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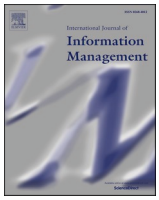

Research Article

Information management in social media to promote engagement and physical activity behavior

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ABSTRACT

Social media can be an effective tool to foster values and lifestyles such as physical activity. However, it is still largely unknown what type of social media information helps to promote physical activity practices. This research aims to (1) identify the combination of variables that explain social media engagement in physical activity (SME-PA) and its relationship with physical activity behavior and (2) determine what type of social media content posted on social media could be most effective in promoting physical activity behaviors. Using a quasi-experimental and an experimental study, the findings showed that the conditions of high levels of information availability, social ties, trust in social media information, and opportunity seeking were present and combined in three of the four solutions (77% of the cases). SME-PA was correlated with the intention to improve physical fitness, and the physical shape, the type of benefit associated with physical activity practice and the gender of the person in the photo practicing physical activity were found to be relevant variables for improving the physical activity-related behavior of social media users. Finally, several implications are proposed to improve the administration of social media content for SME-PA.

1. Introduction

Sedentary lifestyles are one of the greatest challenges facing the world today (Pratt et al., 2020). In the United Kingdom, almost 40% of the population is insufficiently physically active to maintain excellent health (Office for Health Improvement and Disparities, 2021). Inactivity has a monetary cost of £7.4 billion and a human cost of 1/6 of deaths in the UK (Office for Health Improvement and Disparities, 2021). Research from several international bodies shows that regular physical activity protects against type 2 diabetes, coronary heart disease, obesity, hypertension and other chronic diseases (Haskell et al., 2007; World Health Organization, 2010). Accordingly, health officials have made physical activity promotion a top focus (Heath et al., 2012). The specific global objective is to reduce physical inactivity by 15% among all adolescents and adults by 2030 (World Health Organization, 2018). Therefore, appropriate policies need to be developed to encourage physical activity in this population.

Communication technologies have increased the possibilities of sending and receiving information (Westerman et al., 2014). Consumers prefer an online environment with always-on access to digital content (Dey et al., 2020). Social media also serve as a source of health information (Durau et al., 2022; Rutsaert et al., 2013). Online applications that disseminate health information facilitate the propagation of content and facilitate user-generated content (Kaplan & Haenlein, 2010). Various social media platforms exist, including Facebook, Instagram, and YouTube (Dessart et al., 2015). In 2021, more than 4.26 billion individuals were utilizing social media worldwide, with an estimated increase to 6 billion by 2027 (Statista, 2024).

Behavioral change and lifestyle improvement can be fostered through social media because social media is widely accessible, and many people use it very frequently (Laranjo et al., 2015). However, several authors have suggested that studies linking healthy lifestyles and the effectiveness of social interventions are limited and inconclusive (Huang et al., 2022; Friedman et al., 2022). Although there are studies both for (Günther et al., 2021; Welch et al., 2016) and against social media as a means for promoting physical activity habits (Cavallo et al.,

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2012; Joseph et al., 2015; Zhang et al., 2015), there are practically no studies that address the SME-PA (social media engagement related to physical activity). Health professionals also consider social media to be more effective than traditional media in conveying health information (Bannor et al., 2017). The internet is now a source of information on health issues (McKinley & Wright, 2014), but social media offers both social and informational support to users (Kaplan & Haenlein, 2010). In addition, since the appearance of COVID-19, social networks have increased their potential as a source for the promotion of physical-sport activity (Hayes, 2022; Kim, 2022). Hence, social media can offer certain benefits for public health interventions.

Therefore, it is important for information systems (IS) academics to understand the functions of social media platforms (Santos et al., 2022). Social media is increasingly being used by businesses to engage with customers and further corporate goals (Wang et al., 2021), and it can also be an opportunity to encourage physical sports practice habits. Furthermore, the immense popularity of social media, coupled with consistent usage and engagement, appears to offer an unparalleled opportunity for researchers and practitioners to carry out behaviorally influential interventions within social media (Maher et al., 2016).

Social media is a successful means for promoting physical activity habits; thus far, there are practically no studies that analyze SME-PA and its contribution to improving followers' intentions to improve their physical fitness. A significant amount of research on social media interventions has focused on analyzing their effectiveness in promoting physical activity, but to promote physical activity independently of the social media user, a broader approach is needed that looks generally at how to manage information appropriately (Joseph et al., 2015; Maher et al., 2016). Moreover, although some studies have focused on how information posted on social media can influence physical activity behaviors (Johnston & Davis, 2019; Peng et al., 2019), research on this topic remains limited. There is a research gap related to the following question: how should physical activity-related information posted on social media have a greater impact on SME-PA, attitudes, and intentions to improve physical fitness? More research is therefore needed to determine how social media can be used more effectively to promote health behaviors (Johnston & Davis, 2019). In this vein, Prichard et al. (2020) highlighted the necessity of investigating whether the type of image can have a positive or negative effect on physical activity. Hence, it is important to delve into both how to generate SME-PAs and which types of information should be posted on social media to generate a more positive impact on the physical activity behavior of social media users (attitude toward fitness and intention to improve fitness).

Thus, the goals of this research are to investigate (1) the combination of variables that explain social media engagement in physical activity (SME-PA) and its relationship with physical activity behavior and (2) what characteristics of the content posted on social media (physical shape, type of benefits, and sex of the picture of the person practising physical activity) could be most effective in promoting physical activity behaviors. To this end, this research is composed of two empirical studies.

This is the first quasiexperimental study that analyses in a generic way how variables related to the information presented on social media can generate SME-PAs. Overall, an asymmetric and configurational model was used to examine the causal configurations of the antecedents (conditions) that explain SME-PA (outcome variable). Qualitative Comparative Analysis (QCA) is considered an appropriate method for the analysis of complex phenomena (Ragin, 2000), as is the case for SME-PA. Sometimes the relationships between variables are complex and cannot be explained through linear methods such as variance-based approaches (Urry, 2005). One way to overcome this limitation is to examine complex phenomena as sets of interrelated conditions (Woodside, 2017). Furthermore, another major advantage of this method is its equifinality, as it is based on complexity and configuration theory, which states that multiple combinations of antecedent conditions (configurations) are equally effective in explaining the same outcome (Woodside, 2014). Therefore, this study highlights different pathways for developing SME-PAs for social media users in the UK. Moreover, due to its asymmetry, it allows both combinations of conditions that generate both high and low levels of the same outcome to be evaluated under the principle of causal asymmetry, which explains that the presence of an outcome can be different from the combinations of conditions that lead to the absence of the same outcome (Fiss, 2011). Therefore, within the field of IS and marketing, this methodology allows for a more systemic and holistic view (Pappas & Woodside, 2021).

The second study is an experiment that delves into specific elements of the information presented in social media (both images and text). Specifically, it focuses on the impact that the type of photography and text posted on social media can have on changing the attitudes and behavior of social media users. In this way, we aimed to contribute to the literature on information systems by deepening our knowledge of the variables that can help explain the social media engagement of users, specifically about their activity with content related to physical activity. In addition, specific information is provided to act on the most relevant variables to encourage the participation and fitness intentions of social media users through the posting of images and text on social media. In this vein, we contribute to previous research by understanding why physical activity-related photos posted on social media could not be effective in promoting social media users' physical activity behavior. We hope to contribute to the WHO goal of reducing physical inactivity by 2030 by improving the management of social media information related to physical activity (World Health Organization, 2018).

2. Literature review

2.1. Social media and the promotion of physical activity habits

Social media allows people to access engaging content or service information about physical activity that can positively influence their intentions to maintain fit and promote fitness behavior (Edney et al., 2018; Gao et al., 2021). Previous studies have shown the positive influence that social media can have on engagement and the intention to engage in physical activity (eg., Gao et al., 2021; Pope et al., 2019).

In this vein, several studies have evaluated how different types of social media influence users' intentions to exercise. According to (Sokolova & Perez, 2021), active users are primarily motivated by viewing fitness videos and engaging in social interaction on YouTube, whereas nonexercising users tend to be drawn toward entertainment content. Additionally, on the same social media platform, (Durau et al., 2022) highlighted that the trustworthiness and attractiveness of influencers (e.g., on YouTube) could increase the physical activity level of subjects (in both genders). Focusing on Facebook social media, Joseph et al. (2015) showed that through positive messages, users were able to decrease their sedentary behavior but also increase their level of physical activity and satisfaction.

