction with how this impacts agreeable individuals drive to please other people – for example, how they appear to other such as doing well in life or succeeding in the things they share through their social media.

Finally, despite the paucity of prior research on the effects of attachment as a moderator in selfie editing, the literature that is available suggests that attachment anxiety positively predicts social media addiction (Liu and Ma, 2019), whilst attachment insecurity was found to be positively correlated with selfie posting (Yue et al., 2017). For this reason, the present study theorised the following:

#### **H6 – Individuals with an anxious attachment will manipulate their images**

Despite initial predictions, the present study did not find a relationship to support hypothesis 6 that theorised those with an anxious attachment would manipulate their selfies. As previously mentioned, academic and psychological research into the relationship between attachment styles and selfie-related behaviours is sparse. However, the available literature does suggest that anxious attachments might play a mitigating role in individuals' relationships with their online experience. For example, according to the results of Oldmeadow et al. (2013), social media platforms offer the chance to cultivate attachment functions and are likely to appeal to people who have greater levels of attachment anxiety. Moreover, significant social media use has been found to be linked to addiction-related symptoms and attachment anxiety. (Blackwell et al., 2017; Eroglu 2015; Reed et al., 2016). Given the paucity of literature, it seemed logical to hypothesise that anxious attachments would have a moderating effect on interpersonal interactions with photo editing and manipulation, however, no such association was discovered, disproving hypothesis 6. It could be suggested that those who experience higher levels of attachment anxiety experience greater concern about the implication of editing their images, such as the opinions of others, and therefore avoid editing their selfies, or even posting them at all.

#### **4.4 Strengths**

This study is one of the first of its kind and contributes to some of the initial foundations for further research into how individual differences predict selfie-related behaviours, photo manipulation and filter use. It also received a moderate to large response rate of over 100 participants ( $n = 104$ ), which could be considered as a robust sampling size. Moreover, the nature of the study is particularly pertinent to our current and changing world – selfies and social media are now part of everyday life and should continue to be considered in future research as significantly contributing to our behaviours. Additionally, the successful uncovering of two subscales within McLean et al's (2015) Photo Manipulation Scale (PMS) through completion of Principle Component Analysis allowing for a richer interpretation of research findings. This study has also successfully demonstrated a relationship between Narcissism and two subscales of the PMS (Cosmetic and Structural) and between Agreeableness and the Cosmetic component of the PMS, supporting the proposed hypothesis that 'Narcissistic individuals will demonstrate higher levels of photo manipulation'. Furthermore, the findings also demonstrated a relationship between gender and selfie-behaviours, including the use of filters, which allowed for acceptance of hypothesis 1 which proposed: 'Females will engage in more frequented selfie sharing behaviours than males'. Whilst not all hypotheses were accepted, the data provided valuable insights into how our individual differences predict our behaviours and relationship with selfies, photo manipulation and filter use.

#### **4.5 Limitations**

Whilst the current study has provided an insight into individuals differences and predictors, and the impact this has on young people's photo manipulation and selfie taking/sharing behaviour, there are several limitations to the research. Firstly, the current study only explores the individual differences in young adults and their relationship with photo manipulation, selfie taking/sharing and filters – to further strengthen the findings of the current research, a wider demographic to include older adults could provide richer results. Furthermore, the study was advertised across the social media platforms Facebook, Twitter and Instagram, however it could have benefitted from advertisement to wider platforms such as Snapchat and Reddit. Like numerous studies exploring selfies and filter use, a considerable portion of the existing literature relies on self-reporting methods to collect data. Consequently, one of the notable limitations of this study pertains to the reliance on self-reporting methodologies. This choice creates inherent challenges due to participants susceptibility to various biases, including social desirability bias, where participants may offer responses that align with societal expectations

rather than reflecting their authentic experiences. Addressing these methodological considerations is crucial for a nuanced understanding of the phenomena under investigation in the study of selfies and filter use. In future research, employing observational measures to directly observe participants' reactions or responses to stimuli could offer valuable insights into their relationship with selfies, filter use, and photo manipulation.

