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Article

Adolescents' Augmented Reality Filter Usage on Social Media, Developmental Process, and Well-Being

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Abstract

Social media platforms are relevant for the media diet of adolescents. Augmented reality (AR) filters on social media are prevalent within the media consumption of this age group. Recent studies have unveiled the negative impact of beautifying AR filters and digitally enhanced pictures on adolescents' well-being. However, there is a need for an in-depth understanding of how adolescents use AR filters beyond aesthetic reasons. Therefore, the present study aims to contribute to the existing scholarship by focusing on various AR filters and their relation to adolescents' well-being. We investigate different ways of using AR filters (e.g., public posts versus ephemeral settings or direct messages to online friends) inspired by peers and social media influencers. Thus, we conducted four focus groups with $N = 40$ adolescent participants aged 14 to 18 from a European country. Our findings align with previous research on adults, showing that adolescents use AR filters for fun, entertainment, creativity, interaction, and self-expression. Besides, adolescents' well-being determined using AR filters can be tied to crucial elements of the developmental process, such as connections, identity, learning, and emotions. Results showed that using AR filters on social media can facilitate socializing and increase self-esteem. Conversely, their use is time-consuming and can cause adolescents frustration and enhance social pressure. This study provides new insights into adolescents' AR-filter-related interactions. Furthermore, it contributes to the literature on AR filter usage, well-being, and the developmental process of adolescents.

Keywords

adolescents; AR filters; augmented reality; social media; social media influencers; well-being

Issue

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1. Introduction

Social media platforms are relevant to the media diet of adolescents worldwide (Keles et al., 2020) and represent their primary information source (Schmuck et al., 2021). Teens often turn to social media for entertainment and interaction with peers and engage with various features and tools on social platforms such as Instagram, Snapchat, and TikTok. Augmented reality (AR) filters represent platform affordances that enable users to apply visual effects and are therefore available on social media platforms for visual content creation and sharing (Javornik et al., 2022). Merging images with AR filters on social media

creates a new augmented image that is partly fictional and partly factual (Geysler, 2021). A significant number of available AR filters modify facial appearance. They can also adjust different parts of the body, add (cartoon) characters or objects to the picture or video, and change settings. AR filters are prevalent within this age group (Bhatt, 2020). Moreover, the frequent use of these lenses makes them an assertive communication and engagement tool (Ibáñez-Sánchez et al., 2022).

Previous studies mainly focused on the use of AR by adults (de Ruyter et al., 2020; Ibáñez-Sánchez et al., 2022; Scholz & Duffy, 2018) and found evidence that virtually modifying appearances relates to

adults' well-being. Thus, in some cases, the augmented self can negatively affect the existing self-perception of users. In other cases, the augmented self's potential for self-enhancement has a positive impact on adults' well-being (Javornik et al., 2022; Lee & Lee, 2021). Therefore, adolescents' AR filter usage is a timely research topic with societal implications. Some researchers called on AR developers, companies, and policymakers to act and acknowledge problematic aspects of AR filter usage.

Moreover, several countries (e.g., Israel, France, and Norway) have already implemented mandatory disclosures of digitally enhanced pictures for commercial purposes. Moreover, in countries such as the United Kingdom and Germany, there is an ongoing discussion to define ethical and responsible conduct related to digitally modified pictures on social media. Hence, using AR filters is also part of the discussion on the legal framework for adequate disclosure (Javornik et al., 2021b; Naderer et al., 2021).

Teens are forming their identities (Maes & de Lenne, 2022); therefore, their appearance on social media is relevant (Naderer et al., 2021). Given that AR filters shape self-presentation, we argue that, like other tools on social media (Schreurs & Vandenbosch, 2022), using AR filters can positively or negatively affect adolescents' well-being. Adolescents are familiar with social media influencers (SMIs), digital opinion leaders who post content in exchange for compensation (Campbell & Grimm, 2019), whom they follow on social media. Moreover, they look up to SMIs, as they consider them role models (Kühn & Riesmeyer, 2021; van Dam & van Reijmersdal, 2019). Until this date, studies focusing on adolescents and digital image alteration, as AR filters can be considered a form of digital alteration, have evolved mainly around the aesthetic transformation of the self. Therefore, a closer look at broad AR filter types and usage practices is needed. Moreover, to our knowledge, the role of SMIs in adolescents' AR filter use and their relation to well-being in adolescent development was not the focus of previous scholarship.