Regarding Instagram social media, (Peng et al., 2019) assessed the effects of fitness-related images on Instagram and their influence on the intention to exercise, finding that upward comparisons with attractive models reinforced the motivation to exercise. Chaudhary and Dhillon (2022) reported that Instagram increases the self-efficacy of Indian college students for exercise. Tricás-Vidal et al. (2022) found that Instagram influencers linked to fitness could improve moderate physical activity in US residents.

Johnston and Davis (2019) analyzed the influence of exercise-related social media content on people's motivation to exercise on both Instagram and Twitter. The findings showed that posts with images from individuals were more motivating than posts with images from companies. However, posts from companies without images were more motivating than posts without images of individuals. Gao et al. (2021) found that the quality of content, interaction relationships and opinions of relevant people had a positive impact on the perceived value of social media. In addition, perceived value was found to be related to intentions

to improve fitness and engagement. However, there are some limitations and research gaps in the literature that still should be addressed (see Table 1).

In conclusion, studies suggest that social media can influence intentions and motivations to exercise while still considering the impact that influencers can have on engagement. Most strategies to promote and improve physical activity levels have been based on idealized (lean and muscular) body publications (Durau et al., 2022; Peng et al., 2019; Prichard et al., 2020; Robinson et al., 2017), with few focusing on understanding SME-PA. Thus, according to Nuss et al. (2024), future research should study the effect of more diverse body types (body positive) in promoting physical activity. Furthermore, most of these studies were conducted with young people (Chaudhary & Dhillon, 2022; Gao et al., 2021; Sokolova & Perez, 2021), which is one of the main limitations of most of them. Furthermore, no studies have analyzed the impact that the motives for physical activity that may accompany these images may have on the promotion of physical activity habits (intrinsic vs. extrinsic motives).

2.2. Social media engagement

Social media platforms have transformed the way customers and businesses connect, allowing for digital sharing and participation (Trunfio & Rossi, 2021). Social media and how users interact with each other and with the system are key factors in the success of a marketing campaign (Lim & Rasul, 2022; Vander Schee et al., 2020). Furthermore, in sports, engagement is considered a key element in sports marketing and sponsorships (Naraine, Bakhsh & Wanless, 2022; Naraine & Bakhsh, 2022). However, more research is required to understand social media engagement behavior (Cao et al., 2021).

Table 1
Summary of studies that analyze the impact of different types of information posted on social media to promote physical activity habits.

Authors	Social media type	Key findings	Limitations	Research gaps and future research lines
Robinson et al. (2017)	Instagram	-Fitness images were inspirational, but did not impact actual exercise engagement	-Young female sample -Laboratory setting	– Larger and more diverse population – Which types of imagery are most effective in promoting physical activity (athletic ideals vs. neutral imagery) – To discover the mechanisms by which fitspiration images can inspire fitness improvement
Johnston and Davis (2019)	Instagram and Twitter	– Posts with images from individuals were more motivating than posts with images from corporations – Corporate posts without images were more motivating than posts without images from individuals	– Limited view of the processes that influence healthy behaviors. – Focuses on self-reported motivation to exercise as an indicator of behavioral intentions.	– Determine how social media can be used more effectively to promote health behaviors
Peng et al. (2019)	Instagram	– The attractiveness of models has a direct but negative effect on the intention to exercise	– Only male participants – Mostly of them were young males (under 30 years)	– More diverse populations with regard to age – Wider variety of user demographic attributes (occupation, health condition…) – Only photos without text
Prichard et al. (2020)	Instagram	– Watching fitspiration images did not increase the levels of physical activity practice	– Young sample (17-25 years) – Small sample – Female sample	– Investigate the specific aspects of fitspiration that can lead to positive fitness experiences. – Examine if fitness inspiration could promote exercise behavior (diverse range of bodies in comparison to idealized or stereotyped images)
Gao et al. (2021).	Social media in general	– Positive impact on the perceived value of social media of content quality and interactivity – Perceived value positively influences engagement and intentions to engage in physical activity	– Young people in China who were proficient in using social media (university students)	– Extend the samples to other types of population (age and nationalities) – Consider other internal variables or user characteristics
Sokolova and Perez (2021)	Youtube	– Parasocial relationship and entertainment are reasons to watch fitness videos by non active people – Intentions to watch fitness videos are related to intentions to exercise (only for active people)	Younger audience (15–25 years old)	– Analyze motivations and gratifications for watching fitness videos – To consider other variables (social comparison, self-esteem or health awareness) – Experimental studies
Durau et al. (2022)	Youtube	– Trustworthiness and attractiveness increase the physical activity level (in both genders) – Involvement with YouTube fitness videos and lower health increase behavioral intentions – A more negative body image fosters exercise intentions (only female)	– German-speaking influencers – Fitness activity for one specific body area	– Social media fitness influencer model in an international context (other countries) – Other fitness activities and different body parts – Experiments and longitudinal studies
Chaudhary and Dhillon (2022)	Instagram	– No differences between the group of women who saw Instagram posts related to physical activity and those who did not in sports adherence – Higher levels of self-efficacy in the group of women who viewed Instagram posts related to physical activity	– Young undergraduated students	– Other population type – Analyze the impact on other variables – To analyze which types of post (photos, videos or information) can generate greater adherence to physical exercise
Tricás-Vidal et al. (2022)	Instagram	– People who practice more physical activity are women and millennials who are of normal weight and who spend the most time on Instagram asking about nutrition or exercise	– Cross-sectional study – It is not possible to generalize from the results, nonstratified sampling method – The majority of the sample is composed of young women	– Stratified sample – To analyze the impact on the intention to improve physical sports practice habits – Characteristics of the publications that can generate a greater impact on the promotion of physical sports practice

Hollebeek (2011) defines customer engagement as the expression of a motivational state of mind based on the customer's context related to the brand, and Chahal and Rani (2017) define social media brand engagement as consumer participation in brand-building activities that affect their decisions. According to Chahal and Rani (2017), social media engagement is considered a two-dimensional construct composed of informational interest and personal interest. We consider SME-PA a two-dimensional concept (construct) composed of the dimensions of informational interest and personal interest related to the physical activity information published on social media.

Engagement begins with a consumer action and can result in increased satisfaction, brand loyalty, and trust (Schivinski et al., 2016). Social media communication is important for businesses, especially startups, as it can generate engagement in a cost-effective way (Rudeloff et al., 2022). Through social media, organizations anywhere in the world can connect with sports fans and promote physical activity at a low cost (Naraine, Bakhsh & Wanless, 2022). However, information in social media posts does not always have a positive effect on all types of engagement (Zhang et al., 2023). Therefore, it is necessary to delve more deeply into aspects related to the type of information that may be more conducive to engagement in physical activity content on social media.

2.3. The social media consumer perspective uses

Uses and gratifications theory (UGT) is useful for understanding the use of social media because it comes from the field of communication (Whiting & Williams, 2013). The UGT was a pioneer in considering the active participation of viewers in the choice of media. According to the UGT, people use the media to satisfy certain needs (Ku et al., 2013). Diverging from other media theories, this theory perceives social media users as active agents who possess control over their media consumption rather than being passive recipients of messages and products.

According to the UGT (Ko et al., 2005), subjects choose media on the basis of perceived benefits. Benefits may be related to information, relaxation, social connection, social relations, or economic and other incentives. The UGT's integrated theoretical framework provides insightful analysis of social media (Dolan et al., 2016), and the importance of media channels that facilitate consumer choice and interaction has been steadily growing in studies (Ruggiero, 2000) such as social media (Falgoust et al., 2022; Sheldon et al., 2021). Therefore, it can be a good base theory for explaining social media engagement (Dolan et al., 2016; Falgoust et al., 2022).

Katz et al. (1973), following this theory, proposed five categories related to five groups of human needs that could be satisfied through social media. The first is the cognitive need, which is related to the acquisition of information, knowledge, understanding of our social environment, curiosity, and exploration. The second is the affective need, which is related to esthetic and emotional experiences such as pleasure. The third is the need for personal identity, which is related to self-confidence, personal stability, integrity, social status and self-esteem. The fourth is social integration and interaction needs, which are related to family and friendship relationships, connections with the outside world and the need for affiliation. Finally, the fifth is related to the need for escapism, which is related to the need to escape, the release of tension, and the shift of attention from unpleasant to pleasant.

In this study, to understand the reasons that explain SME-PA, we focused mainly on the analysis of cognitive needs (information availability and opportunity seeking) and social integration and interaction (social ties) in the first study. In the second study, we focused on the escapism and personal identification needs.

