


“The sun is life; it is needed”. Analysis of attitudes and barriers to photoprotection amongst young TikTok users

“El sol es vida, se necesita”. Análisis de las actitudes y barreras hacia la fotoprotección entre la juventud usuaria de TikTok




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Abstract:

In Spain, young people are particularly susceptible to skin cancer due to their propensity to engage in risky behaviors related to sun exposure. In the current context, where social media platforms – especially TikTok– facilitate the spread of misinformation, health communication plays a critical role. This study explores the attitudes and barriers of TikTok users towards photoprotection. Understanding how young users perceive information and the factors that shape the adoption of preventive behaviors provides valuable insights for designing effective communication strategies on this platform. Using thematic discourse analysis, 3,696 comments from videos tagged with #photoprotection and #solarburns on TikTok were analyzed. The results reveal a duality in user perceptions: while some users demonstrate a growing awareness of the risks associated with sun exposure and recognize both the health and aesthetic benefits of photoprotection, others exhibit skepticism, engage in conspiracy theories, or trivialize and dismiss these risks. Moreover, the findings underscore the importance of information quality and the credibility of content creators in influencing photoprotection behaviors.

Keywords:

Health communication; misinformation; social media; TikTok; skin cancer.

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Resumen:

En España, la población joven constituye un grupo especialmente susceptible al cáncer de piel debido a su tendencia a adoptar conductas de riesgo en cuanto a la exposición solar. En el contexto actual, en el que las redes sociales, en especial TikTok, facilitan la circulación de desinformación, la comunicación de salud adquiere una importancia fundamental. El objetivo de este estudio es explorar la influencia actual que ejerce TikTok en las actitudes y barreras hacia la fotoprotección solar. Comprender cómo la juventud usuaria percibe la información y cuáles son los factores que influyen en la adopción de comportamientos preventivos proporciona información valiosa para implantar estrategias de comunicación adecuadas en esta plataforma y llevar a cabo una comunicación eficaz. Mediante el análisis del discurso temático se analizaron 3696 comentarios procedentes de la búsqueda de vídeos bajo los hashtags #fotoprotección y #quemadurasolar en la red social TikTok. Los resultados revelan una dualidad en la percepción de los usuarios, así mientras algunos muestran una creciente conciencia sobre los riesgos de la exposición solar y los beneficios de la fotoprotección desde el punto de vista estético y de salud, otros presentan una visión escéptica, conspirativa e incluso trivializan y desestiman los riesgos. Además, el estudio resalta que la calidad de la información en TikTok y la credibilidad de los emisores, son cruciales para influir en las conductas de fotoprotección.

Palabras clave:

Comunicación estratégica, comunicación de salud, alfabetización mediática, desinformación, redes sociales, TikTok, cáncer de piel.

1. Introduction

The increasing global incidence of skin cancer is a major public health challenge (Arnold *et al.*, 2022). According to the World Health Organization (WHO, 2017), skin cancer is one of the most diagnosed cancers in humans. In particular, melanoma is a type of skin cancer characterized by its high mortality rate (Skin Cancer Foundation, 2024). In this context, the Asociación Española Contra el Cáncer (AECC, 2021) reports that Spain is facing increasing concern due to the rising incidence of melanoma cases. Increased outdoor recreation time without adequate sun protection is the main contributing factor to this trend in the country, along with the alarmingly high use of tanning beds amongst young adults and women (Cayuela *et al.*, 2024).

The International Agency for Research on Cancer reports that ultraviolet radiation from the sun and tanning booths is a human carcinogen (IARC, 2024). The causes of skin cancer are multiple; however, as the Sociedad Española de Oncología Médica (SEOM, 2022) points out, one of the main risk factors is prolonged and unprotected exposure to UV radiation.

Risk behaviors associated with sun exposure are more frequently observed during youth. International epidemiological studies point to a high incidence of practices such as intentional tanning and the lack of use of photoprotection measures amongst the young population, which increases their vulnerability to skin cancer (Basch *et al.*, 2017; Gambla *et al.*, 2017; Kirk & Greenfield, 2017; Diehl *et al.*, 2019; Julian *et al.*, 2020; Bowers *et al.*, 2021; Miller *et al.*, 2022; Cambil-Martín *et al.*, 2023). In the Spanish context, the literature corroborates the above findings and highlights the urgent need to change sun protection and tanning behaviors amongst Spanish youth (López-Ravello *et al.*, 2015; Ponce *et al.*, 2019; Sirera-Rus, *et al.*, 2020). Tanning and sunburn contribute significantly to the occurrence of skin cancer later in life (Paul *et al.*, 2014; Savoye *et al.*, 2018). To such an extent, experiencing five or more sunburns significantly increases the risk of developing melanoma (Skin Cancer Foundation, 2024). These behaviors are often motivated by aesthetic ideals and social pressure that leads youth to ignore photoprotection recommendations and irresponsibly expose themselves to UV radiation (Gambla *et al.*, 2017). Young people underestimate the risks associated with sun exposure because they have a low perception of susceptibility (Fernández-Morano *et al.*, 2016). That is, they do not consider themselves susceptible to diseases associated with UV exposure.