Our study concentrates on the use of AR filters by adolescents, aiming for an in-depth understanding of their digital media consumption. Our first objective is to develop a comprehensive perspective on the topic by looking at different ways adolescents use AR filters (e.g., public posts versus ephemeral settings or direct messages [DM] to online friends) and diverse sources of inspiration, such as peers and SMIs. Based on the critical elements of adolescents' developmental processes (Shankleman et al., 2021), our second objective is to shed light on how AR filter use is associated with teens' well-being.

2. Theoretical Background

2.1. Adolescents and Augmented Reality Filters on Social Media

AR filters are digitally based lenses and responsive interactions applied to the user's face or surroundings to

change or extend what users see in the environment (Rios et al., 2018). Previous studies identify several motivations linked to AR filter use on different platforms, such as ideal and transformed self-presentation, affiliation, enjoyment, creative content curation, social interactions, convenience (Javornik et al., 2022), entertainment, curiosity, escapism, interactivity, trendiness, sense of belonging, and compatibility with individuals' lifestyles (Ibáñez-Sánchez et al., 2022). Studies conducted with adult participants showed mixed results regarding the outcomes of AR filter use on well-being. Thus, they alter users' self-acceptance and positive affect, offer a tool for visual exploration of oneself, which can happen through desirable novel depictions of the self, and thus increase self-acceptance and one's affective state (Javornik et al., 2022). On the other hand, AR filter use can also negatively impact the existing sense of self (Javornik et al., 2021a).

Previous research also indicates that, due to their ephemeral nature, AR filters are related to establishing short-term emotions rather than creating or reinforcing long-term commitments (Flavián et al., 2021; Ibáñez-Sánchez et al., 2022). Prior research has established that users of computer-mediated communication, including social media platforms, can optimize their self-presentation and promote desired relationships by spending more time and significant cognitive resources on editing messages (Walther, 2007). Thus, they showcase what they consider to be their positive aspects and present an ideal self (Ellison et al., 2006).

The hyperpersonal model of computer-mediated communication shows "how performing oneself, optimally and deliberately, using the affordances of the media, garners social reward, affecting one's persona and relations" (Walther & Whitty, 2021, p. 128). Thus, the senders of computer-mediated messages engage in selective self-presentation. They can highlight positive traits and downplay negative ones. On the other hand, the receivers absorb these stylized messages and construct an idealized image of their communication partners. Feedback can reinforce positive self-presentation and add a sense of validation (Walther & Whitty, 2021).

Given that AR filters are a tool integrated with social media communication, we can apply the hyperpersonal model of computer-mediated communication to analyze their use. By opting for AR filters, adolescents contribute to their self-presentation. Moreover, adolescents are receivers of messages containing AR filters and give feedback to their peers with the help of several interactive tools that platforms offer (e.g., comments, likes, shares, and DMs). Hence, adolescents' use of AR filters is associated with different outcomes in terms of well-being based on the feedback they receive when using these features.

Instagram and YouTube are widely used platforms influencing adolescent culture and identity formation (Casares & Binkley, 2022). Using so-called beautifying AR filters on social media affects teens, as studies proved

that face filters increased adolescents' acceptance of cosmetic surgery (Maes & de Lenne, 2022). Furthermore, previous research highlighted why Instagram filters are problematic for adolescents, given that digitally altered body images are accepted as standards (Naderer et al., 2021). Given that, several European countries have increasingly worked to develop social media-related laws to inform users of the social media promotion of unrealistic beauty standards and body dysmorphia. However, research must be extended to investigate the impact of other types of AR filters in relation to different motivations highlighted in studies conducted on adults, such as engagement, creativity, interaction, entertainment, and fun (Javornik et al., 2022). Moreover, a closer look at different sources of inspiration for AR filter use, such as SMIs, can contribute to a better understanding of how AR filters are related to well-being.