2.4. Fitness information posted on social media: role of congruency and social comparison

The "fitspiration" movement on social media has gained popularity in recent decades (Nuss et al., 2024). Content posted on social media called "fitspiration" aims to motivate people to lead a healthier lifestyle through exercise and healthy eating (Peng et al., 2019). On Instagram, hashtags (#) are used to search for content, with more than 73.3 million posts related to the hashtag #fitspiration. This content therefore has the potential to exert a large-scale positive influence on the health and well-being of women (Prichard et al., 2020; Robinson et al., 2017) and men (Fatt et al., 2019; Peng et al., 2019) in terms of encouraging exercise. However, it is not easy to know what kind of messages to publish to capture users' attention (Zhang et al., 2023) and to actually motivate users to lead a more active lifestyle (Prichard et al., 2020). In fact, several studies have shown that such content has not had the desired effect on users (Peng et al., 2019; Robinson et al., 2017). In this vein, a systematic review about the impact of fitspiration on the development of physical activity habits suggested that perhaps the desired impact is not being generated because the photos published are of idealized bodies that are often perceived as unattainable (Nuss et al., 2024). For this purpose, it is relevant to consider different aspects, such as the congruence and social comparison of the information published on these social media platforms.

Social Comparison Theory (SCT) (Festinger et al., 1954) suggests that individuals frequently evaluate their success and ability levels by comparing themselves with others. This comparison also extends to other dimensions of the self, such as physical appearance (Wheeler & Miyake, 1992). Comparison of appearance status is considered an important mechanism by which the media in many cases negatively affects individuals' body image (Robinson et al., 2017; Tiggemann & Zaccardo, 2015). Specifically, users who were exposed to images of people engaged in sports who met the ideal of thinness or muscularity did not achieve engagement with exercise in the present study (Nuss et al., 2024; Peng et al., 2019; Prichard et al., 2020). Therefore, it is important to determine whether certain types of idealized images actually motivate physical activity or whether they deter the intention to engage in physical activity (Robinson et al., 2017).

Along these lines, self-congruence theory suggests that consumers prefer brands or products that match their self-concept (Xu Rinka & Pratt, 2018). This theory has been applied in research on brand strategy, advertising and marketing communications (Fleck & Quester, 2007), showing that consumers are more likely to have more favorable attitudes and purchase intentions toward brands whose images are congruent with their self-image (Richins, 1994). A high degree of congruence between a presented image and the consumer's ideal self-image usually translates into a more positive attitude and a greater purchase intention (Ekinci and Hosany, 2006), as well as generating trust and engagement in users (Kumar, 2021). Additionally, in the specific case of social media use, high levels of self-brand congruence have generated high levels of engagement with these social media profiles (De Vries & Carlson, 2014). Moreover, engagement has been proven to be related to changes in physical activity (Edney et al., 2018).

In the specific context of sports marketing, several studies have also demonstrated the positive impact of congruence on users' loyalty and purchase intentions. It has been shown that users' perceived congruence with sport services is related to their loyalty (Alguacil et al., 2019). In the case of spectators of sporting events, it has also been highlighted that spectators' self-congruence can improve their attitudes toward event sponsoring brands and ultimately their brand purchase intentions (Moharana et al., 2023). In the context of online sporting events and eSports, congruence was also found to be important in fostering online consumers' attitudes and intentions (Kordyaka et al., 2023; Thompson et al., 2022). However, to date, practically no studies have focused on the congruence of photos and information published on social media for the promotion of physical sports practices in the population.

Therefore, the present research based on UGT, congruence theory and SCT analyses how marketing messages posted on social media (photos and text) influence social media users' engagement and intentions to improve physical fitness, all in the context of physical activity. These variables are very important findings in research related to

social media (Santos et al., 2022), although they have been scarcely studied in the field of physical activity promotion.

3. Research design

This paper is composed of two studies that delve into the factors that influence SME-PA and its influence on the intention to change physical activity-related behavior in the UK population. The first study, based on the UGT and considering trust in information published on social media, analyzes the combination of variables that generate both high and low levels of SME-PA. For this purpose, an asymmetric and nonlinear approach, such as the QCA methodology, is used. Next, the relationships between SME-PA and current levels of physical sports practices and between SME-PA and the intention to improve current levels of physical sports practices are investigated.

The second study, based on the findings of the first study, delves into what type of specific information published on social media can generate a greater impact on the promotion of SME-PA and the intentions to improve current levels of physical sports practices. To do this, based on the UGT and the theory of congruence, a 3×3 experiment is developed by modifying variables related to the type of photo published and the information that accompanies it. The modified variables related to the photos are gender and physical shape (congruency theory), and those of the text are related to the personal benefits of physical-sports practice based on the body (intrinsic vs. extrinsic) using self-focused benefits messages in both cases.

4. Study 1: quasiexperimental study of the factors influencing SME-PA in the UK population

In this first quasiexperimental study, the combination of variables related to consumers and their motives for using social media (UGT) that can generate high levels of SME-PA are analyzed in a generic way. In addition, specific aspects related to the information they can find and the trustworthiness of the information are considered. Finally, the relationships among EMS-PA, current levels of physical activity, and the intention to improve physical fitness were analyzed.

4.1. Theoretical background and proposition development

It is important to understand why people use social media to find information related to physical activity to encourage their engagement. The availability of information is one of the main motives for participation in social networks (Azar et al., 2016; Chahal & Rani, 2017; Rohm et al., 2013). Drawing from UGT theory, cognitive needs measure how social media content helps users acquire information and knowledge (Chen et al., 2016). According to Rohm et al. (2013), many people use social media for information seeking. As a result, it is necessary to generate value for the consumer through the management of the content and information provided through social media, fostering increased engagement and facilitating valuable outcomes (Malthouse et al., 2013). Accordingly, it has been proposed that informational motivation drives consumers' engagement with social media (Calder et al., 2009; Shao & Ross, 2015). Thus, the following proposition is presented:

Proposition 1. Social media users who perceive high levels of information available about physical activity on these platforms will exhibit high levels of SME-PA.

In addition, some authors have considered how engagement motivations may vary over time (Shao & Ross, 2015). Primarily, consumers join social media communities with the intention of socializing and gathering information. As they become more familiar with the community, their motivation for engagement gradually shifts toward entertainment, which becomes the primary driving force. However, as time progresses, the significance of entertainment decreases, and consumer engagement becomes increasingly dependent on consumers' need to seek information (Shao & Ross, 2015) and brand promotions or incentives (Azar et al., 2016; Chahal & Rani, 2017; Rohm et al., 2013). Thus, the search for opportunities is a factor that can influence people's participation in social media (Chahal & Rani, 2017). Therefore, the following proposition is presented:

Proposition 2. Social media users who perceive high levels of physical activity-related opportunities on these platforms will exhibit high levels of SME-PA.

Additionally, trust is widely recognized as an important aspect of successfully developing long and successful relationships in marketing (Pennanen et al., 2007). The significance of trust in the development and sustenance of consumer relationships has been specifically emphasized in the IS literature within the marketing environment (eg., Ayaburi & Treku, 2020; Kamboj et al., 2018; Kim, 2022).

Specifically, in the social media domain, researchers have considered trust to be an important variable (Alsaad et al., 2017). Indeed, customers on social media share and search for information due to the atmosphere of trust among friends and peers in social media environments (Rohm et al., 2013). In addition, purchase intent is positively correlated with brand trust, engagement and loyalty (Sánchez-Franco et al., 2015; Uribe et al., 2022). However, as users' faith in organizations diminishes, so does their faith in social media (Antoci et al., 2019). Therefore, the effectiveness of business communication operations may be determined by users' trust in the organization (Ayaburi & Treku, 2020). Thus, the following proposition is presented:

Proposition 3. Users who perceive high levels of trust in social media for activity-physical information will exhibit high levels of SME-PA.

Finally, social media is by nature a platform that facilitates social networking (Rote et al., 2015). Interpersonal engagement with other users facilitated by conventional social media elements (message boards, groups, chats, etc.) efficiently enhances health-related knowledge (Welch et al., 2016). Bagozzi and Dholakia (2002) emphasized that peer group identification motivation drives customers to actively participate in online brand communities. Additionally, more recent studies have shown how social ties positively and statistically significantly predict social media engagement (Chahal & Rani, 2017; Rohm et al., 2013). This is because online social support can increase the appreciation of belonging and connection to a group, which in turn increases participation and engagement with the online community (Baumeister & Leary, 2017). These results are in line with the UGT, which considers that the motivation for the consumption of social media stems from the need for integration and social interaction (Katz & Foulkes, 1962). In addition, online social support may also provide additional motivation to maintain a healthy lifestyle and be more physically active (Thoits, 2011). Therefore, the presence of high levels of social support in social media profiles related to physical activity is a key factor for user engagement in social media.