On the other hand, although no single method of sun protection offers complete protection against UV radiation, sunscreen, used correctly, is recognized as one of the most important methods of preventing UV damage and thus skin cancer (AECC, 2020; Sander *et al.*, 2020; Skin Cancer Foundation, 2024). Despite this, its use amongst young people faces several barriers. Various authors point to perceived discomfort in application, price or toxicity (Julian *et al.*, 2020; Støle *et al.*, 2019); as well as inappropriate use when applied insufficiently or incorrectly (Bowers *et al.*, 2021). The latter can lead to a false sense of protection and increase sun exposure, thereby increasing the risk of skin cancer (Bowers *et al.*, 2021; Alli *et al.*, 2022; Alonso-Belmonte *et al.*, 2022).

However, overcoming barriers to prevention through educational campaigns that raise awareness of the risks of UV radiation exposure and the proper use of sunscreen along with other sun protection methods can represent a significant advance in skin cancer prevention amongst youth (AlJasser *et al.*, 2019).

This study considers social media as the main source of information for young people, in a context where misinformation and hoaxes proliferate. The research explores users' attitudes and barriers to adopting preventive behaviors, which will help identify key areas for intervention and develop more effective prevention strategies.

2. Theoretical framework

2.1. Misinformation and promotion of risky behavior on TikTok

Social media play a crucial role in promoting risky behavior amongst young people (Gomaa *et al.*, 2022), becoming significant sources of misinformation (Roche *et al.*, 2021).

The influence of social media is of particular concern due to its ability to reach large audiences and change attitudes and behaviors quickly and effectively (Bessi, 2017; Scheibenzuber *et al.*, 2023). Short video platforms such as TikTok, whose popularity and preference amongst youth has soared in recent times (IAB Spain, 2024), are of particular interest. Short videos on social media have become an increasingly relevant source of information among users (Gao *et al.*, 2023). TikTok is recognised for the alarming spread of unverified information, due to the absence of barriers to entry and the ease with which unofficial sources share content that quickly goes viral (Basch *et al.*, 2021). The algorithm favors this aspect by creating “echo chambers” where users are continuously exposed to content similar to that already viewed, thus contributing to the spread of misinformation (Gao *et al.*, 2023).

The consequences of consuming this type of misinformation content can significantly affect public health and society. In the field of health, TikTok is used as a public forum to promote products, discuss health problems and offer medical advice, where the credibility of information varies considerably (Zenone *et al.*, 2021). A clear example is the relevant role of TikTok videos in the COVID-19 infodemic, misinforming on critical aspects such as the existence of the virus, the efficacy of masks and vaccines, or promoting risky behaviors (Bash *et al.*, 2021; Baumel *et al.*, 2021; Southwick *et al.*, 2021; Unni & Weinstein, 2021).

In particular, the young population is highly susceptible to fake news circulating within TikTok (Truong & Kim, 2023; Lan & Tung, 2024). While the influence of misinformation and promotion of dangerous behaviors related to sun exposure and tanning are commonly discussed on other social media such as Instagram, X, Facebook, Snapchat and Pinterest (Ricklefs *et al.*, 2016; Waring *et al.*, 2018; Fitts & Gall, 2018; Banerjee *et al.*, 2019; de la Garza *et al.*, 2021), there is a notable absence of studies addressing this issue on TikTok. The effects of TikTok in this domain are yet to be explored (de la Garza *et al.*, 2021). The limited literature that does exist analyses skin cancer content on TikTok and finds that, through this platform, dangerous trends are disseminated that minimize or even negate the risks of tanning and sunburn by promoting aesthetic ideals, tanning booth use and excessive exposure to UV radiation (de la Garza *et al.*, 2021; Doyon *et al.*, 2022). For example, Roche *et al.*, (2021) in their study identified that, on TikTok, under the hashtags #tanningchallenge, #tanningbedchallenge and #sunburnchallenge, tanning practices and viral challenges were promoted. These challenges included filming oneself inside a tanning booth or showing extreme burns caused by sun exposure (cited in de la Garza *et al.*, 2021).

This research highlights the urgent need to address the proliferation of misinformation about tanning on TikTok through the dissemination of content –educational and awareness-raising videos on photoprotection– broadcast by specialists in prevention communication work.

2.2. Media literacy on TikTok

Media literacy is an essential solution to counteract the negative influence of social media (Falzone *et al.*, 2017). Educating youth on the importance of photoprotection as well as critical interpretation of media content through campaigns that inform about the risks of tanning and sunburn can empower them to make informed decisions and is therefore also crucial to reducing the incidence of skin cancer (de la Garza *et al.*, 2021).

Recent research has begun to demonstrate that social media literacy about skin cancer fosters risk awareness and promotes the adoption of preventive behaviors amongst youth (Mingoia *et al.*, 2019; Agha-Mir-Salim *et al.*, 2020; Gall *et al.*, 2022). Furthermore, Mandzufas *et al.* (2023) suggest that TikTok has significant potential for health professionals and prevention organizations to effectively target their audience within the platform and influence health-related behaviors. Despite being a social media under exploration in terms of its potential for skin cancer awareness (de la Garza *et al.*, 2021), Zheng *et al.* (2021) point to the platform's potential in this regard to create short educational videos and debunk myths easily and effectively, thus countering misinformation. Audience retention in viewing content is a crucial factor. A recent YouTube study in the field of dermatology revealed that audience retention for educational purposes improves when videos are concise and contain practical and relevant content (Barrutia *et al.*, 2023a).

