

‘What lies behind the filter?’: Uncovering the motivations for using augmented reality (AR) face filters on social media and their effect on well-being

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Abstract: Augmented reality (AR) filters are a popular social media feature affording users a variety of visual effects. Despite their widespread use, no research to date has examined either ‘why’ people use them (i.e., motivations) or ‘how’ their usage makes people feel (i.e., well-being effects). Through the uses and gratifications theory supported by a sequential mixed-method approach (interviews N = 10 and survey N = 536), we provide three overarching contributions. First, based on prior literature and a qualitative study, we identify nine motivations that can potentially drive AR face filter usage on Instagram. Our survey indicates that seven of those motivations (e.g., creative content curation, social interactions) are significant drivers of usage behaviours, while two (true self-presentation and silliness) did not have a significant impact. Second, we provide nuanced insights into the multi-faceted nature of the self-presentation motives underpinning AR face filter use (ideal, true and transformed self-presentation). Lastly, we show filter usage can have both positive and negative well-being effects depending on the underlying motivation. The results offer important implications for policymakers, site designers and social media managers.

Keywords: Augmented reality; Face filter; Social media; Uses and gratifications; Well-being; Self-presentation

1. Introduction

The lifeblood of social media platforms such as Instagram is the creation and sharing of visual content (photos and videos) (Choi & Sung, 2018; Kostyk & Huhmann, 2021), with site designers investing heavily in features (e.g., filters, airbrushing, photo-editing options) that aid users in creating visually appealing and engaging content (Vendemia & DeAndrea, 2018). The newest and most disruptive technology in this arsenal is augmented reality (AR) filters, which are commonly applied onto users' faces – for example, adding “cool” apparel, beautifying their facial features, transforming one into a fictional creature or overlaying ‘silly’ items (e.g. Taco hat). Bhatt (2020) reports that 600 million people use AR filters each month on Instagram or Facebook and 76% of Snapchat users use them every day.

The popularity of AR face filters is a testimonial that this format of AR taps into specific needs that users are motivated to satisfy. Yet, no study to date has uncovered what specific gratifications AR face filters fulfil. Prior research identified the gratifications that users pursue when engaging with social media (Erz, Marder, & Osadchaya, 2018) or, in the domain of AR, when playing games like Pokémon Go (Hamari et al., 2019; Jang & Liu, 2020) or wearing smart glasses (Rauschnabel, 2018). AR face filters differ rather substantially from these types of AR. AR games such as Pokémon Go and smart glasses involve augmentation of the external environment (e.g. a Pokémon appears in one's surrounding area), whereas AR face filters primarily augment the appearance of the users themselves. As such, they are closely associated with self-presentation. Prior research has documented that self-presentational technologies afford specific and important identity-related gratifications (e.g. Erz, Marder, & Osadchaya, 2018) and that AR face filters provide a unique ability to contribute to self-presentation (Javornik et al., 2021). It is thus necessary that the gratifications related to AR face filters are explored, as they are unlikely to have fully

emerged from studying other forms of AR. We aim to fill this gap by addressing our first research question. RQ1: *What motivations drive users when overlaying social media AR face filters on themselves?*

Crucially though, virtually modifying one's appearance can impact how users feel about themselves and consequently their mental well-being (Lee & Lee, 2021; Javornik et al., 2021). A related phenomenon is "Selfie dysmorphia," where consumers experience negative self-esteem issues and perceived body distortion when visually enhancing selfies (Rajanala, Maymone, & Vashi, 2018). This can be exacerbated by AR filters, as virtual modification occurs in real-time and is more realistic. In some extreme cases it has been known to push people towards cosmetic surgery (Hunt, 2019). On the other hand, social media can also positively affect mental well-being, for instance, when presenting aspects of oneself that are otherwise hidden or aiding exploration of one's identity (Choi & Sung, 2018; Yau, Marder, & O'Donohoe 2019). AR face filters could thus potentially affect mental well-being in a variety of ways. Yet, the empirical evidence is lacking, as noted in the vivid discussions on this subject (UK Government – House of Commons, 2019, 2020), and by the growing calls to unveil the impact of digital technologies on well-being (Marder et al., 2016; Lavertu et al. 2020). Our second research question (RQ2) thus asks: *How do the motivations associated with uses of AR face filters affect well-being?*

Through our mixed-methods approach that combines in-depth interviews and a survey study, we provide three theoretical contributions related to AR face filters in human behaviour. First, we uncover seven types of gratifications that drive the use of AR face filters, some unique to this particular feature (e.g., creative content curation, affiliation, silliness) while others are similar to those outlined in related studies (e.g., enjoyment, social interaction, ideal self-presentation) (Erz, Marder & Osadchaya, 2018; Jang & Liu, 2020). Second, we extend prior uses and gratification studies that have

assessed self-presentation motivation as a single dimension related to self-enhancement. We demonstrate self-presentation motives as multi-faceted. Specifically, they are associated not only with the drive to present the ideal self, but also with presenting the true self and with transforming one's self-presentation. Uncovering these key differences in the self-presentational drive for AR filter use contributes to the nascent stream of research on self-concept and immersive technologies in marketing and human-computer interaction fields (Javornik et al., 2021; Mueller et al., 2020). Thirdly, we contribute to the prior literature on social media and well-being (e.g., Zheng et al., 2020; Keles et al., 2019; Rui & Stefanone, 2013), showing that AR face filters can be a double-edged sword for well-being. They can have a detrimental impact if use is motivated by showing oneself in an idealised light, adding empirical weight to the notion that AR filters exacerbate selfie dysmorphia, while in other instances, positive effects can arise. These findings call for a more considered and ethical approach to the deployment of this technology.

2. Background

2.1 Motives for technology and media use

The uses and gratifications (U&G) approach examines what needs people are seeking to fulfil and how that motivates them to use a certain technology or media (Phua, Jin, & Kim, 2017; McLean & Osei-Frimpong, 2019). McQuail (1984) identified five general gratifications - seeking information, entertainment, social interaction, personal identity, and convenience – which vary across technologies or media.

U&G has been widely applied in the context of social media use to understand individual motivations and the corresponding gratification fulfilment (Erz, Marder, & Osadchaya, 2018; Flecha-Ortíz et al., 2021). A study of Snapchat showed that a “selfie” is the type of content that users are most likely to post as they seek to bond with close

contacts via such content (Piwek & Joinson, 2016). Similarly, Sung et al. (2016) found that communicating with friends and family was an important motivational driver for posting selfies on social networks, as well as archiving and attention-seeking. Alongside the motivations that underpin general use of social media, prior research also focused on specific features of such platforms – for instance, Instagram users reported employing hashtags due to their need for self-presentation, chronicling, information seeking, and also as part of online etiquette (Erz, Marder, & Osadchaya, 2018). Among these, self-presentation had the strongest association with hashtags’ use frequency. Sheldon et al. (2017) showed that students use Instagram for social interaction, escapism, documenting, and creativity. In their qualitative examination of adolescents’ motives for using Instagram, Throuvala et al. (2019) found that this demographic group relies on this platform for escapism: for instance, to counteract boredom, and also to be entertained or to learn new things. This is complemented by the convenience and social pressure of “being always on” that these platforms afford. Crucially, Throuvala et al. (2019) acknowledge the duality of a self-presentation driver, which encompasses both the idealisation and beautification as well as the more realistic and inclusive representation, which is traditionally absent from mainstream media.

In recent years, the U&G framework has also been examined in relation to certain forms of AR. Rauschnabel (2018) identified self-expression, socialising and enjoyment as the key motivational drivers for AR smart glasses use, but Rauschnabel, He, & Ro (2018) also highlighted that privacy risks can hinder this process. Furthermore, research by Ghazali, Mutum and Woon (2019) suggests that for the players of the AR mobile game Pokémon Go, the need for achievement, challenge and social interaction drive continuous use and enjoyment. Other studies examined motivational factors and adoption of Pokémon Go. Rauschnabel, Rossmann and tom Dieck (2017) demonstrate that intentions for continuous game use are driven by

emotional, social and hedonic factors. In other studies, entertainment and content enjoyment were also identified as the key use predictors of this app, as well as the game knowledge, nostalgia and trendiness (Jang & Liu, 2020; Hamari et al., 2019). This stream of research on AR games is complemented by a qualitative examination (Alha et al., 2019), unveiling also some other drivers of continued game use, such as prior positive experience, intrinsic interest and expectations.

While prior research has provided a thorough understanding of why individuals use social media and certain types of AR (AR mobile games, AR smart glasses), there is a paucity of research concerning the motivations that drive users to apply increasingly popular AR filters/effects. Prior research has shown that motivational factors for AR games as opposed to AR smart glasses differ (Rauschnabel, 2018; Ghazali, Mutum & Woon, 2019), thus indicating that different types and uses of AR differ in that regard. AR face filters stand out from these other forms of AR in terms of context, content and the way they are used. It is thus likely that different motivations drive this type of AR as opposed to other AR applications. So what makes so many people use AR filters ranging from fantasy characters to beautifying AR effects? Is it just because they are amusing and entertaining (Spark AR, 2021; Matney, 2020), or are there other reasons?