Furthermore, when focusing on the adult population, perceived social support has emerged as the most influential independent predictor of physical activity (Ståhl et al., 2001). According to Ståhl et al. (2001), the level of social support for physical exercise and the likelihood of maintaining a healthy lifestyle were positively correlated. Social support could come from subjects connected on social media or from comments and posts in online communities. These social support networks have proven to be beneficial in promoting healthy behaviors such as physical activity (Rote et al., 2015). Additionally, research by Cavallo et al. (2012) suggests that social support received through existing friendships on Facebook is more likely to influence changes in physical activity behavior than communication within dedicated Facebook groups focused on physical activity. Finally, Zhang et al. (2015) studied the effects of social network characteristics on sedentary behavior, determining whether promotional messages or peer networks were more effective in encouraging physical activity. Zhang et al. found that comments and interactions from other users increased physical activity

levels to a greater extent than interactions with communications for purposes that were perceived as commercial. Thus, the following proposal is presented:

Proposition 4. **.** Social media users who perceive high levels of social support (social ties) on social media profiles related to physical activity will have high levels of SME-PA.

4.2. Research method

4.2.1. Participants

The sample was composed of 902 people who resided in the United Kingdom and met the following criteria: (1) they were interested in sports and (2) they used social media. Of these, 50.1% were male, 49.2% were female, 0.3% were nonbinary, and the other 0.3% preferred not to state their gender. The mean age of the participants was 40.3 (SD=13.1) years. Table 2 also presents their employment status and household income.

4.2.2. Instrument

A data collection instrument in the form of a questionnaire comprising seven scales was utilized. Each scale was adapted to assess the participants' social media activity pertaining to physical sports practice. The scale used to measure social media engagement was obtained from (Chahal & Rani, 2017) and is composed of eight items and two dimensions: (1) information interest and (2) personal interest. The scale used to measure information availability was obtained from Mikalef et al. (2013) (three items). The third scale was the opportunity seeking scale, which was derived from Enginkaya and Yılmaz (2014) (three items), and it is one of the dimensions of consumer-related aspects. The fourth scale was the social ties scale, which was derived from Wang et al. (2012) (three items). The scale measures whether subjects perceive themselves as part of the peer group on social media, how close they are, and whether they like the interaction and exchange of information. The fifth scale was the social media trust scale, which was developed by Chahal and Rani (2017) and is composed of five items that assess how reliably individuals perceive social media for information seeking. Finally, the sixth scale was intentions to exercise, which was obtained from (Hsu & Lin, 2008) and is composed of one item that assesses whether subjects will perform some exercise shortly after to improve their physical fitness. All scales presented Cronbach's alphas greater than.60.

Finally, we used the short version of the IPAQ (International Physical Activity Questionnaire) to measure how physically active the subjects were. It is a widely used tool to measure physical activity levels in the population and has been validated in different languages. The instrument was designed to assess the frequency and duration of moderate- and vigorous-intensity activities in four main domains (work, transport, household activities and leisure time). The survey inquired about the frequency of physical activity practice per week (based on intensity), along with the duration in terms of hours and minutes per day. The total score is calculated by summing the durations of physical activity in the different domains, expressing the results in MET-minutes/week. Finally, the questionnaire included sociodemographic questions.

Table 2
Employment and household income of the sample.

Employment	**Percentage (%)**
Student	5.8
Working 30 hrs a week or more	63.7
Working < 30 hrs a week	15.9
Unemployed	8
Retired	6.7
Household income	**Percentage (%)**
Up to £5199	2.2
£5200 to £10,399	2.8
£10,400 to £15,599	3.8
£15,600 to £20,799	5.4
£20,800 to £25,999	9.5
£26,000 to £31,199	9.8
£31,200 to £36,399	8.3
£36,400 to £51,999	23.2
£52,000 and above	35

4.2.3. Common method bias

To mitigate potential methodological biases, the questionnaire items were phrased in straightforward language. Moreover, to induce psychological separation in the respondents' thoughts, variables were presented prior to their corresponding assessment items (Podsakoff & Organ, 1986). Subsequently, Harman's (1) single factor test (Podsakoff & Organ, 1986) and (2) full collinearity test (Kock, 2015) were performed to measure common method bias.

Harman's test was employed to examine whether a single factor explained less than half of the variance explained by the 22 observed items. The variation explained in this study was found to be 39.62%, which is less than the recommended threshold limit. As a result, this preliminary test demonstrated that the study is free of prevalent approach biases (Podsakoff & Organ, 1986).

Next, the variance inflation factor (VIF) was implemented to test the level of collinearity present in the database. Notably, in this investigation, all the VIF values were less than 3.30. Therefore, there is no risk of bias due to the common method used (Kock, 2015).

4.2.4. Procedure

The Prolific platform (https://www.prolific.co) was used for the recruitment of participants residing in the United Kingdom (November 2022). Participants were directed from Prolific to Qualtrics to complete the questionnaire. Subjects were asked by Prolific about their declared hobbies and sports and their use of at least one social media platform. The participants were compensated 1.1£ for three minutes. The sample was 50% balanced according to the participant's sex (male/female). The number of subjects in the panel from which the sample was drawn with the established criteria was 7406.

4.2.5. Data analysis

The fuzzy-set qualitative comparative analysis (fsQCA) method was employed to examine the combinations of conditions that led to both high and low levels of SME-PA. In the initial step, the questionnaire data were transformed into fuzzy-set variables. After removing missing values, the database was calibrated to the recommended thresholds of 10%, 50% and 90%, as suggested by Woodside (2013).

The second stage was to determine the necessary and sufficient parameters for high and low SME-PA levels. The condition consistency threshold must be above 0.90 in the necessary analysis (Ragin, 2009). Equifinality occurs when a particular outcome (SME-PA) occurs according to a certain sequence of combinations, and a combination can be sufficient when it alone determines the outcome.

fsQCA analysis is conducted in two distinct steps (Eng & Woodside, 2012) to establish sufficient conditions. A cutoff value for frequency and consistency must be established to convert the fuzzy-set membership scores into a truth table. The frequency threshold should be increased to three or more when the sample exceeds 150 cases (Fiss, 2011). A threshold of 18 observations was chosen because the sample size exceeded 900 cases. The frequency cutoff frequency is chosen. The consistency cutoff value was determined when a significant breakdown in the consistency values was provided. The minimum consistency requirement of.75 was followed as recommended by Ragin (2009). In addition, proportional reduction of incoherence (PRI) consistency scores were examined to establish this threshold, and scores above.50 but close to the raw consistency scores were expected (Greckhamer et al., 2018). Finally, the results were presented by combining the intermediate and parsimonious solutions, according to previous researchers (Fiss, 2011;

Ragin, 2009). The larger circles refer to the core conditions (the most important conditions present in both solutions), while the smaller circles refer to the peripheral conditions (those less important conditions present only in the intermediate solution).

4.3. Results

Table 3 provides the calibration values for the conditions utilized, including the standard deviation, mean, maximum, minimum, and the 10th, 50th, and 90th percentiles.

4.3.1. fsQCA results of factors explaining SME-PA

4.3.1.1. Necessary conditions. There are no necessary conditions for the presence or absence (~) of social media engagement because the consistency values did not exceed the suggested threshold of 0.90, according to Ragin (2009) (Table 4).

4.3.1.2. Sufficient conditions. As recommended by Ragin (2009), the truth table was generated with a threshold based on a discontinuity in the consistency values (Schneider & Wagemann, 2010) of at least 0.75. The cutoff frequency was set at eight, and the cutoff consistency was set at.82 for high levels of social media engagement (intermediate solution) (PRI>.50). Four configurations explain 77% of the cases of high levels of SME-PA (consistency:.82; coverage:.77).

The most explanatory solution was that social media users perceived high levels of available physical activity-related information, high levels of opportunities for physical activity-related discounts and offers and high levels of trust in the physical activity information posted on social media (consistency:.88; coverage:.62). The second most explanatory solution was that social media users perceived high levels of available physical activity-related information, high levels of opportunities for physical activity-related discounts and offers and high levels of social links generated through social media (consistency:.88; coverage:.62). The third most explanatory solution was that users perceived high levels of physical activity-related information available, high levels of trust in the information posted about physical activity, and high levels of social links generated through social media (consistency:.88; coverage:.61). Finally, the fourth combination was that social media users perceived high levels of opportunities for discounts and offers related to physical activity, high levels of trust in published information about physical activity and high levels of social links generated through them (consistency:.88; coverage:.60). These solutions were able to explain 62%, 62%, 61%, and 60% of the high levels of SME-PA, respectively (see Table 5).