2.2. Social Media Influence and Adolescents

Adolescents are at a life stage that makes them highly sensitive to social influences (van Dam & van Reijmersdal, 2019) from family, peers, social institutions, media, the economy, or politics (Rudan, 2000). Thus, female adolescents who focus their social media consumption on "appearance-focused" photos, similar to the ones published by SMIs, are more likely to participate in self-objectification and to go through dietary restraint or weight dissatisfaction (Cohen et al., 2017), and they can even be more susceptible to eating disorders (Holland & Tiggemann, 2016; Vandenbosch & Eggermont, 2016).

SMIs exercise a particular form of influence on teens. SMIs are role models with whom teens develop a strong emotional bond (Kühn & Riesmeyer, 2021). Childers et al. (2019) stressed that SMIs are opinion leaders, digital celebrities, content creators, advertising developers, and entrepreneurs. SMIs play a significant role in molding the behaviors of adolescent social media users (Qutteina et al., 2019). SMIs have substantial persuasive power over young audiences that often identify with them (Croes & Bartels, 2021).

Moreover, as they are often close in age to their audience, SMIs fit the frame of reference for this age group (Marôpo et al., 2020). Digital celebrities often use AR filters for both commercial and non-commercial reasons. Therefore, we argue that a closer look at how SMIs serve as a model for teens to use AR filters is relevant to the present research's rationale. Hence, we asked the following research question:

RQ1: How do adolescents use AR filters, and what are their sources of inspiration for choosing AR filters?

2.3. The Relationship Between Adolescents' Social Media Use and Well-Being

A growing scholarship was developed alongside public concerns about social media use, adolescents' men-

tal health, and well-being (Meier & Reinecke, 2021). However, the findings are nuanced and complex (Beyens et al., 2020). Digital well-being is still a "fuzzy concept" (Vanden Abeele & Nguyen, 2022, p. 3) and has various definitions. Well-being is a term used for the states and feelings of the individual that lead to satisfaction, self-esteem, anxiety, depression, happiness, and quality of life (Javornik et al., 2022; Weinstein, 2018). Digital well-being is "a subjective individual experience of optimal balance between the benefits and drawbacks of mobile connectivity" (Vanden Abeele, 2021, p. 7). Moreover, psychological well-being is "characterized by the presence of positive indicators and/or absence of negative indicators of wellness" (Yang et al., 2021, p. 631). Psychological well-being encompasses self-esteem, social connectedness, loneliness, positive and negative effects, and life satisfaction (Yang et al., 2021). Our research will focus on affective well-being based on adolescents' evaluations of moods and emotions (Eid & Diener, 2004).

Previous studies have highlighted the impact of social media use in general on adolescents' well-being (e.g., Deters & Mehl, 2013; Keles et al., 2020; Kross et al., 2013; Lin et al., 2016; Niera & Barber, 2014; Wang et al., 2017). The differential susceptibility to media effects model from Valkenburg and Peter (2013) posits that individuals have a unique susceptibility to the effects of social media. Thus, similar social media use practices regarding well-being can have different outcomes (Beyens et al., 2021). Studies show that teens do not experience any short-term changes in well-being related to social media use, and if they do, the experiences are more positive than negative (Beyens et al., 2020).

Based on a meta-synthetic approach, Shankleman et al. (2021) discussed the impact of social media use on adolescents' well-being in relation to four crucial elements or dimensions of adolescents' developmental processes. Those are connections, identity, learning, and emotions. Similarly, we elaborate on AR filters and implications for adolescents' well-being as a part of their social media consumption.

Regarding connections, social media enables adolescents to create new relationships and interact with others. By building supportive peer connections online, adolescents can develop a sense of belonging and self-disclosure, contributing to their identity development (Davis, 2012). Furthermore, social media use helps to nurture and maintain social groups (Radovic et al., 2017) and allows teenagers to connect on a deeper level, make plans, or even share jokes and humorous images (Bell, 2019; Davis, 2012). Hence, teens validate and normalize their emotional experiences (Singleton et al., 2016). However, the same platforms that can offer support also negatively impact connections, the most common example being bullying (Shankleman et al., 2021). In line with those observations about social media use, AR filters can serve the connection dimension well. Javornik et al. (2022) revealed that adults use

AR filters to connect and interact with peers. Moreover, platform affordances allow users to communicate with peers and SMIs differently.