2.2. Social media and AR effects

AR has been applied across a range of contexts, such as marketing, where it is extensively used for advertising (de Ruyter et al., 2020), to deliver experiential value (Scholz & Duffy, 2018), and to permit virtual product try-on such as make-up (Javornik et al., 2016). While virtual try-ons were initially used for commercial purposes in the context of a purchase customer journey, they are rapidly becoming part of visually focused platforms, like Snapchat and Instagram (WeAreSocial, 2020), for hedonic and experiential purposes (see Fig. 1 for examples). People post photos of themselves with

flower crowns, doggy ears, or their faces on a slice of toast. Filters are a particularly popular feature of Instastories, with around 500 million Instastories published each day (Statista, 2021), documenting users' activities and shared with their audience for 24 hours (Statista, 2021).

The introduction of AR effects has enabled individuals to overlay the physical environment with virtual information such that the user can interact with these virtual elements in real-time as if they were actually situated in the physical space (Hilken et al., 2017). Spark AR Studio, which is a Facebook-owned platform for creating AR effects, became open to everyone to build their own filters, which further contributed to their proliferation (Hutchinson, 2019). An Instagram example is the account @face.effects, which has 258k followers and regularly features new filters that visualize creative, fantasy-like, politically engaged, beautifying, silly, animal-like, and other effects.



Fig. 1. Examples of a fantasy-like filter (left), filter with cool signifiers (centre left), beautifying filter with neon props (centre right), silly filter (right).

Similarly, AR effects are widely employed on other social media applications for videos and photos (Williamson, 2020). Importantly, such AR effects differ from filtered photos where editing is applied retroactively. Instead, AR enhancement occurs in real-time and is thus more dynamic and interactive.

2.3 Motivations for AR face filter use

Prior research in the area of social media, Instagram, and AR (Erz, Marder & Osadchaya, 2018; Rauschnabel, 2018; Sheldon et al., 2017; Throuvala et al., 2019) would suggest that the possible motives for the use of AR filters are likely to relate to self-presentation (how a person presents herself to the social network); enjoyment; social interaction; convenience. Before empirically examining these motivations in relation to the AR face filters, we hypothesise the potential links with use behaviour. Specifically, we examine how *frequently* individuals use the filters as well as how much they *explore* filters' variety. While we acknowledge that these two aspects of behaviour differ, this study is exploratory in examining differences across individual motivations. Thus, it is relevant to consider both behavioural components, as they can offer more holistic insights into new technology use (Venkatesh, Thong, & Xu, 2012). Also, because of the novelty of the applications, theory does not (yet) suggest a priori differentiation between the two aspects of use for AR filters.

Self-presentation – Users are likely to rely on AR filters to present themselves in a specific manner to an online audience. We look at three different types of self-presentation that individuals could be motivated to convey through filters. First, a possible type of self-presentation can relate to expressing the true self, i.e. the person one believes they truly are (Hollenbeck & Kaikati, 2013) – despite the virtual modification, representation through filters can be congruent with the user's true self. Conveying one's authentic nature is an important part of people's online representation (Back et al., 2010; Tosun, 2012). Offline, face-to-face interactions can inhibit the expression of the true self, while online platforms can potentially offer more freedom to users to express it (McKenna et al., 2002). AR filters offer new tools for visualising such true aspects of oneself. Our first hypothesis postulates the link between this motivation and filters' use and exploration.

H1: The need for true self-presentation drives a) use frequency and b) exploration of AR face filters.

Second, filters can depict an idealised version of the self, in other words the person one would ideally like to be. Such idealisation can be linked for instance with aspirations to be more beautiful or associated with cool signifiers (Hollenbeck & Kaikati, 2012; Hong et al., 2020). An idealised presentation of the self is a crucial part of social media activities, as users are much more likely to depict only the positive moments or their best looks to create an enhanced impression of themselves (Chua & Chang, 2016; Zheng et al., 2020). AR filters offer tools to convey oneself in real-time with improved image. This can be linked to attractive appearance and beauty standards such as smoothening the skin, bigger eyes or other characteristics commensurate with their ideal self (Samper, Yang, & Daniels, 2021). This gratifies the need for positive self-presentation. We hypothesise that it drives both the use frequency as well as the exploration of filters to find those that would best fulfil this need.

H2: The need for ideal self-presentation drives a) use frequency and b) exploration of AR face filters.

Third, users can rely on filters to engage in discovering new aspects of themselves. Such use is not tied to a true or ideal version of the self (please see Table 1 for conceptual distinction of self-presentation's dimensions), but is focused on the online transformation of one's self-concept (Yee & Bailenson, 2007). This is akin to the realisation of new 'possible selves', where individuals engage in cognitive processes (thinking, hoping, fearing) about who they might be or become (Markus & Nurius, 1986). As opposed to the "possible selves" that exist in one's imagination and thoughts, transformed self-presentation refers to the visualisation of that self-change, supported

by digital technologies (Yee & Bailenson, 2007). For instance, Yim et al. (2018) demonstrate how consumers mentally project themselves into an imagined scene or consumption context, which can transform their view of the self in the process. Younger consumers in particular have been shown to appreciate opportunities for such transformation and expansion of their self-concept, for instance when interacting with luxury brands (de Kerviller & Rodriguez, 2019). Similarly, individuals who are seeking novelty and change in the self-domain can rely on the interactive visual imagery of AR filters to present such new versions of selves. We hypothesise a link between such transformation and the use frequency as well as exploration of AR filters.

H3: The need for transformed self-presentation drives a) use frequency and b) exploration of AR face filters.

Dimensions of self-presentation	Definitions
True self-presentation	Presentation of the version of self that a person believes they truly are, but is unable to or prevented from presenting it to others in most situations (McKenna, Green, & Gleason, 2002, p.12)
Ideal self-presentation	Presentation of the aspirationally-defined and/or strategically chosen version of the self (Hollenbeck & Kaikati, 2012)
Transformed self-presentation	Presentation of a virtually modified self that represents a possible version of oneself (Lee & Bailenson, 2007)

Table 1: Definitions of self-presentation dimensions

Enjoyment – There is extensive prior evidence that AR technologies and virtual ‘try-ons’ are strongly associated with hedonic value (Javornik et al., 2016; Hilken et al., 2017). Enjoyment and fun represent an important driver for using AR smart glasses or playing AR games (Rauschnabel, 2018; Jang & Liu, 2020) and for engaging with social media generally (Throuvala et al., 2019). As with these other AR formats, enjoyment is expected to be an important driver for use frequency and exploration of AR face filters. The entertainment value can be associated with escapism, similar to other digital platforms that enable a mental projection of oneself into imaginary worlds

(Yim et al., 2018). AR filters can facilitate such mental transportation by situating the virtual elements right in the user's surroundings. Moreover, many AR face filters change one's appearance in a humouristic manner by adding funny virtual props, thus creating an enjoyable experience. Such enjoyment can be linked to viewing incongruencies between who one is and what one sees, similar to those experienced when dressing up in a costume for a themed party, as individuals do for Halloween (McKechnie & Tynan, 2008). We hypothesise that both use frequency and the exploration of the filters are driven by this gratification, because the users engage with and look for those filters that would best gratify their need for enjoyment.

H4: The need for enjoyment drives a) use frequency and b) exploration of AR face filters.

Social interaction – Prior research shows that people post selfies to communicate with others and keep in touch (Sung et al., 2016; de Vries et al., 2017). Social media content such as Instastories is highly interactive thanks to built-in features for followers to comment or react via default emojis. Moreover, posting filtered images of oneself (or one's life) is a specific way of entering into social interactions; selfies, for instance, focus the audience specifically on the self-related content (Hong et al., 2020). We suggest that using AR filters overlays can have a different effect on the audience than a selfie alone. Immersive virtual modifications can trigger the recipient's reactions to take a variety of forms - approval, excitement, shock – and to elicit higher engagement from one's social network. While selfies are largely posted for gaining social approval or popularity (Chatzopoulou et al., 2020), the motives for AR filtered content can range beyond that and be used as a means for initiating interactions, establishing communication with followers, and drawing attention to specific topics. For example, Instastory filters such as the Butterfly Pretty filter were popular in the Covid-19

pandemic as users sought novel ways to present themselves and their individuality in order to connect with others, while often isolated at home (Pitcher, 2020). We propose that the need for social interactions is an important driver of filter use frequency and exploration.

H5: The need for social interactions drives a) use frequency and b) exploration of AR face filters.