The cutoff frequency was set to eight, and the cutoff consistency was set to.92 (PRI>.50) for testing low levels of SME-PA. Four configurations explained 75% of the cases of low levels of SME-PA (consistency:.92; coverage:.75). The most explanatory solution was that social media users perceived low levels of available information regarding physical activity, perceived low levels of opportunities for discounts and offers related to physical activity and perceived low levels of trust in information posted about physical activity on social media (consistency:.95; coverage:.61). The second combination was that social media users perceived low levels of available physical activity-related information, perceived low levels of trust in information posted about physical activity and perceived low levels of social links generated through social media (consistency:.95; coverage:.61). The third most explanatory solution was that social media users perceived low levels of opportunities for discounts and offers related to physical activity, perceived low levels of trust in information posted about physical activity and perceived low levels of social links generated through social media (consistency:.95; coverage:.61). The fourth most explanatory solution was that social media users perceived low levels of available information, perceived low levels of opportunities for discounts and offers related to physical activity and perceived low levels of social links generated through social media (consistency:.95; coverage:.59). These solutions explain 61%, 61%, 61%, 61%, and 59%, respectively, of the low levels of SME-PA.

4.3.1.3. Predictive validity and robustness. We follow the guidelines proposed by Pappas and Woodside (2021) to assess the predictive

Table 4
Necessary conditions for SME-PA and ~SME-PA for UK social media users (intermediate solution).

	SME-PA		~ SME-PA	
	Consistency	Coverage	Consistency	Coverage
Information availability	0.82	0.72	0.44	0.54
~ Information availability	0.48	0.38	0.77	0.86
Opportunity seeking	0.81	0.72	0.44	0.55
~ Opportunity seeking	0.49	0.38	0.77	0.85
Trust	0.78	0.75	0.39	0.53
~ Trust	0.51	0.38	0.82	0.84
Social ties	0.79	0.73	0.42	0.54
~ Social ties	0.50	0.38	0.79	0.84

Note: SME-PA-Social Media Engagement regarding Physical Activity.

Table 5
Sufficient conditions for SME-PA and SME-PA for UK social media users (intermediate solution).

Cutoff frequency: 18	SME-PA *Cutoff consistency:*.86				~ SME-PA *Cutoff consistency:*.92			
	1	**2**	**3**	**4**	**1**	**2**	**3**	**4**
Information availability	●	●	●		○	○		○
Opportunity seeking	●	●		●	○		○	○
Trust	●		●	●	○	○	○	
Social ties		●	●	●		○	○	○
Consistency	.88	.88	.88	.88	.95	.95	.95	.95
Raw coverage	.62	.62	.61	.60	.61	.61	.61	.59
Unique coverage	.06	.06	.05	.04	.06	.05	.05	.03
Total solution consistency	.82				.92			
Total solution coverage	.77				.75			

Note: SME-PA-Social Media Engagement regarding Physical Activity; ● = indicates presence, ○ = indicates absence; Projected vector for social media engagement: 1.1.1.1 (0: absent; 1: present); Projected vector for ~ intention to improve fitness: 0.0.0.0 using the format of (Fiss, 2011).

Table 3
Descriptive results and percentiles of social media engagement, information availability, opportunity seeking, trust, and social ties.

		Information availability	Opportunity seeking	Trust	Social ties	Social media engagement
Mean		38.83	42.66	209.81	83.64	2.71
SD		30.51	35.85	408.69	114.407	.96
Minimum		1.00	1.00	1.00	1.00	1.00
Maximum		125.00	125.00	3125.00	625.00	5.00
Percentiles	**10**	2.00	2.00	2.00	2.00	1.30
	50	36.00	36.00	72.00	36.00	2.77
	90	80.00	100.00	540.00	240.00	4.00

validity of the fsQCA. The holdout sample was used to evaluate the XY plot generated by Model 1 (social ties * opportunity seeking * information availability), as depicted in Fig. 1. As suggested by Woodside (2017), models exhibiting a consistency value above 0.80 are considered valuable for advancing theory. In this specific instance, a consistency value of 0.89 indicates a high level of consistency, while a coverage value of 0.617 indicates the extent to which the model accounts for the observed cases. The results reveal that the data overlap significantly (89%) with the subset of social media engagement related to physical activity (Model 1), explaining 62% of the cases. This test result signifies the robust predictive capacity of the solutions.

The frequency and consistency thresholds were examined as suggested by Muñoz and Kibler (2016), who tested the robustness of the results. The original results obtained and the posterior results were significantly similar, although small modifications in the configuration of the analysis produced significant alterations (Gonçalves et al., 2016).

The assessment of the robustness of the results was conducted as the final step. In this case, the test to examine variations in frequency and consistency thresholds was performed following the approach outlined by Muñoz and Kibler (2016). The obtained results did not deviate significantly from the original findings. However, as highlighted in Gonçalves et al. (2016), recognition must be given to even minor alterations that can potentially lead to notable variations in the final solution. The outcomes for high levels of SME-PA, using a consistency threshold of 0.84, were the following: (1) users perceived high levels of social links generated through the same and high levels of physical activity-related information available (consistency:.83; raw coverage:.68); (2) users perceived high levels of trust in published physical activity information, high levels of opportunities for physical activity-related discounts and offers, and high levels of physical activity-related information available on social media (consistency:.87; coverage:.62); (3) users perceived high levels of social links generated through the same and high levels of physical activity-related information available (consistency:. 87; coverage:.62) and (4) that users perceived high levels of social links generated through social media, high levels of trust in published information about physical activity, and high levels of opportunities for discounts and offers related to physical activity in social media (consistency:.89; coverage:.60).

4.3.2. *Correlations between social media engagement, level of physical activity, and intention to improve physical fitness*

Table 6 shows the correlation between SME-PA and the different levels of physical activity practiced. SME-PA correlated positively and significantly ($p < .05$) with all levels of physical activity, with the correlation coefficient increasing with increasing intensity of physical activity.

Furthermore, a favorable and statistically significant association was detected between social media activity and future intentions to increase physical fitness ($r=.31$; $p<.001$).

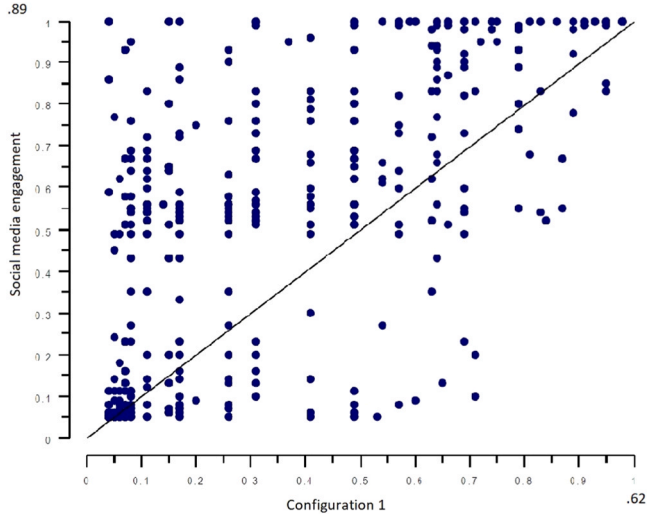

Fig. 1. XY plot of Model 1 with holdout sample data.

5. Study 2: experimental study of the factors influencing the intention to watch fitness photos and to improve physical fitness in the UK population

Once the main motivations and aspects that should be considered to promote SME-PA and its relationship with the intention to improve physical activity levels were known, this second study specifically delves into the variables related specifically to the type of information published. This was accomplished through an experimental study in which both variables of the images (level of physical fitness and sex of the subject) and the text that accompanies them (intrinsic motivation vs. extrinsic motivation related to the body) are modified based on the theory of congruence and considering SCT.

5.1. *Overview*

The photos posted on Instagram about people practicing physical activity (#fitspiration) have generated controversial results in the promotion of physical activity by social media users (Fatt et al., 2019; Peng et al., 2019). Thus, more research is needed to discover what type of content could be more effective in promoting physical activity habits. Thus, this study focuses on the Congruence and the Social Cognitive Theory to better understand the effect that different photos posted on social media could have on people's intentions to watch fitness videos and their intentions to improve physical fitness.