The second topic, identity, describes aspects of social media that support or negatively affect authenticity, self-esteem, distinctiveness, and life continuity. Distinctiveness relates to identity in the sense that the content they post accentuates the need to “be unique and different” and to “stand out from the crowd” (MacIsaac et al., 2018, p. 9). Finding new and original AR filters could contribute to adolescents’ sense of uniqueness.

On the flip side of the same coin, certain adolescent behaviors can be characterized as inauthentic based on actions that do not reflect who they were offline (Singleton et al., 2016). For example, being inauthentic can be associated with deliberately posting a more idealized online identity profile instead of a less accurate image (Throuvala et al., 2019). In addition, AR filter use can contribute to ideal and transformed self-presentation (Javornik et al., 2022).

Social media can support well-being by offering opportunities for learning and development. Learning from online content can be associated with an enrichment experience (Throuvala et al., 2019). Research shows that obstruction of education can also be determined when connected to social media. Creating ideal images to receive likes and positive feedback is time-consuming and involves high levels of criticism and self-scrutiny (Bell, 2019). We argue that adolescents’ use of AR filters is part of a learning process for them. Moreover, AR filters serve as inspiration for them.

The fourth dimension consists of emotions, as social media can influence one’s state both positively and negatively. Throuvala et al. (2019) point out that social media can be a mood booster, and emotion regulation is critical for teens. Social media use helps overcome boredom and supports escapism to relieve distress. Furthermore, in some cases, social media is used as an emotion-focused coping strategy, which can help regulate negative emotions and manage anger or other unpleasant offline experiences (Duvenage et al., 2020). According to Javornik et al. (2022), the use of AR filters is motivated by fun and entertainment and is therefore considered a form of emotion regulation.

As a negative influence on one’s well-being, studies show that social media is a source of pressure, fears, and worries (Shankleman et al., 2021). The fear of missing out negatively affects social well-being. Receiving updates constantly and being available on mobile devices can trigger a particular type of fear of missing out related to online communication and the activities of others on social media (Schmuck, 2021). Hence, we also consider looking at this type of outcome when investigating adolescents’ AR filter use and well-being. Moreover, in line with the second objective of the present study, we formulate the following research question:

RQ2: How does the relationship between well-being and adolescents’ AR filter use on social media relate to the critical factors of developmental processes (connections, identity, learning, and emotions)?

3. Method

Our exploratory study aims to shed light on adolescents’ use of AR filters and whether they relate to well-being. We conducted four focus groups with $N = 40$ adolescents aged 14–18 ($M_{\text{age}} = 15.98$, $SD = 1.14$; 57.5% female, $n = 23$; 42.5% male adolescents, $n = 17$). Table 1 shows detailed information about the participants. The focus groups were conducted on-site, with adolescents from different regions of a European country voluntarily participating. The participants were enrolled in a summer school for high school students organized by a large university in July 2022. Each group interview lasted, on average, one hour and 25 minutes. The discussion revolved around the use of AR filters on social media sites such as Instagram and TikTok, given the participants’ familiarity with these platforms. These platforms were selected due to their high usage among adolescents within the country where we conducted our research (Statista, 2023). Moreover, these platforms have integrated AR filters. Before conducting the research, we obtained institutional permission and the ethical approval of the researchers’ university’s Ethics Committee.

Moreover, the adolescents consented to participate after being explained the study’s purpose. All the group interviews took place in the native language of the participants. As an educational intervention, we highlighted the downsides of AR filter usage at the end of each group discussion. We thus contributed to the development of the digital media literacy of adolescent participants.