Due to the widespread relevance of social media, and particularly TikTok, amongst the youth population, professionals with the capacity to influence prevention must consider establishing a presence on these platforms (Guzmán & Barbieri, 2022). They must adapt and actively employ these media to respond quickly to the spread of misinformation through high-quality, trustworthy and educational content (Güder & Güder, 2022). The credibility and authority of the sender of the content are determinants in the influence exerted on social media (Ramírez *et al.*, 2021), although effective interventions by specialists on these platforms are still scarce (Barrutia *et al.*, 2023b). In Spain, foundations and associations take on the role of regularly disseminating information and promoting skin cancer prevention through their social media profiles (Jiménez-Sánchez & Moreno, 2023). However, all of these organizations issuing prevention communication regularly generate content on Facebook, X and Instagram (Jiménez-Sánchez & Moreno, 2023; Jiménez-Sánchez *et al.*, 2023; Jiménez-Sánchez *et al.*, 2024).

Given that photoprevention education through social media is still in the early stages of research and that previous literature points to TikTok as a source of misinformation and promotion of risky behaviors amongst young people, it is crucial to explore its current influence on attitudes and barriers to sun photoprotection. Ignoring photoprotection recommendations and irresponsible exposure to UV radiation are barriers to the adoption of preventive habits (de Troya-Martín *et al.*, 2009). Overcoming barriers to prevention is essential to reduce the incidence of skin cancer among young people, a demographic group that is vulnerable to the disease according to epidemiological studies.

As misinformation content proliferates on TikTok, it becomes a priority to understand how youth TikTok users develop attitudes and barriers that influence the adoption of prevention behaviors. This will allow us to identify areas of intervention

and develop effective prevention strategies that counteract the flow of misinformation, raise awareness about prevention, and modify risky behaviors amongst youth TikTok users.

3. Methodology

3.1. Methodological design

In this research, comments were collected from TikTok through a qualitative methodology. The qualitative method is considered optimal for research related conducted mostly using to emotions and attitudes, especially regarding gender, health and migration (Vila-Vives, 2019; Fuentes-Lara & Arcila-Calderón, 2023).

This research is based on the general objective of TikTok users' statements about sun protection and is oriented around two research questions (RQ):

RQ1. What attitudes do TikTok users have towards photoprotection?

RQ2. What are the barriers to photoprotection reflected by TikTok users?

Previous studies were mostly conducted using quantitative techniques such as surveys (Fuentes-Lara & Arcila-Calderón, 2023). However, following the emergence of social media and data analysis, attitudes are now considered to be internal processes of the individual that can also be measured directly (Cinelli *et al.*, 2021). This approach contrasts with the traditional use of the survey as a method to catalyze attitudes, which was based on the consideration that attitudes should be measured indirectly, i.e. by asking people to express themselves in the face of certain facts and/or behaviors (Gimeno, 2001; Rinken, 2015). This research is based on the emergent approach, which understands that attitudes can be measured directly without the need to ask subjects indirectly, as is done with the questionnaire technique. Therefore, we will approach young people's attitudes through their self-statements on TikTok. The statements of TikTok users reflect their attitudes and barriers to sun protection as expressed through comments on posts on social media.

The choice of TikTok as the social media analyzed in this research responds to three fundamental criteria. Firstly, and this is one of the main advances to the knowledge presented by this research, TikTok is the social media that receives the highest volume of comments from users, so the analysis of comments is a direct source of data on attitudes and barriers to sun protection. Secondly, young people are vulnerable to the incidence of skin cancer due to their photoprotection behaviors (Cambil-Martín *et al.*, 2023) and TikTok is one of the most popular social media among young people in Spain (IAB, 2024). Thirdly, health communication on TikTok has already achieved successful results (Valero-Contreras, 2020; Agrelo, 2023).

3.2. Method

The data collection method for this research involved downloading comments from the social media platform TikTok. First, a selection of keywords related to sun protection was made, and a hashtag search was conducted, resulting in a total of 3,696 comments from the first 50 videos using the selected hashtags (Olivares-García & Méndez, 2020). As shown in Table 1, the volume of comments varied substantially depending on the keyword used in the search.

Table 1. Keywords and number of comments

Keyword	Number of comments
#photoprotection	2120
#sunburn	1576

Source: Own elaboration

The search and download of comments were carried out in December 2023. However, the comments collected correspond to videos that were published between March and August 2023. The dataset includes opinions expressed spontaneously by users mainly during the spring and summer months, coinciding with greater sun exposure and awareness campaigns on photoprotection. Most of the videos came from accounts related to health, dermocosmetics, or pharmacy (e.g., @laboticasantacruz, @alex.docampo.derma, @isdin, @dr.oro_derma, among others), and dealt with recommendations for sunburn, sun protection tips, or reviews of sunscreen products.

The search and download of comments in TikTok were done manually. Several software packages for automated downloading were tested during the data collection process; however, they were ineffective due to the complexity of the subject matter and the use of comments as the unit of analysis. Therefore, data extraction was carried out by three researchers who had previously been trained in the object of study and the data extraction procedure.

From the total number of comments, a final sample of 2,744 comments was selected from the social media platform TikTok, once repeated comments were eliminated; comments that, despite being related to the keyword, were used in another context; those that lacked logical meaning; those whose meaning depended on a hyperlink or attached images (Arcila-Calderón *et al.*, 2020); in addition to comments by the video creator, those that only contain mentions and/or emoticons, and those that are not relevant to photoprotection and/or skin cancer. In this database cleaning process, the three researchers trained for the procedure carried out preliminary work on 10% of the total number of comments downloaded. An intercode was used resulting in 276 comments analyzed.