Convenience – Previous research has demonstrated the importance of utilitarian value – e.g., use of food delivery apps (Ray et al., 2019) and consumer brand engagement through voice assistants (McLean et al., 2021). Posting content overlaid with AR filters does not directly provide a vehicle for convenience in the form of information-seeking, as is the case for the typical use of social media (de Vries et al., 2017). Instead, the potential convenience value is more related to the AR characteristics that allow the creation of relevant and meaningful content in a quick, efficient way, as AR visualizations appear in an effortless manner. Brands are for instance relying on AR try-on to ensure convenient product search and decision-making related to make-up and fashion accessories, allowing for online buying in product categories that used to involve an obligatory store visit (Hilken et al., 2017; Javornik et al., 2021). Similar type of convenience can also be pursued by social media users, as they can still engage in meaningful social interactions by effortlessly applying AR filter without needing to physically alter their appearance. Such convenience provided by AR filters is expected to drive both use frequency and exploration on social media.

H6: The need for convenience drives a) use frequency and b) exploration of AR face filters.

2.4 Psychological well-being

Social media is increasingly investigated in relation to aspects of subjective well-being, as the link between the two is becoming evident (Berezan et al., 2018; Pera, Quinton, & Baima, 2020). In academic literature, well-being is linked to the quality of psychological experiences (Deci and Ryan, 2006), and can relate to life satisfaction, happiness, perceived quality of life, anxiety, depression, and self-image (Weinstein, 2018). It denotes users' evaluation of how happy they feel in their life, both in the moment or also long-term. An established approach to investigate well-being is by studying individuals' affective state (Diener & Emmons, 1984). While this can be associated with both negative and positive affect, we focus specifically on positive affect. We aim to uncover how much the different motivations for using AR face filters can improve one's well-being in terms of a person's affective state. Prior work on social media has focused disproportionately on the negative effects of social media on well-being, but there is ample support for positive effects as well (Beyens et al., 2020). The valence can depend on how much the positive side of social media use (e.g., inspiration, social connectedness) outweigh the negatives (e.g., envy) (Weinstein, 2018).

Affective state can provide one type of insights, but there is another one which is of particular relevance to this research. Ryff (1989) defined subjective well-being more specifically in terms of different aspects of one's life, concretely self-acceptance, relations with others, autonomy, environmental mastery, purpose in life, and personal growth. Among these, our research focuses specifically on self-acceptance as a key dimension of well-being that is related to self-concept. Given that AR face filters virtually modify one's appearance and that AR try-on can impact the self-concept (Javornik et al., 2021), our work explores how motivations that are associated with the self-concept and AR face filter use on social media can impact the self-acceptance dimension of well-being.

Online spaces offer new possibilities to individuals to express who they are and to do so in ways that are not always possible in real life (McKenna et al., 2002). Such true representation on social media implies a lower discrepancy between one's outward presentation and genuine aspects of self, which can indirectly increase subjective well-being (Kim & Lee, 2011; Sheldon, Gunz, & Schachtman, 2012; Reinecke, & Trepte, 2014). Being truthful about oneself online is also associated with user's acceptance of one's characteristics (Aricak, Dündar, & Saldana, 2015; Pera, Quinton, & Baima, 2020). While AR face filters virtually modify users' faces, they also offer novel types of visualisation to present one's authenticity, which is expected to increase positive affect. We postulate that those individuals who are conveying their true self through AR filters will experience higher self-acceptance as the filters will visualise their authenticity.

H7: True self-presentation through AR face filters improves a) self-acceptance and b) positive affect.

However, certain types of appearance-focused activities on social media can have a harmful impact on vulnerable individuals' well-being, for instance, adolescents or individuals with low self-esteem (Chae, 2017; Choukas-Bradley et al., 2020; Bue, 2020; Steinsbekk et al. 2021). The driver of such negative effects on mental well-being can be the comparison that users draw between themselves and the idealised representation of others (Lee & Lee, 2021), as well as the concerns about how others might perceive one's representation online (Marder et al., 2016). For instance, those people driven to only post their most attractive selfies, experience increased body dissatisfaction, internalization of beauty ideals, and are more likely to suffer from eating disorders (McLean et al., 2015). AR face filters can portray one's idealised appearance with higher realism, either by enhancing one's facial feature or overlaying

“beautification” filters (for instance infantilising one’s face). Such changes, albeit ephemeral, can represent a disruption to one’s self-concept, making the gap between actual and ideal self more apparent, which has been shown to lead to lower tolerance for one’s flaws (Neff, 2011; Javornik et al., 2021). Thus, we expect that those who are motivated by presenting themselves in an enhanced light through AR filters will experience a lower acceptance of themselves and a decreased well-being in terms of one’s affect.

H8: Ideal self-presentation through AR face filters decreases a) self-acceptance and d) positive affect.

Another important aspect of self-presentation online is a potential visual transformation of the self that one can experience or achieve through online portrayal (Lee & Bailenson, 2007) and how that can affect well-being. Chatzopoulou et al. (2020) showed that men with low body self-esteem engage in fitness activities to transform their bodies into “instabods” to receive online community recognition. Such body transformation results in anxiety and muscle dysmorphia, but also in positive effects like higher confidence (Chatzopoulou et al., 2020). Online-only transformation that can be achieved via avatars (Yee & Bailenson, 2007) or AR face-filters is less intrusive than physical body transformation. It offers an effortless way to expand oneself into new directions without the pressure of physically achieving such change. Much prior research on self-concept specified the self as “work-in-progress”, whereby individuals frequently engage in activities that imply self-related changes in order to create and express themselves (Rifkin & Etkin, 2019). Recent work by Smith et al. (2021) highlights appearance as an important area for such self-transformation, specifically how experimenting with one’s looks can make individuals feel more authentic about themselves. Prior research shows that when a possible self is considered probable, this

is positively associated with positive affect (Markus & Nurius, 1096). We propose that AR visualisation of a possible self makes the potential change as more probable and attainable, thus increasing the positive affect. When individuals can consider such possible selves which represent a desirable change, this is linked to well-being effect, including increased self-acceptance, while the opposite can be the case when new possible selves are viewed as undesirable (Loveday, Lovell, & Jones, 2018; Frazier, Barreto, & Newman, 2012). Following the above logic, we propose that AR face filters offer a tool for visual exploration of oneself, which can happen through novel desirable depictions of the self, which thus increases self-acceptance and one's affective state.

H9: Transformed self-presentation through AR face filters improves a) self-acceptance and b) positive affect.

Besides self-related motivations, users are also driven to AR face filters to experience enjoyment. Numerous studies revealed the link between hedonic activities and one's well-being (e.g., Huta & Ryan, 2010; Batat et al., 2019), also in the online context (Dennis et al., 2017), yet none in relation to AR. Huta & Ryan (2010) demonstrate that the activities associated with hedonia are positively associated with the affective state. Prior studies in AR highlighted the hedonic aspect of this technology experience (Hilken et al., 2017). We propose that this enjoyment that is derived from the pleasure of interacting with visually stimulating AR filters can have a positive impact on a user's affective state.

H10: Enjoyment of AR face filters improves positive affect.

The effect of social media use on well-being depends on the type of social activity (Burnell, George, & Underwood, 2020). Increased social connectedness that online space can deliver has shown to improve users' well-being (Sinclar, & Grieve, 2017;

Hoffman, Novak, & Kang, 2017), while peer pressure and cyberbullying can cause anxiety and depression among adolescents (Best, Manktelow, & Taylor, 2014). Social interactions afforded through AR face filters are likely to have a high hedonic connotation due to the AR overlays commanding a playful, enjoyable experience (Javornik et al., 2016). The nature of AR face filters would thus enrich social interactions and trigger more engagement from one's online audience, leading to a more positive affective state.

H11: Social interactions through AR face filters improve positive affect.

3. Methodology

The study adopts a mixed-methods approach and combines a qualitative study with a survey. The aim of the qualitative study was to conduct interviews with Instagram and Snapchat users to explore and gain qualitative insights about their underlying motivations related to the use of face filters, also to uncover the motivations that have not been previously identified (Lincoln & Guba, 1985; Strauss & Corbin, 1990). We follow the approach of Erz, Marder, and Osadchaya (2018) in that the established categories of motives (entertainment, social interaction, personal identity, and convenience) guided the investigation about the individuals' motivations to use filters. The aim was to understand how both the established and potentially novel motivations are specifically linked to the uses of AR filters on Instagram, with a close interest in the motivations related to self-presentation. The quantitative study, i.e., survey, was conducted in order to explore and validate the identified motivations and examine their effects. Institutional ethics approval was obtained prior to data collection.