Participants saw digitally enhanced pictures with different AR filters (e.g., dog-ear filters, exaggerated face-altering filters, eye-color-changing filters) as input for the group interviews. We followed Shankleman et al. (2021) when developing the guidelines for our focus groups. We applied an inductive-deductive approach (Deterding & Waters, 2021) by focusing on how adolescents use filters to interact with others (connections), how they discover and disclose these filters (learning), in what way filters help them express their identity and contribute to increasing/decreasing their self-esteem (identity), and how the use of AR filters affects their mood (emotions). Furthermore, the four critical dimensions of adolescents’ developmental processes, namely connections, identity, learning, and emotions, were considered categories in the thematic analysis (Swain, 2018) of the focus groups. Moreover, within the categories mentioned above, we coded how AR filter use affected adolescents’ relationships with peers (nurturing versus compromising relationships), self-presentation (authentic versus inauthentic), inspiration for AR filter use and usage practices (ethical versus deceiving practices), and emotions (positive versus negative). This approach allowed us to describe

Table 1. Description of the sample.

	Gender	Age		Gender	Age
ID1	M	17	ID21	F	16
ID2	F	16	ID22	F	16
ID3	F	18	ID23	F	15
ID4	M	16	ID24	M	16
ID5	M	16	ID25	M	17
ID6	F	18	ID26	F	18
ID7	M	15	ID27	F	16
ID8	M	15	ID28	M	15
ID9	M	17	ID29	F	15
ID10	F	16	ID30	F	17
ID11	F	14	ID31	F	16
ID12	F	16	ID32	F	15
ID13	M	17	ID33	M	18
ID14	M	16	ID34	M	14
ID15	F	15	ID35	F	16
ID16	F	16	ID36	F	17
ID17	F	17	ID37	M	17
ID18	F	17	ID38	M	17
ID19	M	14	ID39	F	15
ID20	M	15	ID40	F	14

how teenagers’ social media use enhances or damages their well-being. Moreover, we transcribed all group interviews and performed a thematic analysis with the help of MAXQDA software.

4. Findings

The results of the thematic analysis of the focus groups are presented aligned with the categories we identified based on previous literature on adolescents’ developmental processes and well-being (Shankleman et al., 2021). Hence, we focused on how adolescents’ AR filter use establishes connections with peers and builds their identity. Moreover, we explore how AR filters are related to learning processes and associated with emotions. During the group interviews, the most popular topics respondents discussed were how AR filters contribute to communication processes and affect users’ perceptions of authenticity.

4.1. Connections

Using AR filters on Instagram and TikTok is part of adolescents’ socialization process. Thus, our respondents highlighted using AR filters to stay in touch with their peers and nurture relationships. Hence, teens often use AR filters to communicate with friends via DMs on Instagram and not publicly. Communicating through AR filters replaces simple text or voice messages. Thus, adolescents emphasized the importance of forming connections with the help of AR filters in small groups of peers. Using AR filters for entertainment and fun, “to laugh, chat with friends, for memes, and for jokes” (ID14),

encourages peers to engage in communication processes with them.

Both friends they follow on social media and SMIs are sources of inspiration when it comes to finding new AR filters, as some teenagers highlighted: “I save my filters from other people’s stories and DMs, from friends and SMIs” (ID39). Hence, AR filters represent not only the opportunity to connect with peers but also with SMIs, given that adolescents consider SMIs to be a valuable source of information and inspiration to find AR filters on Instagram and TikTok. Moreover, the adolescents we talked to knew the advertising dimension of SMIs’ activity and stressed that some of the AR filters the SMIs use are brand-related, but that SMIs use mostly beautifying AR filters. Besides, some of the teens we interviewed highlighted that AR filters could also be an advertising tool SMIs use.

There are also downsides to adolescents’ AR filter use. Thus, pressure to use AR filters often results in unfollowing peers and SMIs or even disconnecting from social media. Hence, extensive AR filter use on Instagram and TikTok can compromise relationships. Peers sometimes formulate offensive comments to a story in which they engage with these tools, often leading to bullying and criticism. This kind of unpleasant interaction applies especially in the case of teens who feel uncomfortable with their physical appearance and use beautifying filters. Participants also experienced harmful and offensive comments connected to the use of AR filters. However, in some cases, not using AR filters was the subject of offensive comments, as highlighted by one of our participants: “Because everything in the online world is flawless, my followers have been abusing me because I am

obese, do not use filters, and do not exhibit that fake stance” (ID37).