3.3. Data analysis technique

The data analysis technique used in this research is thematic discourse analysis, which is a widely used technique in qualitative methodology in the social sciences and is considered an analytical level within the technique of discourse analysis (Paill'e & Mucchielli, 2008). This approach identifies themes or patterns of cultural meaning, in this case, attitudes and barriers to sun protection (Zeler *et al.*, 2022). The resulting thematic axes are then coded and interpreted by searching for commonalities, relationships, general patterns and theoretical constructs (Lapadat *et al.*, 2010).

In the analysis of thematic discourse, the thematic axes have been previously determined before the production of the data (Poli'c & Holi, 2021). In this research, two axes were identified: the analysis of attitudes towards social photoprotection and the barriers that users must protect themselves from the sun. These thematic axes were identified in the previous phase of the research based on the bibliographic references that guided the analysis of the data (Zeler *et al.*, 2022).

The analysis started with an open coding of the TikTok comments, because the unit of analysis was small, i.e. the comments were short. The coding was carried out following the line-by-line method, detecting the incidents in each of the comments (Soriano-Miras, 2006). Once this process was completed and the categories had emerged, the concept-indicate model (Glase, 1978) was followed, in which incident was compared with incident, incident with concept and concept with concept until the theoretical saturation of the categories of analysis was reached (Carrero *et al.*, 2012). At the end of open coding, selective coding began, where the number of categories was reduced to 168. The categories were grouped into families according to their association with each other and with the thematic axes of the thematic discourse analysis. Thus, the 168 categories were grouped into 14 families.

The categories were grouped according to the principles of this data analysis until theoretical saturation of the categories was achieved -table 2- (Carrero *et al.*, 2012; Fuentes-Lara, 2019).

Table 2. Category families and number of categories per family

Category family	Number of categories
Negative attitude towards sunscreen	8
Negative attitude towards photoprotection	4
Negative attitude towards sun protectionhacia la protección solar	10
Negative attitude towards sunburn	12
Positive attitude towards sunscreen	26
Positive attitude towards photoprotection	7
Positive attitude towards sun protection	17
Positive attitude towards sunburn	18
Need to expand knowledge about barriers	5
Need to provide information about photoprotection	2
Barriers to sun protection	13

Barriers to sunscreen	33
Barriers to photoprotection	8
Barriers to sunburn	3

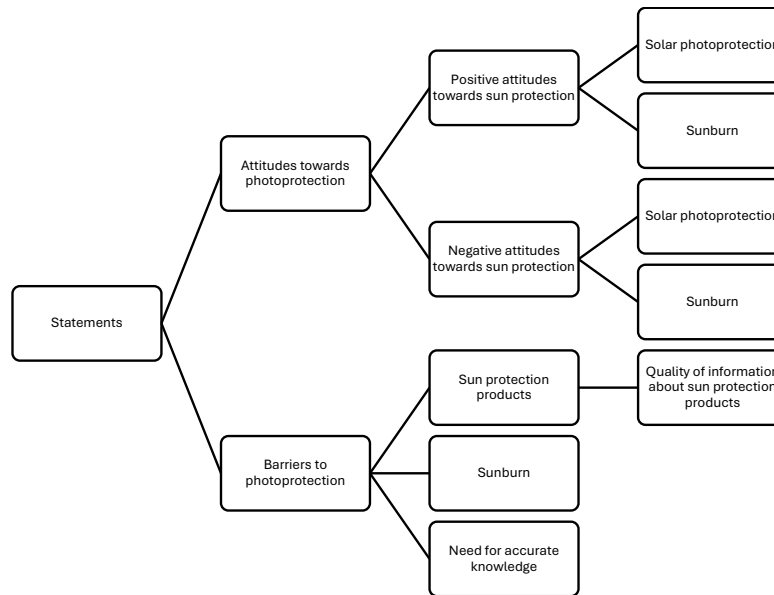
Source: Own elaboration

The qualitative analysis software Atlas.ti version 24 was used for the analysis.

4. Results

The thematic analysis identified two main areas: attitudes towards solar photoprotection and the barriers users face in protecting themselves from the sun. Although the primary themes were pre-established based on existing literature, additional categories emerged during the coding process, providing further depth and specificity to the initial analytical categories. Firstly, attitudes towards photoprotection were distinguished between positive or favorable attitudes and negative or detrimental attitudes towards sun protection. Regardless of whether attitudes were positive or negative, a distinction was made between solar photoprotection and sunburn. Secondly, barriers to photoprotection are distinguished between barriers to sun protection products and quality of information about sun protection products, barriers to sunburn, and the need for accurate knowledge (Figure 1).

Figure 1. User statements about sun protection



Source: Own elaboration

The results obtained for the two research questions will be examined in more detail below.

4.1. Attitudes of TikTok users towards photoprotection

This first section of results responds to RQ1 on what attitudes are reflected by TikTok users in their comments on photoprotection. When analyzing the attitudes of TikTok users about photoprotection, the polarization of positive and negative attitudes towards sun protection is shown; in both cases, there is a duality between solar photoprotection and sunburn.