3.1 Qualitative study

We recruited participants for our interviews via social media and through invites sent to students at three UK universities. The participant criteria were to be between 19 – 35 years old, a UK resident, and a regular user of filters on social media where filters are a prominent feature (i.e., Instagram or Snapchat). Our sample of 10 full-time students (nine female, aged 20-29) included seven regular Instagram filter users (the others only used Snapchat filters). We gathered data on both Instagram and Snapchat filter use in order to increase the breadth of understanding of possible U&Gs of the phenomenon. Participants received a £10 voucher for an international online retailer as compensation for taking part. The interviews lasted between 21 and 44 minutes, with an average length of 34 minutes. The lead researcher conducted all the interviews remotely (via Zoom video calls). Only audio was recorded and all the interviews were transcribed. To identify specific motivations of AR filters and also to probe for any effects of such motivations on well-being, our interviews were structured as follows. In the beginning, the interviewees were asked to show a recent example of the AR face filter use, both to verify that they do use this feature and also to facilitate their thinking about it. All showed at least one such example, and most of them showed several. We started with a set of general questions related to the main filter platform used (e.g., their use of Instagram). Then the interview focused specifically on AR filters, asking the participants about the different filters they tried, how their use of AR filters has evolved, what are their typical uses of filters, etc. Subsequently, four sets of questions about the different motivations that drive their use of AR filters were asked. Here, we asked both: i) broad questions to allow for novel motivations to emerge (“Why do you use AR face filters? What do these filters contribute to your interactions on Instagram / Snapchat?”); and ii) more specific questions related to self-presentation (“What do the AR filter symbolize in terms of your personal identity? Do they change the way you present

yourself online?”), and established motivations from the uses and gratification theoretical approach (information, entertainment, social interaction, personal identity and convenience (McQuail, 1984)). Finally, we iv) explored the link between the filters and well-being (e.g., “Does the use of filters have a positive or negative influence on your everyday life? How?”), again with some emphasis on the differences between the self as presented on the platforms when filtered and the self in real life. In the end, the participants were debriefed and thanked. Full list of interview questions is available in Appendix A.

3.1.1 Qualitative analysis and further hypotheses development

The analysis focused both on validating the motivations that have been previously established in the U&G research as discussed in the background section (true, ideal and transformed self-presentation, enjoyment, convenience and social interaction), as well as uncovering new motivations that are unique to AR face filters. We relied on thematic analysis (Braun & Clarke, 2006) to generate measurement items and identify the key motivations that underpin the use of AR filters.

We analysed the data by extracting all items that could link to different uses & gratifications. To ensure a comprehensive analysis, we paid attention both to those that appeared most frequently as well as those mentioned occasionally. Once the list of items was compiled, it was mapped against the six motivations identified in the background section.

Many generated items validated previously hypothesised motivations. For instance, interviewees discussed in detail how they wish to present themselves in a specific way through filters (e.g., to make them feel good about their appearance; to express parts of their identity that others do not necessarily know about; to explore different looks). Also, hedonic and social aspects were frequently mentioned, as many interviewees rely

on the face filters for short-term enjoyment and fun with friends, emphasising the social component.

The items that could not be categorised as part of the already identified motivations were discussed further. With the aim of identifying new potential motivations, four researchers engaged in iterative discussions typical for content analysis (Braun & Clarke, 2006) to identify the patterns across the uncategorised items. Three new motivations emerged as a result of this process: affiliation, silliness, creative content curation. Below, we offer more insights and also propose hypotheses accordingly in terms of user behaviour and well-being.

Firstly, interviewees explained they used filters to emphasise social or political causes or events they feel strongly about or to affiliate their image with external entities such as countries, celebrities, or events. Exemplary quotes include:

“The Malaysian flag is very easy. You just use a filter and there’s a Malaysian flag on your face. (...) One of the filter that I use it is in conjunction with one of the artists in Malaysia. He just launched a new song and he launched that filter especially for that song. So that filter has the music background and the eyes. My eyes become a hibiscus flower. So that is very funny and very catchy and attractive.” (Zara)

“If I am communicating or just participating in a breast awareness campaign. So the cancer breast cancer campaign, I would be using these filters to just communicate this kind of values more.” (Alice)

“There was also one time at my university in X (location anonymised) we did a carnival and they created a Snapchat filter for it. So you can see the kind of location or anything like that and the mascot that was used there and then people were just trying to post their stories with them. (...) It just really contributes to spreading awareness.” (Alice)

Affiliation satisfies the need for belongingness which is an important psychological motive (Baumeister & Leary, 1995), also in online contexts (Chen, 2012). Such affiliation differs from other types of self-presentation mentioned above, as affiliation implies an association with other entities. AR filters offer new opportunities to users for meaningful affiliation, thus driving the use frequency and exploration of filters. Prior research has shown that visible affiliation through social media with brands, institutions and causes, have positively supported users' identity development (Hollenbeck & Kaikati, 2012). In particular, Yau, Marder and O'Donohoe (2019) found that explicit affiliation of one's identity with certain social media content, i.e. content that was linked and associated with home and host nations had positive well-being effects for acculturating international students. Following the logic that affiliating with entities that promote identity goals has positive well-being effects, we propose that affiliation through AR filters in turn affords individuals an opportunity for increased self-acceptance and positive affective state.

H12: The need for affiliation with other entities drives a) use frequency and b) exploration of AR face filters.

H13: Affiliation with other entities through AR face filters improves a) self-acceptance and b) positive affect.

Another identified motivation was silliness, as the interviewees revealed that AR face filters provided them with an opportunity to act in a funny, frivolous way. This motivation is aligned with Farace et al. (2017), who show that silliness is a common component of selfies. AR filters provide new means to gratify the motivation to embrace one's carefree, less serious part.

Exemplary quotes include:

“Usually if you don't want to make a conversation too serious and you want to be like.. I mean, I don't know if you use Instagram, but very often it's like when you text someone for the first time and the conversation kind of gets too serious or like weird, you can always do the filter and say, OK, let's just have fun and like, let's stop being so serious and do some jokes. So, yeah, that's really kind of it kind of helps to improve the atmosphere.” (Wendy)

“Most of the filters that I use and in the situations that I use them, it's always to get like the funniest, the funniest video, the funniest Snap, the most random, the most obscure. And it will be for the most of it, it will be about the comedic part.” (Samuel)

We postulate that this drives use frequency behaviour as well as exploratory use. Also, research has shown that silliness is significantly associated with one's mood (Caruso & Shafir, 2006), specifically being silly can make one feel better (Locke, 1996). We postulate AR face filters to have similar effects .

H14: The need for silliness drives a) use frequency and b) exploration of AR face filters.

H15: Silliness of AR face filters improves positive affect.

Finally, the interviewees noted the filters can make their content more special and help them curating it in a creative or even artistic manner. AR face filters, in some cases, offer affordances for unique visualisations, thus tapping into the desires of users to experiment with such possibilities and inspiring them to engage with the social media content in imaginative ways.

Exemplary quotes include:

“They just make the videos appear a little fancy. They complement the videos, so if they're pretty, they make them slightly prettier. (...) Filters are just something that complement your content. They don't transform it completely. (...) It's not really changing the way we communicate. It's just it's just making it a little different. And a little better.” (Varala)

“You see it's my creativity (i.e. that I am expressing), because if, for example, like the face painting, I may not be able, even though I love art, I may not be able to paint myself that good. Compared to if I use the filter is very easy and is very neat as well. (...) I would say that (i.e. using filters) is the creative part of me. Yeah, I like that kind of art.” (Zara)

These and other findings from the interviews resonated with some prior research that identified how creative projects and showing off creative skills can be an important motivation for social media use (Mull & Lee, 2014; Sheldon et al., 2017). Other research also pointed out how AR can inspire users (Rauschnabel, Felix, & Hinsch, 2020). Creative content curation through AR filters is thus expected to drive both the use frequency as well as the filters' exploration. Individuals who engage in creative pursuits often perceive them as highly enjoyable, alongside other positive psychological benefits (Csikszentmihalyi, 1997). We postulate the link between this motivation and improved affect.

H16: The need for creative content curation drives a) use frequency and b) exploration of AR face filters.

H17: Creative content curation through AR face filters improves positive affect.

Finally, we noted some relevant insights in relation to well-being. Some interviewees explained how they carefully think about the way they want to present themselves – for instance, with smoother skin and shine in their eyes, but that it should at the same time appear natural and that they are pleased when such representations gain social approval. However, they acknowledged that self-presentation through filters and online in general can occupy their thoughts extensively. One interviewee revealed that she underwent an aesthetic procedure (face fillers) in order to improve her facial symmetry to simulate the look visualised by AR filters. Others remarked that they perceive platforms and the real-life to be clearly separated and that they do not feel their well-being or self-perception to be negatively affected by the filters, but that they appreciate the interactive and fun engagement that the filters can deliver.

3.2 Conceptual model

In summary, we hypothesised nine identified motivations to affect AR filters' use as well as the exploration of different AR filters. In terms of well-being outcomes, we expected all the self-related motivations, namely ideal, true and transformed self-presentation, as well as affiliation, to affect self-acceptance. Moreover, we postulated for the majority of the motivations to increase the positive affect, except the ideal self-presentation, for which we hypothesised a decrease in positive affect. Finally, we did not postulate effects from convenience on well-being, as prior research shows that utilitarian value is not significantly associated with well-being (Pera & Viglia, 2015; Dennis et al., 2017). See Figure 2 for model visualisation of hypothesised relationships.