4.2. Identity

The interaction between adolescents and AR filters is related to identity building, another key element in this age group’s developmental process and well-being. Hence, the respondents assess authenticity, self-esteem, self-acceptance, and distinctiveness as crucial roles in their identity formation. When asked how AR filters can help them express their identity, the adolescents’ answers show that AR filters are context-related and that users perceive them in many ways under different circumstances. Respondents addressed the issues of beautifying filters and authenticity. For the adolescents we interviewed, being authentic entails consistency and distinctiveness, or as a participant highlighted, “I do not need filters that make me look different. You must accept yourself. You are perfect as you are. Nobody can change this” (ID26). The focus group participants emphasized the importance of self-acceptance: “You have to love yourself as you are” (ID31). However, using beautifying filters is an accepted practice among adolescents as long as the digitally altered media persona and the real persona are similar in terms of appearance. Adolescents noticed that social media platforms’ algorithms favor attractive people like peers and SMIs:

TikTok picks out SMIs with a pleasant physical appearance and recommends their content to others. Therefore, being attractive contributes to the success of social media content as it generates views. If you are pretty, people will check out your social media account. (ID33)

“Instagram is an app that puts aesthetics first” (ID4) and promotes an ideal self. Adolescents are aware of the social pressure SMIs face, given that, from the teen users’ perspective, “SMIs must have an external appearance as perfect as possible and offer an ideal image” (ID3). Hence, SMIs use beautifying filters. However, adolescents criticized the excessive use of filters by both SMIs and peers. They found it problematic when the social media persona no longer resembles the real-life person, as one participant stressed: “I noticed a lot of SMIs, but not all of them appeared real to me, due to the use of filters. This led to unfollowing them” (ID18).

Respondents discuss other types of AR filters besides beautifying filters. Hence, they mentioned using “funny filters” (ID40) and “childish filters” (ID32). Using popular filters keeps adolescents up to date with the latest trends, nurturing a sense of presence and relevance. Engaging in using funny filters to entertain their social media friends was associated by the adolescents we interviewed with self-esteem and self-acceptance.

However, respondents stressed that adolescents’ AR filter use might result in falsehood, an inauthentic self-

presentation, and shrinking self-esteem. Thus, some participants criticized SMIs’ engagement with AR filters as “they want to make the world believe that constantly employing beautifying filters is normal” (ID31). Furthermore, teens criticized the excessive use of AR filters as a lack of authenticity. In addition, they argue that some of the beautifying AR filters “promote falsehood” (ID6), as people “want to pretend to be different than in reality” (ID24). However, most adolescents highlighted that moderate use of AR filters as ephemeral content is recommended. Thus, using filters is not opposed to an authentic media persona; “it depends on how often you use them” (ID21).

Even though our study was conducted on a small sample, we observed differences in how female and male adolescents perceived the use of AR filters. Thus, female respondents addressed the topic of beautifying filters, whereas male participants talked more about using funny filters for entertainment purposes. Moreover, male participants criticized female adolescents’ excessive use of beautifying filters.

4.3. Learning

Learning is another key element of adolescents’ developmental process. Our research focused on how adolescents learn to use AR filters and what they ascertain from using them. The participants learned to recognize and search for AR filters inspired by peers and SMIs. However, some of the respondents search for AR filters daily using keywords. In contrast, others encounter them by chance while scrolling through the applications, as “filters are everywhere on social media, even on informational content, such as stories about politics” (ID25). The active search leaves teens with the impression of exploring social media, finding something unique, and being a source of inspiration for their peer community when sharing the filters they discover; however, finding them can be time-consuming.

Adolescents are confident in recognizing content that contains AR filters. Moreover, teens stressed that AR filters are easy to identify regardless of the lack of disclosure, given that “technology has not yet advanced so much that we cannot notice the difference between a filter and a normal picture” (ID19) or even that some “photos or videos were unnatural, exaggerated, unrealistic, and the texture of the face was different” (ID35). Hence, the adolescents we spoke to are not in favor of mandatory disclosure. However, our respondents encountered and identified unethical and deceiving practices related to using AR filters. In this sense, using beautifying filters when promoting beauty products was mentioned as a negative example. Thus, SMIs must be honest and avoid deceptive practices related to using AR filters, as one respondent highlighted: “If an SMI applied AR filters to promote cosmetics or make-up products, I would rather not follow him/her. Those are deceiving practices. It is about looking good that comes first” (ID1).