5.2. *Hypothesis development*

According to Festinger et al. (1954), people tend to compare their physical appearance with that of others. Along these lines, previous studies have shown that exposure to images of thin ideal or muscle images did not increase exercise engagement in the present study (Robinson et al., 2017). Media images of the athletic or thin ideal can be detrimental to the promotion of physical activity habits in the population (Benton & Karazsia, 2015; Homan et al., 2012). Several studies have shown the negative effects of the idealized body images of people practicing physical activity in the media on the promotion of physical sports practices by users (Dakanalis et al., 2015; Franchina & Lo Coco, 2018; Johnston & Davis, 2019; Peng et al., 2019). Moreover, based on self-congruence theory, the more individuals identify with the photos presented, the greater the impact of the photos is expected to be on their engagement and their intention to change physical activity-related behavior. Therefore, based on these two theories, it seems that the bodies of people of the same sex who move away from the ideal of slimness or muscularity may have a greater impact on the promotion of physical sports habits.

On the other hand, there is a need to study what kind of motivations for physical activity may be associated with greater or lesser adherence to physical activity (Mazorra et al., 2020). People tend to engage in physical activity for enjoyment/interest, skill development and body-related reasons (Frederick & Ryan, 1993). These motives have been classified as extrinsic or intrinsic (Ryan & Deci, 2000). Extrinsic motives are those that are achieved because of practice, while intrinsic motives are those that are achieved during practice. Although the first two motives (enjoyment/interest and skill development) have always been considered intrinsic motives, the classification of body-related motives has been more controversial. Initially, the body-related motive was theorized as extrinsic, given its more instrumental intention to achieve a goal that is indirectly derived from the activity and is mainly related to appearance. However, years later Richard et al. (1997)

Table 6
Correlation between social media engagement and different types of physical activity.

	Sedentary activity	Walk activity	Moderate Activity	Vigorous activity	Social media engagement
Social media engagement	-.06	.07*	.12***	.18***	
	.087	.028	.000	.000	1.00

*p< .05,**p<.01; ***p<.001;

revised this approach by pointing out that body-related motives could have both intrinsic value (improving health) and extrinsic value (having a body attractive to others).

Similarly, Sherwood and Jeffery (2000) showed that to promote physical activity, the benefits associated with a physically active lifestyle should be presented, and messages should be tailored according to their target audience or population. Among the benefits of physical activity are improved health and well-being, enhanced self-esteem, and social enjoyment. In the experiment developed by Northcott et al. (2021), health and well-being advertisements (get active, feel good) had more clicks and app downloads than social enjoyment advertisements (get active with friends). Therefore, it appears that the body-related text motif of personal wellbeing (intrinsic) tends to have a greater impact on users.

According to Eng et al. (2023), fitspiration posts on social media influence attitudes as a function of the content of the post. If the content is self-congruent with the subject's gender (Xu Rinka & Pratt, 2018) and congruent with the subject's physical fitness (physical shape) (Johnston & Davis, 2019; Peng et al., 2019) and the motivation is intrinsic (Mazorra et al., 2020), the attitude will be greater than if the content is not self-congruent with the subject's gender, as their physical shape and motivation are extrinsic. The hypothesis is as follows:

H1. The manipulation variables include the physical shape of the protagonist of the post, the match between the gender of the subject and the gender of the post, and motivation, which influence attitude.

For decades, the theory of planned behavior has shown the relationship between attitude and intention (Ajzen, 1981). However, SCT theory has also served as a basis in previous research to support the relationship between attitudes and intentions toward physical activity (Eng et al., 2023). Therefore, the following hypothesis is proposed as a function of the outcome of the planned behavior if the outcome is video viewing:

H2a. The variables of physical shape, gender and gender match, and motivation influence the intention to watch fitness videos.

Behavioral intention refers to photo viewing (Peng et al., 2019). Thus, the following hypothesis is presented:

H2b. The manipulation variables, physical shape, post protagonist, subject gender and post gender match, and motivation influence the intention to watch fitness photos.

Finally, intention also refers to the performance of physical activity, as previously proposed by Peng et al. (2019) and Eng (2022). Hence, the following hypothesis is presented:

H3. The manipulation variables, physical shape, gender and post-gender match, and motivation influence the intention to improve fitness.

5.3. Research method

5.3.1. Participants

The sample is composed of 299 people who resided in the United Kingdom and who met the following criteria: (1) they were interested in sports, and (2) they used social media. Of these, 50.8% were male, and 49.2% were female. The mean age of the participants was 41.5 (SD=13.1) years. Table 7 also presents their employment status and household income.

Table 7
Employment and household income of the sample.

Employment	**Percentage (%)**
Student	3.0
Working 30 hrs a week or more	59.2
Working < 30 hrs a week	23.4
Unemployed	6.4
Retired	8.0
Household income	**Percentage (%)**
Up to £5199	1.0
£5200 to £10,399	2.7
£10,400 to £15,599	3.4
£15,600 to £20,799	5.0
£20,800 to £25,999	8.4
£26,000 to £31,199	8.7
£31,200 to £36,399	11.4
£36,400 to £51,999	21.8
£52,000 and above	37.6

5.3.2. Procedure and stimuli

We created eight images, each of which simulated an Instagram post, alternating the gender of the protagonist of the image (male or female), the type of content (intrinsic or extrinsic) and the type of physical condition of the subject (underfit or muscular condition). The experiment was 2×2x2.

We visually communication the protagonist's gender and physical condition. The communication of the motive of the protagonist of the post was in writing through two situations. The extrinsic condition was communicated as follows: "Exercising 3 days a week for at least 60 min makes my body more attractive." The intrinsic condition was communicated as follows: "Exercising 3 days a week for at least 60 min helps me to improve my physical and mental well-being." All stimuli are available in the appendix.

The verification of the stimuli had three phases. (1) A first qualitative analysis between digital marketing academics who contrast similarity with Instagram posts and physical education academics who contrast subjects' fitness levels and exercise execution. (2) A qualitative pretest with 25 university subjects at convenience was performed, and we measured the time required to understand and dissect the post. (3) Finally, we performed a posttest to verify that the subjects understood the differences between the stimuli.

We also used Prolific and Qualtrics for Study 2. The sample was gender balanced, and all subjects were required to at least use Instagram. Each subject who entered the experiment was randomly assigned to one of eight possible scenarios. After being shown the image for 20 s (manual scrolling was not possible), the subject was automatically taken to the questionnaire.

5.3.3. Common method bias

We used the same method as in Study 1 to reduce potential methodological bias. There was no risk of bias due to the common methodology used in Study 2.

5.3.4. Instrument and manipulation check

The engagement scale was adapted from Chahal and Rani (2017) to measure subjects' information interest: "I will watch fitness videos on social media in the near future" and "I will watch fitness photos on social

media in the near future." The attitude and intention to exercise scale was adapted from Hsu and Lin (2008): "In general, my attitude toward exercising is positive" and "In the near future, I will exercise to improve my fitness."

The manipulation check used the following items: "The person in the Instagram photos has a muscular physique," "The person in the post has hedonistic (pleasure or achieving happiness) motives for exercising," and "The subject of the Instagram post does physical exercise to show off to others." The manipulation test was successful in all cases ([F (1299) = 12.37, $p < .001$]; [F (1299) = 5.02, $p = .026$]; [F (1299) = 50.36, $p < .001$]).

5.4. Results

The database was filtered based on response time and respondents' personal identifiers to avoid manipulation and repeated surveys. Surveys in the first and last deciles based on response time were removed.

The first analysis (H_1) started with a test for differences in means. We found an increase in attitude after viewing the post (M = 5.29, SD = 1.59) compared to before viewing the post (M = 5.17, SD = 1.63, t (299) = −2.131, $p < .034$). An analysis of variance was then conducted to test attitude scores as a function of the stimulus presented. There was a significant effect of subject fitness, gender difference and motivation on attitude (F[1291] = 8.056, $p < .01$). Post hoc comparisons using Tukey's HSD test showed that the participants in the same sex/underfit condition and the intrinsic condition had significantly greater mean attitude scores. However, attitude differs significantly depending on whether the subject is the same gender as the postprotagonist and in an underfit condition (it is higher) or the same gender as the subject but in a muscular condition (it is lower). In other words, when the sexes are matched, attitude increases when the subject is underfit, but the opposite occurs when the sexes are mismatched.