Furthermore, the research is limited by the demographics of the sample, particularly in terms of gender diversity and cross-cultural differences. While the survey did not collect data on ethnicity or education status, it is reasonable to deduce that a significant proportion of the participants were likely from the UK or Western cultures. Rad et al. (2018) explores the concept of WEIRD (Western, Educated, Industrialised, Rich and Democratic) samples in Psychology, suggesting that whilst research demonstrates we should always look to be as inclusive as possible in our sampling, often we are not. This is pertinent to the present study, where the circulation of the survey took place via social media and other online platforms. This inadvertently creates a form of digital exclusion, as it assumes everyone has the necessary tech skills and internet access, which is not a truly inclusive representation. This is particularly prevalent for those from lower socioeconomic groups, limiting the study's ability to access diverse perspectives. To overcome this, future research should use more varied and inclusive recruitment methods for a more representative sample. This might look like an alternative method of data collection, such as focus groups or interviews, to include a more varied cohort of participants – without the need to rely on technology for responses.

Additionally, as noted previously, gender is a complex and currently sensitive social concept. Addressing gender diversity is crucial in research, and the current study may be limited in its representation of various gender identities. The present study asks participants to identify as 'Male', 'Female' or 'Other' (where those who select 'Other' were asked to further specify in typeable box). As the concept of gender is changing and definitions are evolving (such as the non-binary community who do not conform to standard societal definitions of gender), it's important to consider the modern-day impact of asking people to specify what they identify with. Considerations of this in future research may like recruiting participants who do not conform to stereotypical gender identities and instead explore how selfies relate to those from the LGBTQ+ community.

## 4.6 Future research

Whilst the present study uses several potential predictors to explain selfie related behaviours, future research could look to include the potential impact of perfectionism online. Perfectionism is demonstrating an impact on users well-being and dissatisfaction with themselves. Perfectionism is a personality trait that comprises strict self-criticism and exceptionally high personal standards (Frost et al., 1990) and has been observed in the domain of physical appearance (Stoeber and Stoeber, 2009). Previous research has demonstrated consistent links between Perfectionism and body dissatisfaction (Donovan et al., 2014; Wade and Tiggemann, 2013; Welch, et al., 2009), and has been shown to be predicative of upward social comparison and appearance dissatisfaction on sites such as Instagram and Facebook (McComb and Mills, 2021; Padoa et al., 2018). It could be argued that perfectionism online is cultivated by image sharing where users promote their most 'ideal-self'. By fostering comparisons amongst those who experience higher levels of the perfectionism trait, these individuals may ultimately feel worse about their own appearance through comparing how 'perfect' others online lives appear in comparison to their own. This would be an interesting future direction for selfie and photo manipulation related research.

It is also worth noting that generally, selfie related research focuses on the individual and their experiences and attitudes towards selfies, but as selfies become part of our normal lives, investigations into the impact on society and our younger generations will be highly important. Selfies have proved to be powerful enough to convince people they need surgery (Rajanala et al., 2018) and that life might not be worth living if you do not look like your selfies (Senft and Baym, 2015), and therefore considerations regarding selfies and there sometimes detrimental effects on well-being should be considered.

Moreover, whilst selfie-related research is still relatively new in regards to previous literature, a longitudinal study would be an interesting way to further explore the long term impacts of selfie and filter use culture. For example, do young people demonstrate more reliance on selfies to promote their self-presentation online in their younger years, but move away from this as they age? Following a younger group of participants through from their 20's to their 40's – for example – might make for interesting and potentially important findings.

## **5. Conclusion**

To conclude, this study set out to explore whether individual differences including Self-esteem, Narcissism, Personality, Attachment and Gender are predictors of selfie taking and photo manipulation.

As demonstrated by the review of literature, research surrounding selfie related behaviours online including, taking selfies, sharing selfies and manipulating/filtering images has generally been investigated using a single lens. The present study uses a multifactorial lens in an attempt to evidence how our differences predict our motivations and behaviours surrounding selfie related behaviours. Conducting the review of current and previous literature also provided opportunity to understand the paucity of psychological studies in certain areas of selfie related research, particularly in attachment and personality.