4.4. Emotions

The fourth key element, emotions, was also addressed in the group discussions. Hence, adolescents' AR filter use can promote positive moods, body positivity, and self-contentment on the one hand and can create social pressure, worries, and feelings of insecurity on the other. Adolescents associate AR filter use with entertainment and creativity related to positive feelings. For example, they use AR filters for fun, excitement, or because "this makes them laugh" (ID25). In this sense, AR filters are a "remedy for boredom" (ID33).

The interaction with AR filters generates emotions and moods: "It would make me sad if I could not find the filter that I often use anymore" (ID29). However, AR filter use has downsides by affecting adolescents' moods due to "societal pressure to look in a certain way" (ID12). This leads to the perpetuation of the feeling of insecurity, and "it lowers self-confidence" (ID36). From a respondent's point of view, excessively using AR filters means "not accepting yourself as you are" (ID1). These emotions develop various types of moods, such as sadness, anger, fear of rejection, or fear of missing out, as they are not able to follow a particular social media challenge related to AR filters.

5. Discussions

AR filters on social media are prevalent among adolescents and are an active part of their media consumption. Recent research has revealed that beautifying AR filters and digitally modified images affect adolescents' well-being (Hjetland et al., 2021). However, AR filters are a creative tool that improves physical appearance and provides entertainment, fun, and peer interaction. The present research highlighted the overall relevance of AR filter use for teenagers concerning connections, identity, learning, and emotions. AR filters are used mainly ephemerally in Instagram stories and especially on small-group DMs. In line with previous studies conducted on adults (Ibáñez-Sánchez et al., 2022; Javornik et al., 2022), we observed that in the case of adolescents, entertainment, interaction with peers, and enhancing creativity are among the relevant motivations behind AR filter use. Considering the four critical elements of adolescents' developmental processes (Shankleman et al., 2021), the present research showed that AR filters play an essential role in adolescents' connectivity by contributing to relationships with peers, helping them stay in touch, and strengthening their sense of belonging to the online community. However, extensive AR filter use can compromise relationships, resulting in criticism, bullying, unfollowing, and even disconnecting.

Communicating with peers, especially on DMs, can lead to asynchronous interaction. Hesse et al. (1988) state that asynchronous online communication gives social users time to compose, edit, send, and receive messages. This way, adolescents can produce more

socially desirable and compelling content by employing AR filters. As integrated tools of social media platforms, primarily used in DM's and stories, AR filter use is based on constant feedback. Thus, everyone can use AR filters to create and edit the content multiple times before sending it to their peers, who can give feedback on this augmented image, enabling the sender's validation.

AR filter use is associated with identity building. AR filter use is related to (a lack of) authenticity and self-acceptance. Many teenagers we spoke to criticized the excessive use of beautifying filters. Regarding physical appearance, the adolescents we interviewed favored the idea of consistency between social media and the real-life persona. The abusive use of AR filters was associated with a lack of authenticity in the case of both peers and SMIs. The participants in our study not only highlighted the importance of being true to themselves but also condemned the excessive use of filters. The focus group participants held social media platforms and SMIs accountable for the excessive use of beautifying filters.

Part of the learning process is determining how to use AR filters on Instagram and TikTok and identifying peers and SMIs that use them. The teenagers who participated in the group interviews considered they developed the necessary skills to identify the employment of AR filters. They are aware of deceiving practices related to AR filters. However, mandatory disclosure of AR filters is optional at this point. Besides, as techniques evolved, they stressed that disclosures might be needed.

The use of AR filters on social media generates a wide range of emotions, from positive emotions generated by filters for entertainment or fun to negative emotions caused by social pressure, low self-esteem, and feelings of insecurity. In line with other studies (Schreurs & Vandenbosch, 2022), we found evidence that AR filter use contributes to the self-affirming role of posting self-related appearances. Therefore, SMIs are a source of inspiration for AR filter use. Furthermore, adolescents are aware that SMIs must apply AR filters to look attractive, the way audiences and brands expect them to appear. However, adolescents appreciate honesty and raised concerns regarding ethical AR filter use by SMIs in the context of advertising for specific products. In line with previous research on AR filters, we state that AR filters enable short-term emotions rather than creating long-term commitments (Flavián et al., 2021; Ibáñez-Sánchez et al., 2022). Furthermore, exposure to AR filters may affect individuals' four developmental processes differently (Valkenburg & Peter, 2013). Thus, respondents refer to excessive filter use by SMIs and peers, resulting in negative feedback.