Two analyses of variance were conducted to test Hypotheses H2a and H2b. In both cases, the results were similar: a significant effect of subject fitness, gender difference and motivation on the intention to watch videos (F [1291] = 38.610, $p = .004$) and fitness photos on social media (F[1291] = 38.853, $p = .002$) was found. Fig. 2 shows the estimated marginal means of the engagement variables as a function of the experimental factors.

Regarding viewing fitness photos, significant differences are observed when the subjects are of the same gender, have an underfit condition, and have intrinsic motivation. However, it decreases when the condition is muscular, extrinsic and of the same sex.

With regard to watching videos, significant differences are observed between the underfit condition/intrinsic/same gender and the other conditions, except for the underfit condition/different gender/extrinsic. As before, but more clearly, the subject inversely relates motive and gender in the underfit condition. If the subject was exposed to the same gender in the underfit condition, the motive must be intrinsic to have a higher intention, or an underfit condition but of the opposite gender, with the extrinsic motive being extrinsic (Fig. 3).

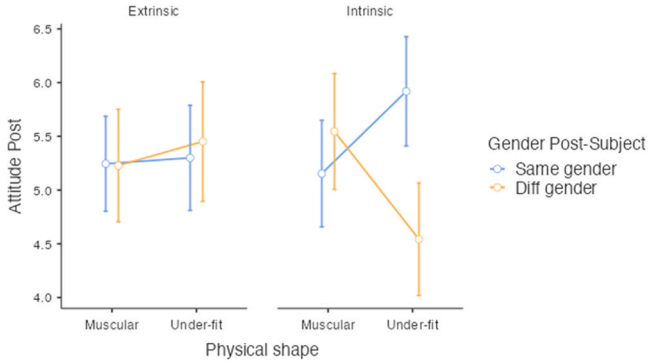

Fig. 2. Estimated marginal means of attitude after the stimulus.

Hypothesis 3. (intention to improve fitness) was tested with another analysis of variance. Similar to the previous results, a positive and significant relationship was found between intention and the three conditions (F[1291] = 20.662, $p = .012$). Significant differences occur when the condition is underfit/intrinsic/the same sex and all other conditions except when the conditions are muscle and different sex/any reason. The difference from the previous results lies in the increase in intention when the protagonist of the item is of the opposite sex and muscular (regardless of motive) (Fig. 4).

6. Discussion

The generation of physical activity habits and the reduction of sedentary lifestyles in the population has become a great challenge for today's society (World Health Organization, 2018). The irruption of technology has brought about new forms of communication, one of which is social media. However, although brands have shown that the utilization of social media can have a favorable impact on the formation of good views toward it as well as purchasing intent (Majeed et al., 2022; Yoong & Lian, 2019), the changes that these can generate in the physical-activity habits of the population are largely unexplored (Laranjo et al., 2015). Hence, the findings of this study aim to enhance our understanding of the factors that can drive higher levels of social media engagement concerning physical activity, which, in turn, may lead to behavioral changes and improvements in physical fitness. Moreover, it aims to understand the specific characteristic that the information posted on social media (both photos and text) should have a greater impact on the promotion of physical activity habits of UK social media users. To achieve this goal, improving the information management of social media profiles that publish information on physical activity is vital.

The findings showed that there is no single strategy to achieve social media engagement with physical activity but that these strategies should vary, as some previous studies in other fields have pointed out (Rudeloff et al., 2022). To promote social media engagement, it is essential for the population to perceive a substantial amount of information regarding sports and physical activity available on social media. This condition is present in three of the four solutions. This finding aligns with UGT theory, as the desire to acquire information and knowledge is frequently a primary motivation for users to become involved with social media (Calder et al., 2009; Rohm et al., 2013). Therefore, both public and private organizations involved in the promotion of physical activity should strive to promote the use of social networks by improving the access to and availability of information on physical activity for the general population (tools, useful tips to promote physical activity habits, activity and services offered). In addition, content that generates value for the population should be created and published to add value to users and generate a higher level of engagement (Malthouse et al., 2013). Therefore, analyzing user preferences about the physical activity content to be published can be of great use for this purpose.

However, for information to have a significant influence on users' performance, considering the sheer quantity of information and the need to align specific information with the specific needs of the user is essential (Zha et al., 2018). Users must perceive that social media information helps them improve their knowledge to stay up to date with the latest news, sports activities, and products and that this information is quickly accessible, voluminous, and related to physical activity. It is also relevant that users perceive physical activity information on social media to be reliable (a condition present in three of the four solutions). These findings align with prior research that has demonstrated the significance of information trust in establishing enduring relationships (Ayaburi & Treku, 2020; Kamboj et al., 2018; Pennanen et al., 2007). Therefore, both public and private sports institutions are recommended to publish information based on scientific evidence. In this way, they will be able to ensure the trust and credibility of their followers on social

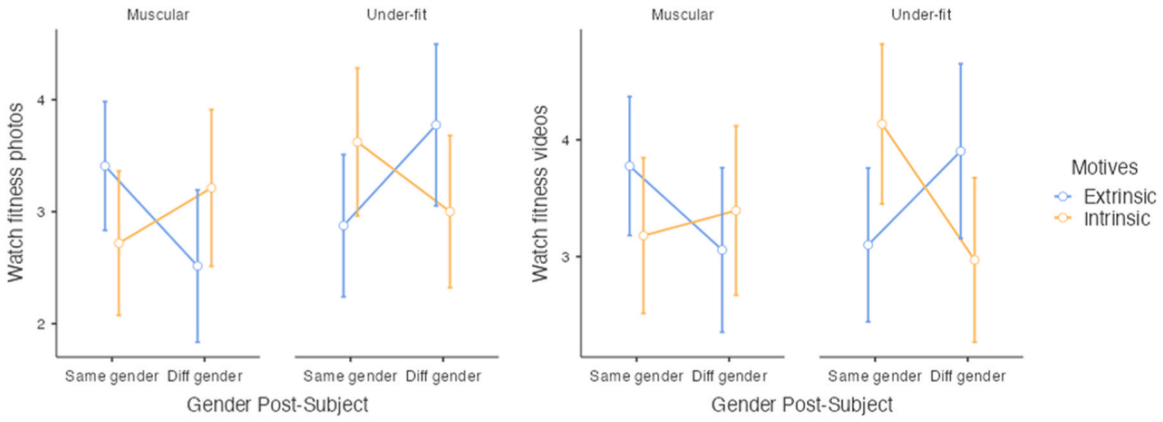

Fig. 3. Estimated marginal means of engagement with photos (left) and videos (right).

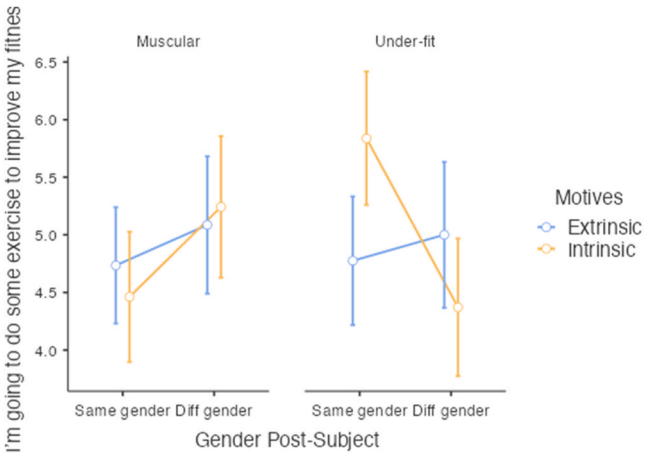

Fig. 4. Estimated marginal means of intention to improve my fitness.

media and thus encourage their engagement.

Regarding the information published, the fact that users perceive high levels of opportunities related to physical activity on social media is also important for generating high levels of social media engagement. Similarly, promotions or incentives proposed by brands or entities through social media have also been considered the main motives for the use of social media (Azar et al., 2016). Consequently, it is necessary not only to publish information about the benefits of physical activity or possible exercises or workouts to be performed but also to present promotions, discounts, and sweepstakes of sports services or products. Through the combination of diverse content, greater engagement with consumers will be achieved.

Likewise, the fact that users present high levels of membership and interactions in these social media profiles related to physical activity was another of the conditions present in four of the five solutions. Along these lines, some previous studies have pointed out that peer groups motivate online community participation (Bagozzi & Dholakia, 2002), and these factors positively and statistically significantly predict social media engagement (Chahal & Rani, 2017). The results highlight that social interaction and integration are motivators for using social media, as predicted by the UGT. In fact, social support through social media can support changes in physical activity habits (Zhang et al., 2015). Therefore, it is necessary to improve users' interactions on social media related to physical activity (Edney et al., 2018) and to carry out group cohesion activities. The creation of challenges related to physical activity and live activities in which users can intervene could be good strategies for this purpose.