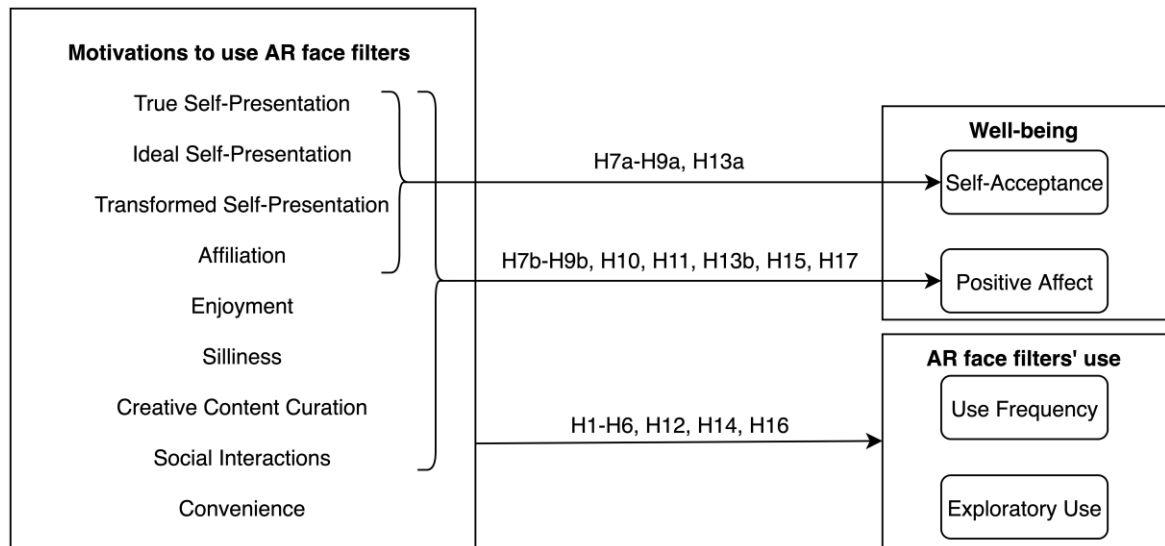


Fig. 2 – Model visualisation with tested hypotheses

3.3.Measurement items generation

From the interview data measurement items were coded and compiled by the lead researcher and then validated and discussed with three other researchers on the team, adopting the insider-outsider coding method (Gioia et al., 2010), similar to the approach adopted by Mull and Lee (2014) and Muninger et al. (2019). The initial list of measurement items was 71. Researchers engaged in iterative discussions about the items (Braun & Clarke, 2006) and further reduced them to 55. This reduction occurred as the researchers agreed that certain items could be meaningfully combined because they were expressing very similar ideas. We also revised items by consulting literature on prior measures of similar motivations. Specifically, we relied on the scales for self-presentation, self-expansion, self-brand connection, convenience, enjoyment, silliness, creativity and social engagement. However, we paid attention to ensure that the measurement items remained unique to the use of AR filters and captured the associated specificities. The final list included 55 measurement items which were generated both from the interviews and prior literature – see Table 2.

3.4 Quantitative study - survey

3.4.1 Procedure

We conducted a survey by recruiting 552 Instagram users (who had used filters within the last month) via the Prolific crowdsourcing platform. Payments were given through the platform. We provided them with the description of AR face filters (see Appendix B). Following the description, we included a verification check of participant eligibility: they had to confirm that they used such a filter in the last month – those that responded ‘No’, were unable to continue the survey. We also included a description to clarify that using the filters entails all active interactions with the filters, such as trying them on oneself, other people or posting the content for which filters were used (see Appendix B). A quality assurance check included in the study was a question regarding participants’ most recent use of AR filters in an open-ended response format. Specifically, each participant was then asked to briefly summarise how they last used an AR face filter on Instagram (how did the filter look; what they were doing when you used the filter; did they share any content with filters like a photo or a video with their friends). Participants reported on a wide range of filters – silly, beautifying, with artistic effects, animal-like and others. In addition, they described that they either used the filters only for themselves or shared them with others to gauge social interactions or have fun with friends. Only those who provided a description of their prior AR filter use were included in the final sample. Moreover, we included two verification checks among the measurement items (“This is an attention check. Please click 1.”). 8 participants failed one or more of these checks and were eliminated. Finally, an average completion time was 11.17 minutes (SD=6.58 minutes). Completion time of less than 4.5 minutes (i.e. shorter than one standard deviation away from average completion

time) was deemed too short to complete the survey meaningfully. 8 more participants were removed on that basis.

3.4.2 Measures

In addition to the items measuring uses and gratifications, we measured how well-being is affected during the use of AR filters in terms of positive affect (Watson, Clark, & Tellegen, 1988). We also measured self-acceptance with four items from Ryff's psychological well-being scale (Ryff, 1989). Moreover, the measures for our dependent variables were adapted from measures for behavioural use, specifically: frequency (Erz, Marder, & Osadchaya, 2018) and AR filters exploratory use (Lee, Kim, & Fiore, 2010). The items with measurement scales are presented in Table 2.

3.4.3 Sample

The final sample consisted of 536 participants who were above 18 years old, UK residents and have used an AR face filter on Instagram in the last month. Their demographics can be viewed in Appendix C. We also collected descriptive data about their use of the Instagram platform and AR filters. They reported rather high intensity of Instagram use (example item 'Using Instagram is part of my regular social media activity; 7-point Likert; Ellison, Steinfield, & Lampe, 2007): $M = 5.75$ ($SD = 1.29$). We also measured frequency of AR filters use (Du, van Koningsbruggen, & Kerkhof, 2018): 17% of participants reported using them less than once a month, 26.9% use them once a month, 27.6% use them once a week, 22.9% several times a week, 4.1% once a day and 1.5% several times a day. The participants had on average 680 followers ($SD = 1562$) and followed on average 544 followees ($SD = 658$). We also asked them how often they use different types of AR face filters (1 – never, 7 – always): funny $M = 4.71$ ($SD = 1.29$); cause-related (political or social) $M = 2.51$ ($SD = 1.32$); scary $M = 2.79$

(SD = 1.41); beautifying M = 4.32 (SD = 1.68); location-based M = 2.88 (SD = 1.51); occasion-related (Halloween, Christmas...) M = 3.91 (SD = 1.30) and branded M = 2.51 (SD = 1.31). Filters that are funny, beautifying, or occasion-related were the most popular. We also examined differences across gender by conducting ANOVA and found significantly different frequencies between male and female for scary filters ($M_{\text{Male}} = 3.24$ (SD = 1.42), $M_{\text{Female}} = 2.63$ (SD = 1.36); $F(1, 530) = 18.89$, $p < .001$) and the beautifying ones ($M_{\text{Male}} = 3.18$ (SD = 1.69), $M_{\text{Female}} = 4.70$ (SD = 1.51); $F(1, 530) = 93.77$, $p < .001$), with no significant differences for other filters.

	<i>Item loadings</i>
<i>True Self-Presentation (adapted from Seidman, 2013; Seidman, 2014; Samper, Yang, & Daniels, 2017)</i>	
To present my real self.	0.93
To communicate what my real life is about.	0.90
To express my true self.	0.92
To show who I really am.	0.93
To show the real me that others don't necessarily know much about.	0.87
<i>Ideal Self-Presentation (items adapted from Seidman, 2013; Javornik et al., 2021)</i>	
To improve the way I present myself.	0.87
To look more as how I would really like to look.	0.84
To hide some of my negative emotions.	0.84
To cover up my negative mood.	0.83
To fake a positive image.	0.83
<i>Transformed Self-Presentation (adapted from Lee, Kim and Fiore, 2010; de Kerviler & Rodriguez, 2019)</i>	
To experiment with my appearance.	0.85
To try out different looks.	0.83
To create a different version of who I am.	0.85
Filters transform me into someone else.	0.79
To modify my appearance in a new way.	0.86
<i>Affiliation (adapted from Escalas & Bettman (2003) and Milošević-Đorđević & Žeželj (2017))</i>	
To communicate my support for a political or social cause.	0.85
To express my affiliation with a certain topic.	0.92
To express my opinion about specific topics in a visual way.	0.90
To depict my opinions.	0.90
<i>Entertainment (adapted from Ghani and Deshpande(1994) and Franke and Schreier (2010))</i>	
Filters are fun.	0.93
I enjoy using filters.	0.92