6. Conclusions, Limitations, and Future Research

The present work offers an in-depth perspective on adolescents' AR filter usage on social media associated with well-being. Thus, our study contributes to a better understanding of teens' digital media consumption.

Our research has both theoretical and practical implications that will be presented below. Furthermore, based on group interviews, the present work benefits from the strength of a qualitative approach, providing insights into how adolescents use AR filters on social media.

Our study contributes to the existing literature on social media and well-being. Few studies have examined the use of AR filters by teenagers. As tools often used by this age group, it is necessary to investigate how they relate to adolescents' social connections with peers and family, their mood, identity, learning process, and possible societal threats. Our findings replicated the results of previous studies focusing on social media use and adolescents' well-being, showing positive and negative associations (e.g., Schreurs & Vandenbosch, 2022; Vanden Abeele et al., 2018; Vandenbosch & Eggermont, 2016). Based on our findings, the use of AR filters can bring benefits to the four critical elements of the developmental process of adolescents, namely connections, identity, learning, and emotions. Our study's main takeaways are that AR filters can enhance connectivity with peers, nourish relationships, and make adolescents feel unique. Using AR filters for fun and entertainment contributes to self-esteem and self-acceptance in adolescent groups and generates positive moods. However, the excessive use of (beautifying) filters can compromise relationships with peers, resulting in negative moods, insecurity, and social pressure.

The study has practical implications for adolescents, educators, policymakers, SMIs, brands, and filter developers. We recommend that adolescents use AR filters for self-expression and creativity to showcase their unique personalities. Moreover, we recommend that adolescents use AR filters to promote relaxation and positive emotions, incorporating calming visuals. Thus, AR filters can reduce stress and improve mood. Excessive use of beautifying filters can lead to a dissociated perception of oneself.

Furthermore, we recommend that adolescents engage more with filters with educational content to raise awareness about relevant issues. However, we stress that AR filters must be balanced to avoid excessive usage. In addition, we recommend that adolescents acknowledge the specifics of the social media platforms (terms and conditions) and be aware of the content they choose to make public and the digital fingerprint they leave behind.

Based on our findings, we recommend that policymakers, AR filter developers, SMIs, and media educators take an ethical and responsible approach to AR filters. Moreover, we recommend that educators discuss with adolescents the potential risks of excessive use of AR filters, thus contributing to developing teens' digital media literacy. Furthermore, we recommend that policymakers consider efficient disclosure of AR filters. Besides, SMIs should reflect on their status as role models and use (beautifying) AR filters with moderation so that their social media personas resemble real-life appearances.

We recommend that developers design filters promoting healthy beauty standards, relaxation, and positive emotions. Furthermore, AR filters related to educational content that stress the relevance of critical societal topics should be the focus of their development efforts.

This study has practical implications for brands that invest in creating AR filters for brand-related interactions among adolescent social media users. Our findings show that adolescents search for AR filters on social media for various reasons. We recommend that brands invest in AR filters associated with entertainment and fun, as both male and female participants use AR filters for this reason. Furthermore, we recommend that brands targeting a younger audience in their promotional activities create AR filters for educational purposes or personal development. Brands should focus less on the development of beautifying filters.

The present study has limitations due to the exploratory nature of the research, as we applied qualitative methods. Hence, our study does not investigate causal relations between teens' AR filter use on social media and well-being. Besides, our study did not address the differences between AR filter use on Instagram versus TikTok. Therefore, future research should address platform differences. Moreover, future research on using AR filters by teenagers may apply a different methodological approach and develop comparative studies. Furthermore, experimental research is needed to highlight the effects of using AR filters.

Conflict of Interests

The authors declare no conflict of interests.

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