4.1.1. Positive attitudes of TikTok users towards sun protection

TikTok users through the comments they leave on posts with hashtags #photoprotection and #sunburn express positive attitudes towards the use of photoprotection, especially to sunscreen and sunburn.

4.1.1.1. Positive attitudes of TikTok users to solar photoprotection

In terms of photoprotection, the most repeated positive attitudes and with the greatest intensity refer to the use of sunscreen. Other positive attitudes that have been widely discussed on TikTok include the use of sunscreen capsules, the prevention of

sunspots and the effects of sun exposure on health. Regarding the use of sunscreen, it is the main topic of the comments in the publications, highlighting areas such as brand preference, the cosmetic use and beauty effect of sunscreen, the request for recommendations on sunscreen brands and health prevention –including lupus, rosacea, melasma and carcinomas.

“I love you very much XXX [omission of the brand name].”

“Can you recommend a 50-sunscreen spray?”

“I love the colored one. It leaves my face looking like I’m wearing a make-up base. It’s super 😊😊😊.”

“Let’s see... what do I wear if I have rosacea, oily skin and spots? Do I have to wear all three at the same time? Thank you.”

“Better to pay a little more than 20 euros than to have to pay for a lifelong skin disease.”

There are also, although less frequently, comments expressing positive attitudes towards sunscreen, particularly concerning racial issues and its chemical composition, with an emphasis on products that are environmentally friendly and cruelty-free.

“Me, being black, I use the first one [referring to a brand of sunscreen], which is the only one that doesn’t leave a white mark. I’m delighted, and yes, black people should also apply sunscreen 😊.”

“It should be added that XXX [omission of the brand name] is environmentally and sea friendly. Important thing 💜💜💜.”

“Wonderful. The good thing is that they don’t test on animals. Their textures are unique for different needs. Ideal for your daily routine ❤️.”

Apart from comments on sunscreen, there is also an abundance of comments with positive attitudes towards sun protection concerning the use of sunscreen capsules and sun patches. For both methods, the comments are recommendations –both requested in the comments and personal experiences– and ways of use. However, there are also comments of surprise towards sun protection methods other than sunscreen.

“I’m white and I’ve been taking them [sun capsules] for years. They work great. They prepare my skin for the sun. Start taking them a month before 😊❤️.”

“Once it [sun patch] is purple, you take it off and put a new one on, or does it replicate the sunscreen on top?”

“I’ve never heard of that! I didn’t know there was an oral route 😲.”

Although these methods are the ones that generate the most comments and with the most intensity, there are also positive attitudes towards sun sticks and sun powders.

To conclude with the positive attitudes towards sun protection, the issue of prevention in terms of health and aesthetics is widely commented on. As far as health is concerned, in addition to requesting recommendations and correct use, the need to protect oneself from the sun to avoid melanoma and/or skin cancer stands out; while on an aesthetic level, there are numerous comments on the importance of prevention to avoid sunspots.

“Recommend something to prevent skin blemishes.”

There are comments with positive attitudes amongst TikTok users referring to the use of long sleeves or umbrellas, although they are in the minority.

4.1.1.2. *Positive attitudes of TikTok users to sunburn*

Positive attitudes towards sunburn are mainly related to three main thematic blocks: mockery of sunburn, normalization of sunburn, and positive attitudes towards recovering from sunburn.

As for the mocking or joking comments about sunburn, these comments are mostly responses to videos where one or several people appeared with extreme burns, and in situations of losing a layer of skin. These comments are motivated or reinforce phenomena such as sunburn challenges.

“This one hasn’t been sunburnt, it’s been burnt with fire 😊😊😊. A little more and it would be scorched black.”

“Human unboxing.”

Within the comments on the normalization of sunburn, there are different reactions. On the one hand, there are comments on the number of times users get sunburnt, the areas where it happens and their tricks to reduce the pain. On the other hand, they share similar experiences to those seen in the publication, especially when it comes to the removal of burnt skin. So, these comments reaffirm the normalization of these sunburns that result in the loss of layers of skin. However, what is most notable is the tone, while in some comments the tone is self-critical, in others there is still a jocular or mocking tone regarding sunburn.

“When I get burned like this, I get a fever. I get white spots and with time they turn cinnamon, like freckles...”

“That’s my fun when I come back from the beach [removing burnt skin], but then I lie down and cry 😊😊.”

Comments on TikTok containing positive attitudes to sunburn are differentiated between those who advise or ask for advice on sunburn pain relief and remedies; those who seek recovery on a more aesthetic level such as avoiding skin blemishes or pigmentation; and those who opt for clinical options such as dermatological treatment or a visit to a doctor.

“I want to get rid of the spots on my shoulders and neckline because I got a lot of spots and moles from sunburn 😊😞.”

“Apple cider vinegar diluted in water. It literally heals you and that’s the cure.”

“I once got burned like this, on my shoulders and arms, and the ONLY thing that calmed me down and reduced the redness was an ointment with betamethasone.”

4.1.2. *Negative attitudes of TikTok users towards sun protection*

4.1.2.1. *Negative attitudes of TikTok users to solar photoprotection*

TikTok users in comments on posts express negative attitudes about sun protection differentiated into three significant points: sunscreen, other methods of sun protection, and solar photoprotection.