I use filters for entertainment.	0.84
<i>Silliness (adapted from Farace et al. (2017))</i>	
To create a light-hearted content.	0.92
I use filters because they are comical.	0.86
To create ridiculous content.	0.85
To make the content silly.	0.91
<i>Convenience (adapted from Franke & Schreier (2010))</i>	
It is uncomplicated to use filters.	0.88
Filters require little effort to use.	0.91
<i>Social Interaction (adapted from Voorveld et al. (2018), Mirbagheri and Najmi (2019) and Chen (2011))</i>	
To get more engagement from my friends and followers (e.g. emoticons, tagging, reactions, comments).	0.87
To trigger an online exchange.	0.75
To draw attention of my followers.	0.86
To connect with my followers.	0.87
To feel closer with others.	0.78
Filters make me more connected with others on Instagram.	0.87
<i>Creative Content Curation (adapted from Sheldon et al. (2017))</i>	
Filters inspire me to be creative with my content.	0.91
I feel I create artistic content through filters.	0.89
To communicate creatively.	0.83
I am more creative with my content because of filters.	0.90
<i>Filters' exploration (adapted from Lee, Kim, & Fiore (2010))</i>	
Try an AR face filter that others (friends or brands) are using.	0.76
Search for new AR face filters.	0.85
Try out different AR face filters that are available.	0.87
<i>Filters' use (adapted from Erz, Marder, & Osadchaya (2018))</i>	
The content that I share has AR face filters.	0.92
AR face filters are part of my Instagram activity.	0.89
I use AR face filters when creating Instagram content.	0.93
When I interact on Instagram, I use AR face filters.	0.91
<i>Positive affect (Watson, Clark, & Tellegen, 1988)</i>	
Confident	0.82
Enthusiastic	0.84
Proud	0.85
Excited	0.78
<i>Self-Acceptance (Ryff, 1989)</i>	
When I look at my life, I am pleased with how things have turned out.	0.76
In general, I feel confident and positive about myself.	0.87
I like most aspects of my personality.	0.77
When I compare myself to friends and acquaintances, it makes me feel good about who I am.	0.74

Table 2: Measurement items with factor loadings

3.4.4 Items exploration

Initial exploratory factor analysis included 55 items that were generated both from the interviews and the literature. Bartlett's test of sphericity was significant (< 0.001) and Kaiser-Meyer-Olkin (KMO) sampling adequacy score was .96, thus above the required threshold > 0.60 (Williams, Onsman, & Brown, 2010). Harmann's single common factor showed that common method bias was not a concern, as a single factor explained 34% of the variance, thus well below the 50% threshold. As the correlation matrix showed the factors to be correlated, an oblique rotation (Promax) was applied to the factor analysis. Three items were deleted as they did not load on any factor and 11 further items with loading $< .70$ were removed. There were no cross-loadings above .40. Nine factors with eigenvalue > 1 were extracted, with a cumulative variance of 71.42%. The factors represented the following users' motivation to engage with AR filters: *self-presentation* – specifically, *true*, *ideal*, and *transformed self*; *affiliation*; *social interactions*; *enjoyment*; *silliness*; *convenience*; *creative content curation*.

3.4.5 Confirmatory factor analysis

In order to examine the effects of the gratifications on well-being and behavioural use, we specified a model in SmartPLS. We first conducted a confirmatory factor analysis. We again examined the measurement items of each factor. We removed three Ideal Self-Presentation items, as their VIF for outer loadings was > 5 , thus indicating multicollinearity issues. Upon that, CFA demonstrated appropriately high factor loadings ($> .70$) for all the uses gratifications and the key outcome variables (see Table 2) and all the items loadings were significant ($p < .05$). VIF values for the outer loadings were below 5 for all the items, indicating no multicollinearity issues. Moreover, convergent validity was established, as the composite reliability of the constructs was above .70, and the average variance extracted (AVE) was above the recommended .50

cut-off value (Hair et al., 2016). Also, the correlations between constructs were below the values of the square root of the constructs' AVE, thus confirming the discriminant validity of the factors (Fornell & Larcker, 1981). HTMT criterion was below .90 cut-off value. Moreover, the scales displayed appropriate reliability. See Appendix D for the reported values.

3.4.6 Model fit and hypothesised relationships in the path model

We estimated the model in Smart-PLS. The model fit criterion indicated that the estimated model had an acceptable fit, as SRMR was .06, thus below the cut-off value of .08 (Hu & Bentler, 1999). The model was deemed to be a robust, reliable, and valid assessment of the relationships between users' gratifications, well-being, and behavioural use of AR face filters.

We estimated the paths in the model to test the effects of uses and gratifications on well-being measures and behavioural use of AR filters. The results are presented in Table 3. Bootstrapping was used to estimate the significance of the path coefficients (5000 subsamples, 95% confidence intervals), which allowed for testing the hypotheses. Path coefficients are displayed in Table 3, along with the overview of the associated hypotheses' test. We now comment on specific gratifications and the key results.

	b	t	p	Hypothesis evaluation
Factor 1 - True self-presentation				
True self-presentation through AR face filters				
a) drives filters' use frequency.	0.069	1.396	0.163	H1a Rejected
b) drives filters' exploration.	-0.052	1.005	0.315	H1b Rejected
c) increases self-acceptance.	0.145	2.609	0.009	H7a Supported
d) increases user's positive affect.	0.103	2.072	0.038	H7b Supported
Factor 2 - Ideal self-presentation				
Ideal self-presentation through AR face filters				
a) drives filters' use frequency.	0.2	4.237	<0.001	H2a Supported
b) drives filters' exploration.	0.06	1.135	0.256	H2b Rejected
c) decreases self-acceptance.	-0.269	4.683	<0.001	H8a Supported
d) decreases user's positive affect.	-0.098	1.839	0.066	H8b Partially supported

Factor 3 - Transformed self-presentation					
Transformed self-presentation through AR face filters					
a)	drives filters' use frequency.	0.073	1.62	0.105	H3a Rejected
b)	drives filters' exploration.	0.148	2.894	0.004	H3b Supported
c)	increases self-acceptance.	0.148	2.894	0.004	H9a Supported
d)	increases user's positive affect.	0.16	3.057	0.002	H9b Supported
Factor 4 – Enjoyment					
Enjoyment related to AR face filters					
a)	drives filters' use frequency.	0.158	4.073	<0.001	H4a Supported
b)	drives filters' exploration.	0.348	7.516	<0.001	H4b Supported
c)	increases user's positive affect.	0.239	5.234	<0.001	H10 Supported
Factor 5 – Social interactions					
Social interaction via AR face filters					
a)	drives filters' use frequency.	0.185	3.669	<0.001	H5a Supported
b)	drives filters' exploration.	0.104	2.005	0.045	H5b Supported
c)	increases user's positive affect.	0.155	2.917	0.004	H11 Supported
Factor 6 – Convenience					
Convenience of AR face filters					
a)	drives filters' use frequency.	0.007	0.171	0.865	H6a Rejected
b)	drives filters' exploration.	0.117	2.709	0.007	H6b Supported
Factor 7 – Affiliation					
Affiliation through AR face filters					
a)	drives filters' use frequency.	0.138	3.377	0.001	H12a Supported
b)	drives filters' exploration.	-0.01	0.234	0.815	H12b Rejected
c)	increases self-acceptance.	0.029	0.492	0.623	H13a Rejected
d)	increases user's positive affect.	0.006	0.146	0.884	H13b Rejected
Factor 8 – Silliness					
Silliness of AR face filters					
a)	drives filters' use frequency.	-0.07	1.865	0.062	H14a Rejected
b)	drives filters' exploration.	-0.012	0.261	0.794	H14b Rejected
c)	increases user's positive affect.	0.03	0.655	0.513	H15 Rejected
Factor 9 – Creative content curation					
Creative content curation with AR face filters					
a)	drives filters' use frequency.	0.205	3.882	<0.001	H16a Supported
b)	drives filters' exploration.	0.137	2.706	0.007	H16b Supported
c)	increases user's positive affect.	0.227	4.167	<0.001	H17 Supported

Table 3 – Hypothesised relationships with path coefficients

Filters' use and exploration - The results showed that neither true nor transformed self-presentation were significant motivators for the filters' use frequency. Conversely, the presentation of an ideal self through AR filters significantly drives the use frequency of the filters, as does also the affiliation with relevant causes and entities. In terms of behaviour related to self and filters' exploration, users are only motivated to explore different filters when engaging in self-transformation. Further on, participants reported

using and exploring AR filters because of the enjoyment they derive from them. Silliness did not drive filters' use behaviour. Furthermore, the convenience related to the effortless manner with which the filters can be applied was shown to drive the exploratory behaviour, but not the use frequency itself. Importantly, the need to engage in social interactions was shown to drive both the filters' exploration as well as use frequency. Finally, the need to creatively curate online content was revealed to be a significant driver for both the use and the exploration of filters.