The findings from the study showed that females were more likely to share selfies on social media, and use beauty filters compared to men. Whilst the present study is supportive of former literature that also observed women are more likely to share images of themselves (Sorokowski et al., 2015), and edit, crop and use (filters Dhir et al., 2016) compared to men, there are important implications to consider in these findings. For example, women are already considered to be more enamoured with how they look (e.g., Quittkat et al., 2019) and therefore considerations regarding reinforcing gender stereotypes should be illustrated. Whilst the present findings confirm a gender difference, it must be remembered that the findings are not representative of either all women, or all men and there are some cases where both men and women use selfies as an opportunity for self-presentation online (e.g., Guo et al., 2018).

Low levels of self-esteem were also found to be significantly negatively correlated with more frequented beauty filter use. Furthermore, those who demonstrated higher levels of narcissism were more likely to manipulate their images, both Structurally and Cosmetically, while higher levels of Agreeableness were found to be significantly positively correlated with the Cosmetic subscale. The analysis of the data was also able to uncover two subscales within the Photo Manipulation Scale using PCA comprising of subscale 1, which was defined as the Cosmetic subscale. and subscale 2, which was defined as the Structural subscale. This analysis allowed for further interpretation of the types of manipulation participants reported subjecting to their selfies, including casual touch ups and softening (Cosmetic) in contrast to manipulating the size of body parts (Structural). In turn, this resulted in a richer understanding around how predictors like narcissism may be responsible for all types of image alteration, whereas agreeableness was only connected to the Cosmetic component of the scale.



The degree to which individuals feel they need to edit and manipulate aspects of themselves is a relatively new phenomenon and has only been possible due to the recent advances in technology and easy access to applicable software. While people may have disliked their appearance in previous decades or even sought to change certain aspects of themselves, the non-permanent modifications that can be made digitally elicit concerns for people's wellbeing. Users' capacity to see their most ideal self in digital form (without experiencing the same change in real life) raises concerns about how individuals see their unedited, unfiltered appearance offline. It is crucial to take into account how an individual's perception of their real appearance in comparison to their digital appearance affects how they feel about themselves – particularly if the modified version of themselves 'appears' popular online (i.e., receiving lots of likes on edited images). As mentioned earlier, research has observed that some selfie takers who were dissatisfied with the quality of their selfies experienced thoughts of self-harm (Senft and Baym, 2015).

The rise in popularity and appeal of cosmetic surgery and aesthetic procedures may be especially detrimental to people's wellness and self-esteem. As noted previously, cosmetic procedures are not without consequence or complication and can have fatal results in some cases. This is evidently impactful to people's lives if they feel they need to seek permanent changes in attempt to mitigate low feelings of self-worth. However, if permanent changes are not financially or routinely viable for people, this may significantly impact their mental wellbeing, affecting their self-esteem and potentially leading to depression.

The direction of selfie culture is unclear, requiring further scrutiny to understand the true impact of selfie taking, editing and filter use. Through one lens we see a revolt in filter use and editing of images (see Coole, 2021), and in another, observations surrounding Snapchat and similar platforms sees the development of terms such as 'Snapchat dysmorphia' (see Haines, 2022). It may be that society will witness generally poor mental health amongst selfie users who are active in editing and manipulating their images, or alternatively as suggested by Poe (2015), we may witness continued rising levels of narcissism amongst social media users.

Although earlier research has shown links between posting and taking selfies with a variety of factors, this is the first study of its kind by using a number of predictors in an attempt to explain motivations for selfie related behaviours. However, in order to learn more about how filter use and selfie editing impacts people's lives, considerations around the detrimental impact of easily accessible editing tools and constant consumption of selfies online needs to be further examined.

The findings from this research are important in shaping current literature and further understanding surrounding selfie related research, particularly filters and photo manipulation. The findings provide evidence for how individual differences influence our relationships with selfies and selfie related behaviour. Whilst further research in this field is needed to continue to develop understanding, the present study contributes to an essential establishment of literature regarding selfie related research and individual differences.

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## **Appendices**

**Appendix A – JISC Survey Export**

**Appendix B – Participant Debrief Sheet**