As with the positive attitudes towards sunscreens, these are the most numerous in the data analysis. Negative attitudes are mainly focused on stating that sunscreens are not effective for sun photoprotection. In this group, the range of comments goes from denying that the sun is bad for humans to conspiratorial comments, which consider that it is just a “business” of the pharmaceutical industry.

“Yesterday I used it [sunscreen] for the beach and now I look like a burnt guiri.”

“I’m from the countryside and cream is just another business. I don’t wear anything and I don’t get burned.”

“ALL LIES.... SKIN NEEDS THE SUN EVERY DAY (WITHOUT SUN CREAM) FOR VITAMIN D. ENOUGH PULLING OUR LEG”

Also, negative attitudes towards sunscreen are caused by sexist stereotypes, considering it as a “women’s” issue. Similarly, there is a perception of rejection towards the idea that its chemical composition may be harmful to the skin, as well as concerns about its high price. In these three variables of analysis, conspiratorial factors about the pharmaceutical industry as an entity that manipulates so that sun creams continue to be sold are recurrent.

“Sunscreen is a woman’s thing or a fragile masculinity thing. There is nothing more beautiful than healthy skin [without sunscreen].”

“If we look at the ingredients [of sunscreen] more harmful than the sun. The best protection is to go to the off-hours of the sun, shades and a cap.”

“Please talk about the comments that came out about the sunscreen industry lying to us and that our skin adapts to the climate.”

As for other sun protection methods, the same dialectic structure is followed as with sunscreens, i.e. lack of efficacy –of patches and capsules– and the conspiracy of the pharmaceutical industry.

“Taking carcinogenic things [about sunscreen capsules] to avoid something natural and healthy like the sun... pharmaceuticals don’t want your health, they want your money.”

“You take a carrot a day and it has the same effect [as sunscreen capsules], but your big pharma bosses don’t make any money that way.”

Negative attitudes towards sun protection are found in the comments of TikTok users, however, in contrast to those relating to sun creams, capsules and patches, here the fear of sunbathing due to the ineffectiveness of sun protection methods, and the contrast with the need to acquire vitamin D emerges.

“I don’t want to go out in the sun because I’m a bit scared. What do we really call sunbathing? When is it good? (We need vitamin D).”

In the face of this disquisition, comments emerge about the “obsession” of people to protect themselves from the sun being the sun necessary to be a human being, even to the point on the part of users.

“That’s already too much of an obsession... the balaclava is missing.”

“Me thinking about how the inside of my mouth is going to tan [about sunscreen capsules].”

4.1.2.2. *Negative attitudes of TikTok users to sunburn*

As with solar photoprotection, negative attitudes to sunburn appear in the TikTok comments. These comments revolve around two themes. Firstly, a negative attitude towards sunburn recovery and secondly, a negative attitude towards the consequences of sunburn on the individual.

Regarding the comments about recovery from sunburn, there is a debate about whether sunburn is not curable or whether it heals on its own, the main theme being the action of removing the burnt skin. However, in the sense of a negative attitude towards sunburn.

“Sun is life, it is needed. Dermatitis is stress dermatitis, but medicine will never tell.”

“Burns do not heal.”

“And it’s soothing to get the burnt skin off and your body doesn’t get so hot.”

The second point, related to the negative attitude towards the consequences of sunburn on oneself, highlights the interest in aesthetics as an important variable to consider. At this point, the comments refer to the aesthetic dislike of sunburn and the rejection felt by users when they see or suffer from it. Those critical of the users who show positive attitudes towards sunburn.

“It makes me very disgusted and repulsed. Apart from the fact that it can give you skin cancer.”

“What do you mean, satisfying or that do you love it? It disgusts me. I almost threw up 🤢”

This concern is also linked to the health effects of sunburn, which are closely related to the possibility of developing skin cancer. Closely related to this theme is the relationship between natural remedies and the effects of sunburn.

“Long-term skin cancer.”

“Literally my mother always told me ‘Skin has a memory’. Now I really listen to her more.”

“I remember a case in XXX [omission of the location] that a girl died like this [sun shower]. She got so tanned (burnt) that she died 💔.”

4.2. *Barriers to photoprotection for TikTok users*

This second section of the results answers RQ2 about the barriers to photoprotection reflected by TikTok users. The analysis of the barriers shows three thematic axes to answer RQ2, which are: barriers to sun protection products and quality of information about sun protection products, barriers to sunburn, and the need for accurate knowledge amongst TikTok users.

4.2.1. *The barriers to sun protection products*

The main barriers expressed by TikTok users in the comments on the videos with the hashtags #photoprotection and #sunburn mainly refer to sunscreen and other methods such as sunscreen patches or sunscreen capsules. These barriers are the high price of these products according to TikTok users, mistrust about the composition of these products, and the negative effects they have on the skin.

Regarding the price, TikTok users in their comments point out that the price is high and that the quality or the size does not correspond to the price of the sunscreen. While this is especially noticeable in the case of sunscreen, it is common to other methods of photoprotection.

“The bad thing is that the protectors are sold small and very expensive. It doesn’t fit the reality.”

“¡¡¡¡Reduce your prices!!!!”

Also, in this regard, comments are asking for recommendations on more economical or reliable photoprotectors in terms of value for money.

“Can you make a video with inexpensive sunscreens that pregnant women can use? Thank you 🥰”

In addition, there is a mistrust about the chemical composition of these products which is a barrier to their use, according to social media users. This manifests itself in comments about how the chemical composition causes sunburn.