Impact of the motivations to use AR face filters on well-being – When assessing the links between the motivations and well-being, we found the following results. Pursuing true and transformed self-presentation through AR face filters was shown to significantly increase both individual self-acceptance and positive affect. However, when motivated to depict their ideal self, users' self-acceptance decreases. There was marginally significant evidence that seeking ideal self-presentation through AR face filters decreases positive mood. Affiliation was shown to have no significant effect on the well-being. Enjoyment, as expected, increased users' positive mood. However, silliness revealed no such effects, indicating that the silliness of the filters is less impactful in terms of individual well-being as opposed to enjoyment, even though silliness and enjoyment are conceptually rather close. Importantly, when AR filters are used to foster social interactions, that increases users' positive affect. Finally, creative content curation via AR filters was also shown to increase users' positive mood.

4. General discussion

Though AR face filters are a widely used and a prominent feature for major social media platforms such as Instagram, to date there has been no examination of what motivates people to use them. We fill this important gap by empirically

demonstrating the following motivational drivers of AR face filters' use: *ideal* and *transformed self-presentation*, *affiliation*, *enjoyment*, *convenience*, *social interaction* and *creative content curation*. Additionally, we also postulated *silliness* and *true self-presentation* as relevant gratifications, but the online survey revealed no significant effects on use behaviour. Furthermore, we show how different motivations affect not only filters' behavioural use (frequency and exploration), but also user well-being (affect and self-acceptance). Overall, we uncover important and unexpected complexities that accompany individuals' use of these visually powerful features on social media, allowing for three theoretical contributions.

4.1 Motivations: Why are AR face filters used?

We contribute specific motivations for AR filter usage and situate these within the broader U&G landscape. Our findings support both unique motivators of AR filters alongside the previously established motivations. Existing related U&G studies have broadly treated the self-presentational motive as a singular dimension, associated with self-enhancement (i.e. presenting an ideal self) to boost one's image in front of online audiences, for example in the context of hashtags (Erz, Marder, & Osadchaya, 2018), AI-based voice assistants (McLean & Kofi Osei-Frimpong, 2019) and general social media use (Sheldon et al., 2017). This uni-dimensional approach to self-presentation is mirrored in other closely related AR studies (Rauschnabel, 2018; Jang & Liu, 2020). In contrast, we find that when virtually modifying one's appearance in real-time for self-presentational purposes, users engage in a complex process of visually depicting themselves, driven by ideal, true and transformed selves. We expand upon this important point later on below. Also in relation to the self, we found that users are motivated to visually affiliate with other entities through AR filters, which not only further cements AR overlays as an important tool for online activities that are

meaningful from the self-perspective (Rifkin & Etkin, 2019), but also as a vehicle for cause-related user engagement and as an awareness raising tool (Kristofersson, White, & Pelozo, 2014) .

We establish creative content curation as a unique motivation for AR face filter usage. While creativity, in general terms, has previously been identified as a driver for social media use (Mull & Lee, 2014; Sheldon et al. 2017), though often omitted in U&G studies of Instagram (Phua, Jin, & Kim, 2017; Ponnusamy et al. 2020), we demonstrate that AR face filters foster a specific type of creative pursuit. Specifically, AR filters both inspire and allow for creativity in the curation of visually appealing social media interactive content. Content creation is the *raison d'être* of Instagram (Kostyk, & Huhmann, 2021) and social media in general, as users express their preferences or admiration, for instance towards a destination (Fileri, Yen, & Yu, 2021) or post extreme content to attract attention (Bigley & Leonhardt, 2018). AR filters provide a novel vehicle for content creation based on their unique characteristics – a real-time overlay of virtual elements that can be applied effortlessly and with a high level of realism.

Furthermore, we support that enjoyment and social interactions, as two previously established motivations for AR use (Rauschnabel, 2018; Jang & Liu, 2020), are also important drivers for AR face filters. Enjoyment as a significant motivation for both exploratory use and use frequency reinforces the importance of hedonic gratification in connection to digital technology use (McLean & Kofi Osei-Frimpong, 2019). In contrast, silliness did not significantly affect the frequency use of the filters, despite identifying this motivation in our interviews and silliness being previously highlighted in social media literature (Farace et al., 2017). We explain this lack of significant result by considering the typical use of Instagram. Silly AR-based representation generates visualisations that can appear ridiculous and pointless to some,

while others might respond positively to the affective undertone that such silliness embodies (Katz & Shifman, 2017). Such interpretation might carry a certain risk of negative impression management on a platform that is dedicated to visually perfect content (Colliander, & Marder, 2018; Kostyk, & Huhmann, 2021). On the other hand, silliness might be a more prominent factor on platforms like Snapchat, where interactions take place in a smaller group with stronger ties (Piwek & Joinson, 2016). Other personality or platform-related factors could moderate the effect of silliness on frequency use. It is possible that the participants who highlighted this gratification in our qualitative study, represent a minority or are characterised by specific traits that moderate these effects.

In addition, we find filters are used to support social interaction, another key motivation of media and technology use (Sheldon et al., 2017). Specifically, AR filters are used as a conversation starter, to seek the attention of others and to initiate social interactions. As users enter into social interactions through virtually augmenting themselves, the social psychology of online interactions becomes more complex (Turkle, 1994). Furthermore, we support convenience as a utilitarian driver for AR filter interactions. This is similar to prior studies that have established ease of use, convenience and efficiency as utilitarian motives that precede platform and feature usage (Rauschnabel, 2018; McLean & Kofi Osei-Frimpong, 2019; Erz, Marder, & Osadchaya, 2018).

4.2 Multi-faceted self-presentational motive: Idealised, true or different me?

We contribute a novel understanding of the multi-faceted nature of the self-presentation motive for AR filters. Our findings highlight the dominance of a self-enhancement motive driving AR filter use, supporting the focus on this dimension in prior work (e.g., Erz, Marder, & Osadchaya, 2018; Rauschnabel, 2018; Jang & Liu,

2020). However, simply viewing self-presentation as synonymous with self-enhancement (or idealised selves) can risk being somewhat myopic. Our study supports that AR filter interaction is linked with two further self-presentational motives. First, we highlight the ‘true,’ authentic self as a motivator, in line with related work on drivers of social media use (McKenna et al., 2002; Hollenbeck & Kaikati, 2012). Whereas true self-presentation did not predict the filter usage behaviour, it was positively related to self-acceptance and to positive mood. Findings also align with the notion that the true and ideal self-presentations lie at different ends of a continuum (Zhao, Grasmuck & Martin 2008), as our participants discussed differing intensity on which idealisation can be realised through filters – from lightly enhancing the true self by smoothening the skin, to covering flaws or, when taken to an extreme, faking an intensely beautified appearance or portraying a cool image that hides any insecurities. This potentially calls for rebalancing ideal and true self-presentation via the filters for emotional regulation purposes, as we find that true/ideal self motives associate with positive affect. Second, we highlight the exploration of selves (i.e., transformed self) as another facet of an overarching self-presentation motive. Individuals use AR filters to explore different representations of themselves; hence this motive predicted exploratory use of filters, though not frequency. These findings extend Javornik et al. (2021), who showed that AR make-up filters can facilitate self-experimentation, but suggest such experimentation is a private rather than a public activity. Thus it appears that users prefer playful experimentation through browsing filters without necessarily sharing these. This concurs with prior research that has distinguished between private vs. public impression management (e.g., Rui and Stefanone, 2013). Future studies into self-presentation through AR filters and other technologies more broadly should consider the potential for self-presentation motives to be multi-faceted in order to gain a

comprehensive understanding of this critical overarching motive (Erz, Marder, & Osadchaya, 2018).

4.3 Well-being effects: How do people feel when using AR face filters?

Finally, we contribute new insights that face augmentation through filters impacts well-being, which we examined both in terms of self-acceptance and positive affect. We establish that the usage driven by true or transformed self motives increases self-acceptance, whereas usage motivated by ideal self-presentation reduces self-acceptance. This highlights how this prominent social media feature can directly affect a user's self-concept and thus their subjective well-being (Ryff, 1989), corroborating recent findings that AR make-up try-on changes individuals' ideal-actual gap and can decrease their tolerance of perceived appearance flaws (Javornik et al., 2021). However, we extend this work by showing that AR filter usage can lead to positive effects if driven by self-transformation or true self-presentation. This resonates with broader work that positively links social media engagement with self-acceptance for older people or the LGBT community members (Fox, & Ralston, 2016; Pera, Quinton, & Baima, 2020). Additionally, we show varying effects of the different motivations on one's affective state. A positive mood was increased by true and transformed self-presentation, enjoyment, social interaction, and creative content curation. Conversely, marginally significant results offer some support that positive affect could be decreased by ideal self-presentation.

Taken together, these results indicate that the use of AR filters can be beneficial and have a positive effect on mood, but with some exceptions. Idealising or faking one's image can have a negative consequence in terms of how users view themselves, which further highlights the damaging consequences of social media with regards to conveying unreasonable body image expectations (Hogue, & Mills, 2019) and constant

social comparison (Chae, 2017). Moreover, despite prior literature highlighting users can be nervous about whether their content will be well-received with their social contact (Alkis, Kadirhan, & Sat, 2017), our study shows that using filters for boosting social engagement can lift users' mood. Filters act as a social lubricant, as they can generate additional comments, likes, emojis or other forms of online social interactions, thus increasing users' sense of being connected with others (Sheldon et al. 2017). Prior literature established a strong link between one's social activities and personal well-being (Hoffman, Novak, & Kang, 2017) – our study shows that such benefits of social media activities can also be reaped through the use of AR face filters.