“That product literally burned my skin. I returned it to the pharmacy, and they sent it to the XXX [brand omission] laboratory for analysis. Be very careful. It has a lot of alcohol in it.”

Concerning skin types, i.e. how the use of sunscreens alters the user’s skin type due to the chemical composition. Comments are about how the skin becomes more oily or dry, or excessive sweating. Comments are also given asking for recommendations based on skin type or phenotype, especially in the case of people with very light phenotypes.

“Puff... It generates a lot of grease and my eyes itch.”

“Which one do you recommend for combination skin that doesn’t leave the face too oily and shiny now with the heat? 😊”

A variety of comments are given asking for sunscreen recommendations whose chemical composition is not harmful to children. In turn, this barrier is especially considered when women are pregnant and have doubts about whether it is harmful to health, or if it generates side effects such as skin spots.

“I wear 50 all year round and because of pregnancy I’m getting spots 😞.”

Related to the above, a persistent barrier in TikTok’s comments is the effects that sunscreens and other methods have on the skin. These harmful effects could be eye irritation or the effects on different skin types such as dry or sensitive skin.

“XXX [omission of brand name] burns my face 😞😞 Very badly. My dermatologist recommended it and it’s exaggeratedly expensive 😞😞.”

“I wouldn’t be caught dead wearing that. I’ve damaged my cornea three times.”

4.2.1.1 Barriers to the quality of information about sun protection products

In the thematic analysis of content, a category related to barriers to sun photoprotection emerges, which is related to sun protection information published online. This category is directly related to the content creator, i.e. the person who made the video on which the content is commented. On the one hand, comments emerge that the information provided by the content creator confuses the recipients of the information. However, rather than misinformation, the comments express confusion about the information provided or lack of clarity in the messages.

“Is it my imagination or are you saying the opposite of what should be done 😞.”

“It would be good if you didn’t just put *hashtags* on your videos and put studies that endorse these products. Especially with the ignorance of TikTok.”

On the other hand, in the opposite direction, some comments value positively the information provided by the content creator but point out that other information on the web is not of the same quality.

“Thank you very much XXX [omission of the name of the content creator], she is the only specialist who makes a very good study of the products she shows us and shows that she understands them perfectly.”

4.2.2. Barriers to sunburn

In TikTok’s comments on barriers to photoprotection concerning sunburn, two types of barriers are shown. On the one hand, the ineffectiveness of sunscreens as a protector to prevent sunburn. This generates fear amongst some users of exposing themselves to environmental factors where there may be excessive solar radiation, such as the beach, or simply waiting for summer to arrive.

“It happens to me every year. I don’t know what protection to use anymore because I get burnt all the same. I’M AFRAID TO GO TO THE BEACH ETC.”

“Whether you use sunscreen or not, you still get sunburnt.”

On the other hand, this barrier also extends to children, raising the question of whether the use of sunscreens is not only effective but also harmful to them due to their chemical composition.

4.2.3. Barriers related to the need for precise knowledge

Finally, users are interested in obtaining quality information on the methods for photoprotection. This category emerges as a barrier, since a lack of information may prevent them from making the right decisions. This demand for knowledge is divided into two blocks. The first is the differences between sun protection, sunblock and sunscreen.

“What is the difference between sun protection and sunblock, which should be used? Thank you very much 😊❤️.”

The second is the interest in having more quality information on skin cancer, prevention of sunburn, and correct use of sun protection.

“Could you make a video about how serious MELANOMA is? People think it’s the same as carcinoma and take it lightly. It just happened to me.”

“When you go to the beach, do you take it [the sunscreen capsule] instead of putting on the cream, or is it always a supplement?”

5. Discussion and conclusions

This research aims to explore the attitudes and barriers to photoprotection expressed by users of TikTok given its idiosyncratic nature as a source of misinformation and promotion of risky behavior, and its high volume of comments from young users, a group vulnerable to skin cancer. This study stands out for its innovative methodological approach by analyzing TikTok as a data source to assess attitudes and barriers toward photoprotection.

Through thematic analysis of the discourse in the comments, the study provides a comprehensive overview of attitudes and barriers around photoprotection, which helps to shed light on how young people perceive the information and what factors influence the adoption of preventive behaviors.

Analysis of TikTok comments reveals a clear polarization in attitudes towards photoprotection and sunburn. This provides valuable information on how young people perceive sun protection and the factors that facilitate or limit the adoption of preventive behaviors.

On the one hand, many users express positive attitudes towards photoprotection, especially about specific cosmetic products such as sunscreens and sun protection capsules, expressing the need to protect themselves from the sun to avoid skin cancer and/or melanoma, and sunspots. This interest suggests a growing awareness of the benefits of prevention and the dangers of prolonged sun exposure, both aesthetic and health-related, which could be harnessed in prevention campaigns. Indeed, evidence of this awareness amongst TikTok users is consistent with previous studies indicating that young people may be more motivated to adopt photoprotective practices when they understand the risks of serious diseases such as skin cancer (Cambil-Martín *et al.*, 2023). The prevention of premature photoaging is also positioned as a strategic pull factor for photoprotection campaigns aimed at young people, as it aligns with the priorities of the target audience.

However, other users reflect negative perceptions towards photoprotection, particularly sunscreens, which are described as unnecessary, ineffective or part of a pharmaceutical industry “business”. These negative perceptions are in line with research on social media misinformation, which suggests that TikTok and other platforms may promote conspiracy theories and disseminate content that minimizes the need for preventive practices (de la Garza *et al.*, 2021; Scheibenzuber *et al.*, 2023). Therefore, intervention strategies should address these negative beliefs and present evidence on the benefits of photoprotection, as well as debunking common myths.

The normalization of sunburn, evidenced by comments that trivialize or even celebrate sunburn as a fun experience, highlights a worrying acceptance of risky practices amongst young people. This trivialization of the negative effects of sunburn highlights the need to raise awareness among young people of the long-term risks involved, such as skin cancer. TikTok’s tendency

to virilize challenges and present sunburn in a light-hearted way highlights the platform’s role in promoting risky practices (Doyon *et al.*, 2022). To overcome this perception, prevention campaigns should include messages that demystify sunburn as inevitable or harmless and highlight the cumulative consequences of each burn on skin cancer risk. Such messages can correct the misperception that sunburn poses no immediate danger and emphasize its role in the development of serious diseases in the future. Similar to photoprotection, tapping into the visual dislike of sunburn that is also evident in TikTok users’ comments, as well as the aversion to scars and spots, can be an effective strategy. Aligning campaigns with these two concerns –health and aesthetics– can encourage preventive attitudes in the user population.

On the other hand, the barriers identified, such as the high price, distrust of the chemical composition of photoprotection products (mainly sunscreen) and the harmful effects they have on the skin, represent significant challenges to improving the adoption of preventive habits. According to the comments, users perceive that the chemical composition of these products from pharmaceutical brands can cause sunburn and affect children and pregnant women, as well as alter the skin, making it oily or dry. They also mention that these products can irritate sensitive skin and eyes. These findings add to the literature on barriers to sunscreen use (Støle *et al.*, 2019; Julian *et al.*, 2020; Bowers *et al.*, 2021). Content creators on TikTok also influence these perceptions, and comments suggest that many users are confused by the content on photoprotection.

The results highlight a critical barrier to the adoption of sun protection behaviors: the quality of sun protection information provided by content creators. Many users’ express confusion or lack of clarity in the messages conveyed, leading to uncertainty about recommended sun protection practices. This is not only perceived as misinformation but as a lack of consistency or accuracy in the information, which makes it difficult for the audience to understand. This category highlights that the inability to discriminate between the quality of content and the credibility of the broadcasters on TikTok is a barrier to preventative behavior. However, there are also cases where creators who provide clear and reliable information are positively highlighted. This contrast highlights the importance of content creator credibility and clarity in health communication (Ramírez *et al.*, 2021).

In addition, users on social media also express interest in more quality information about skin cancer, sunburn prevention and the correct use of sun protection. The barriers demonstrate how the lack of clear, accurate and substantiated information on TikTok can fuel misperceptions. Consequently, it reinforces the idea that the platform needs to incorporate authoritative and influential professionals who generate accessible, educational, reliable and high-quality health content (Güder & Güder, 2022; Guzmán & Barbieri, 2022). This not only helps to reduce confusion but also to establish trust in photoprotection information, which is an essential step in modifying risky behaviors and encouraging the adoption of skin cancer preventive practices amongst youth.

In conclusion, this research highlights the role of TikTok as a key platform for understanding and addressing young people’s attitudes and barriers to sun protection. The results reveal a duality in users’ perceptions: while some show a growing awareness of the risks of sun exposure and the aesthetic and health benefits of photoprotection, others are skeptical, conspiratorial and even trivialize and dismiss the risks. This polarization, coupled with the presence of misinformation promoted by certain content creators, underlines the importance of implementing strategies that tap into aesthetic concerns, highlight evidence on the benefits of photoprotection, demystify sunburn as inevitable or harmless, and debunk common myths, to increase the

effectiveness of preventive communication campaigns. The barriers identified, such as mistrust of the chemical composition of sunscreens and their high cost, suggest the need for interventions that clarify misunderstandings and promote positive attitudes towards photoprotection, addressing the full range of methods recommended by the World Health Organization beyond the use of sunscreens (WHO, 2022). Furthermore, the study underlines that the quality of information on TikTok and the credibility of the broadcasters are crucial in influencing photoprotection behavior. This suggests the importance of credible and authoritative content creators, which could reduce confusion and increase trust in photoprotection information.

Thus, the present study contributes new findings to our knowledge about young people's attitudes and barriers to sun protection and identifies areas of intervention for future prevention campaigns on social media that seek to reduce the risks associated with skin cancer in this vulnerable population. The results emphasize the need for preventive communication strategies on TikTok to counteract the flow of misinformation, raise awareness about prevention and modify risky behavior among young users. This study can contribute to the work of skin cancer prevention organizations in Spain by helping to professionalize their communication and improve the effectiveness of their content strategies on digital platforms aimed at young audiences¹.

Amongst the limitations of this research is the focus on a single platform (TikTok) and the exclusive use of user comments. However, this work complements the previous approach to this knowledge from quantitative methodologies through methodological innovation (citing the survey articles). Future research could complement these findings through other qualitative methodologies, such as focus groups, which would allow for a more detailed exploration of certain beliefs and attitudes in different social contexts and population groups.

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8. Conflict of interest

The authors declare that there is no conflict of interest contained in this article.

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