5. Practical implications

These findings offer some important implications for marketers, designers, and social media managers:

- *Design implications.* Site and app designers could consider informing the social media users more clearly about the unintended consequences of such filters, for instance, via automated pop-ups. Such communication could either focus on affirming positive self-image and help to mitigate the reliance on augmentation, which can cause selfie dysmorphia and, in some cases, drive users to undertake aesthetic surgery.

- *Brands' use of AR face filters for affiliation.* Social media managers should be encouraged by our findings that users are motivated to affiliate themselves with relevant causes or topics via AR face filters. Brands and organisations can look to invest in bespoke AR face filters to promote brand associations or socially important causes. As consumers seek to align themselves with brands that foster positive societal outcomes and are purpose-driven (Hajdas & Kleczek, 2021), AR filters may present new opportunities in terms of engaging consumers for different causes, similar to other

immersive technologies that are used for charitable appeals (Kristofferson, Daniels, & Morales, 2019).

- *Creative content co-curation.* Additionally, our research demonstrates a unique outcome with regards to user-generated content (UGC) in that creative content curation was a key driver of AR filter use. Organisations and brands should consider the use of AR face filters in a manner that would foster users' creativity.

6. Limitations and further research

Limitations associated with this research may provide opportunities for future studies. This study focused on one country, the UK. Future studies could potentially explore cross-cultural differences in terms of AR filters' use. Also, we did not examine the long-term effects of filters' use - deploying a longitudinal research design could help understand how such effects develop over time. Future studies could compare AR filters across other platforms to determine if the results differ depending on the type of social media. Such efforts would contribute towards a more comprehensive understanding of this exciting technology and its integration on social media. Moreover, this research has taken the first steps in examining the use of AR face filters on an individual's well-being. While our exploration of affective state was focused on positive affect, future studies can focus more closely on potential impact on negative affect, for instance links with anxiety or depression. Future research should explore in more detail the varying types of face filters and the specific effect these have on different well-being aspects. Relatedly, there are calls for ethical policies on AR face filters (UK Government - House of Commons, 2019, 2020; Vogue, 2021); however, there have been no such concrete outputs so far. Our research provides important empirical support for these needed developments. In 2019, Instagram blocked filters that visualised cosmetic surgery treatments. While such actions are helpful, further

research could offer more insights to pave a way for a more comprehensive policy that would tackle the damaging psychological effects of AR face filters and promote responsible usage and provision.

Finally, the quantitative portion of this study primarily focused on one social media platform. Future studies could compare AR filters across other platforms to determine if the results differ depending on the type of social media. Such efforts would contribute towards a more comprehensive understanding of this exciting technology and its integration on social media.

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Appendix A – Interview Questions

Demographic data:

- Name and surname (audio recording up to this point will be eliminated from the recordings that will be shared with the third party conducting interviews' transcription)
- Age, gender, occupation / education, no of followers, frequency of platform use, time period of using the platform (since when)

Each participant is asked to show a recent example of them using an AR filter.

General questions:

How long have you been using Instagram? How often do you use Instagram / Snapchat?

Could you tell me how do you typically use Instagram / Snapchat?

How important is Instagram / Snapchat for you? What does it represent to you?

What do you most often post about?

Do you use Instastories / Snaps?

How do you decide to post an Instastory / Snap – what motivates you?

What typically features on your Instastories / Snaps?

How do you decide if you record yourself for Instastories / Snaps so that you feature in it?

How would you like to present yourself online through Instastories / Snaps?

Questions related to the use of AR face filters:

AR filter uses and habits

What different types of AR selfie filters have you seen on Instagram / Snapchat?

Which ones have you tried?

Which filters do you not like using? Why?

Do you have a favourite AR filter? What do you like about it?

How do you usually use it? How do you decide on the filter?

Where do you find such filters / how do you look for filters?

Have you noticed any change in terms of what type of filter you use now as opposed to when you first started using them?

AR filter gratifications (information, entertainment, social interaction, personal identity & convenience)

Why do you use face filters?

What do these filters contribute to your Instastories / Snaps?

What do these filters represent to you?

What do you wish to communicate with them?

Do you use filters to communicate specific information about you or the world? If yes, what type of information?

Do you find it useful or convenient to apply the filters? If yes, why?

Do they make the Instastories / Snaps more entertaining or fun? If yes, how?

How do your followers react to your filters?

Do you think these filters make a difference in terms of how the online audience then interacts with you on (Instagram or SnapChat, depending on which platform they use for filters)? If yes, how? Can you connect to your followers or IG community in a different way because of these?

What do the filters symbolize in terms of your personal identity? Do AR selfie filters change the way you present yourself online? (If yes, how?) What do you express with AR filters that you could not express otherwise?

Self-perception and well-being

How do these filters make you feel about yourself and your appearance?

Do different filters make you feel differently?

How do you see the link between who you are in a real world and how you are represented when overlaid with AR filter?

Do you think the use of filters has a positive or negative influence on your everyday life? How?

Do you think the use of filters has a positive or negative influence on how you feel about yourself? How?

Appendix B - Survey details

Description of AR face filters as provided in the survey

“Augmented reality (AR) face filters visually change your appearance or your background and surrounding in real-time with virtual overlays, that contains imagery, information, and other visual effects. The visual overlays range from subtle to extreme. As opposed to photo editing, where photos are edited *after* they are taken, AR face filters *directly* visually change one's appearance *in real-time* while looking in the screen with camera view or when being recorded. There are different such filters that you can use on Instagram. See an image below with some examples.”

Description of interactions with AR face filters as provided in the survey

“Please note that all the questions about the filters refer to your use of AR face filters on Instagram. Important: For the purpose of this survey, using the filters include all your active interactions with AR face filters - when you try out different filters on yourself, on other people, or/and posting the content for which you used such filters. Content with AR face filters is any visual material (videos, photos) for which you used AR face filters.”

Appendix C - Demographics of survey's participants

	Frequency	Percentage
Gender		
Male	130	24.3%
Female	401	74.8%
Non-conforming	4	.7%
Prefer not to say	1	.2%
Age		
18-20	102	19.1%
21-23	99	18.5%
24-26	106	19.7%
27-29	104	19.4%
30-32	80	14.9%
33-35	45	8.4%
Education		
High School	163	30.4%
Professional Degree	37	6.9%
Undergraduate Degree	221	41.2%
Postgraduate Degree	95	17.7%
Doctoral Degree	12	2.2%
Other	8	1.5%
Employment		
Student	168	31.3%
Full-time employed	262	48.9%
Part-time employed	42	7.8%
Self-employed	18	3.4%
Unemployed	40	7.5%
Other	5	0.9%
Missing data	1	0.2%

Appendix D – Constructs’ reliability, correlations and discriminant reliability

	α	CR	AVE	1	2	3	4	5	6	7	8	9	10	11	12	13
Creative Content Curation	0.90	0.93	0.77	0.88												
Convenience	0.75	0.89	0.80	0.21	0.89											
Filters' Use Frequency	0.93	0.95	0.83	0.59	0.20	0.91										
Filters' Exploratory Use	0.77	0.87	0.69	0.40	0.31	0.51	0.83									
Enjoyment	0.88	0.93	0.80	0.33	0.28	0.37	0.50	0.90								
Ideal Self-Presentation	0.90	0.92	0.71	0.45	0.20	0.55	0.36	0.25	0.84							
Positive Affect	0.84	0.89	0.68	0.50	0.32	0.48	0.45	0.43	0.29	0.82						
Affiliation	0.92	0.94	0.80	0.49	0.09	0.47	0.20	0.13	0.31	0.30	0.89					
Self-Acceptance	0.80	0.87	0.62	0.15	0.14	0.09	0.06	0.18	-0.08	0.33	0.08	0.79				
Silliness	0.91	0.94	0.79	0.20	0.13	0.03	0.14	0.33	-0.14	0.18	0.11	0.08	0.89			
Social Interactions	0.91	0.93	0.69	0.63	0.16	0.59	0.36	0.27	0.48	0.45	0.53	0.10	0.10	0.83		
Transformed Self-Presentation	0.89	0.92	0.70	0.44	0.29	0.49	0.43	0.37	0.65	0.39	0.26	0.03	-0.01	0.41	0.84	
True Self Presentation	0.95	0.96	0.82	0.61	0.11	0.54	0.28	0.26	0.47	0.42	0.56	0.10	0.05	0.62	0.39	0.91

Constructs’ reliability, composite reliability, average variance extracted, and constructs’ correlations; bold in the diagonal is the square root of AVE