Participation in social media related to physical activity may indirectly improve the fitness intentions of users. These findings align with several studies that have demonstrated that social media engagement is related to future purchase intentions for products and services (Dhar & Jha, 2014; Majeed et al., 2022; Yoong & Lian, 2019) and to behavioral change intentions related to physical activity (Edney et al., 2018). Moreover, these findings support the results of previous studies that have established the usefulness of social media for the promotion of physical sports practice habits (Durau et al., 2022; Peng et al., 2019; Sokolova & Perez, 2021). However, it should not be forgotten that appropriate management of physical activity-related information on social media must be performed if such a positive impact on behavioral change is to be achieved.

Not all information posted on social media to promote physical activity has had a positive impact on users' engagement and intentions to engage in physical activity (Nuss et al., 2024). Specifically, the findings of the second study highlight the need to design specific strategies for the management of physical activity information posted on social media. First, it highlights the need to know the target population, as suggested by the social strategy cone presented by (Effing & Spil, 2016). It is necessary that the information presented in the photographs is perceived by users as congruent to generate higher levels of engagement and promote the practice of physical activity. This finding is in line with self-congruence theory, which suggests that consumers prefer products that match their self-concept (Fleck & Quester, 2007; Xu Rinka & Pratt, 2018). In particular, images of physically active people of the same gender as the users are relevant if they are to have a positive impact on their intention to improve their fitness. These findings are in line with several previous studies in the marketing area, which have highlighted that consumers are more likely to develop more favorable attitudes and purchase intentions toward products or services with images perceived as congruent to them (Thompson et al., 2022; Kordyaka et al., 2023; Moharana et al., 2023), generating trust and commitment in users (De Vries & Carlson, 2014; Kumar & Kumar, 2020).

In addition, the physical shape of people in sports photos has also been found to be an important variable to consider in promoting engagement and activity practices. Similar to previous studies (Durau et al., 2022; Peng et al., 2019; Prichard et al., 2020; Robinson et al., 2017), images of men or women with idealized or stereotypical bodies practicing physical activity (underfit and muscular) were not found to have a positive impact on either engagement in social media or on the intention to improve physical sports practices. This can be explained by the SCT (Festinger et al., 1954), which suggests that people tend to compare their physical appearance with that of others. Therefore, if such images are not congruent with users and they visualize them as difficult or impossible to achieve, they may demotivate users and not generate the expected result.

Finally, the text information accompanying the photo is also relevant for generating a greater impact on improving physical activity levels.

Specifically, it seems that intrinsic motives related to the body generate a greater impact (well-being). This may be because intrinsic motivation for sports practice generates a greater impact on users, which may also help to explain why the physical appearance of the people in the photos is not as relevant. This finding is also in line with a previous study (Northcott et al., 2021), which found that sport advertisements related to health and wellbeing have more interest than other types of advertisements. Therefore, accompanying such images with text highlighting intrinsic body-related benefits (wellbeing, pain reduction, mental disconnection, etc.) may be relevant for the promotion of physical-sport practice.

6.1. Theoretical contributions

The results of this study provide insight into the factors that encourage engagement in social media, especially in relation to physical activity. Prior studies have highlighted the need to deepen the knowledge of these factors (Dolan et al., 2016; Naraine & Bakhsh, 2022). Second, it contributes to increasing the existing knowledge on social media information management (Santos et al., 2022), suggesting ways to improve the management of social media information to generate a greater impact on generating physical sports practice habits and thus reducing sedentary lifestyles, which is one of the priority objectives of society (World Health Organization, 2018). Moreover, previous studies have shown that the ability of social media to generate behavioral changes and promote physical sport practices is still scarce and inconclusive (Laranjo et al., 2015; Williams et al., 2014). Furthermore, this research contributes to the literature on information systems and marketing by demonstrating empirically, based on congruence theory and SCT, how the combination of user-congruent images and texts based on the intrinsic personal benefits of physical activity generates more positive impacts on users. In addition, this study contributes to the limitation presented by Santos et al. (2022) related to the characteristics of the sample of studies that focus on the analysis of social media engagement with samples of young people, mainly university students. In this way, it provides theoretical evidence on aspects related to the management of information to generate SME-PA and improve the levels of physical activity of a broader spectrum of the population. It also contributes to the recommendations made by Nuss et al. (2024) to analyze the impact that nonidealized bodies of physically active people can have on the promotion of physical activity habits, highlighting the power that these nonstereotyping bodies have in promoting these habits. Therefore, the findings of this study suggest that such interventions can improve and generate a greater impact on the generation of physical activity practices.

6.2. Practical implications

Second, the practical implications of this study highlight the need to develop different strategies related to information management to enhance the influence of social media on the formation of physical activity behaviors. Social media has now emerged as a readily accessible source of information for the general population. Therefore, social media engagement through physical activity can indirectly generate changes in the behavior of the population, such as the intention to improve physical fitness. Those responsible for promoting physical activity and reducing sedentary lifestyles in the population should recognize the tremendous potential that social media holds for achieving these objectives. However, good information management of the content shared through social media is essential if these results are to be achieved.

First, to effectively promote social engagement in physical activity and improve the physical fitness of social media users, organizations responsible for or aiming to promote physical activity, such as public and private sports organizations and sports influencers, should prioritize providing up-to-date, reliable information on the latest sports trends and benefits. This information should be backed by scientific research to ensure its credibility and encourage users' intention to participate in physical activities. In addition, social media managers must encourage participation in social media by their users. Therefore, they should work on generating a good group climate among users who follow social media profiles that publish content related to physical activity so that they can identify and ultimately interact through comments, posts, and reactions. They should also try to encourage social interaction among their followers. The generation of challenges related to physical activity or live sessions can be useful. Finally, posting information related to offers or opportunities related to physical activity practices in terms of materials, events, or other sports activities is also important. Therefore, those in charge of managing the information systems of sports entities and those responsible for promoting physical activity habits should consider these recommendations if they want to improve their impact on social media.

There are also a number of practical implications regarding the characteristics or typology of the information published on social media related to physical activity. The first step should be to consider the characteristics of the target population to be more effective. Social media platforms should be leveraged according to the context and objective of the social cause, in this case, promoting physical activity practices in a specific population. Thus, the photos and information provided should be tailored according to the characteristics of the population. Ensuring that images depict individuals of the same sex as the target audience helps enhance relatability and engagement. Users are more likely to identify with and be motivated by individuals of their own gender participating in physical sports activities. Specifically, in the case of posting photos of people engaging in physical sports activity, posting photos of people who are similar in physical shape to the population in which you want to promote physical sports activity and who are not stereotypical (thin or muscular) is important. Featuring individuals who are similar in physical shape to the target population helps to increase relatability and resonance with the audience. When individuals see others who look like them participating in physical activity, they are more likely to feel inspired and motivated to do the same. This finding reinforces the idea that physical activity is attainable and achievable for everyone, regardless of their body shape.

The sex of the population in which physical activity habits are promoted should also be considered. It is important to publish photos of people of different sexes and qualities appropriate to the population at which the intervention strategies are aimed. If the intervention or physical activity promotion campaign is carried out for a large population with very different characteristics, it is necessary that the photos published represent all the diversity of the population so that the people who view them feel identified (e.g., gender, disability, age, ethnicity). Posting photos of individuals with a variety of body shapes participating in physical activity sends a powerful message that exercise and sports are accessible and beneficial for everyone, regardless of their appearance. It helps to normalize diverse body types and fosters a more inclusive and supportive environment for individuals to engage in physical activity without feeling self-conscious or discouraged.

In addition, the text accompanying the image is also relevant. Thus, the combination of both images and text can be more effective if combined in the proper way. In this case, the benefits of regular physical sports practices reported in such images are relevant. By pairing images of individuals practicing physical activity with informative text detailing its benefits, a synergistic effect is achieved. Viewers are not only visually stimulated but also provided with compelling reasons to adopt similar behaviors. This integrated approach enhances the likelihood of eliciting a positive response and motivating individuals to incorporate physical activity into their lifestyle. Specifically, accompanying images with information about the benefits of physical-sports practices, especially those that are more intrinsic to the body and related to the physical and mental wellbeing that people experience as a result of regular physical-sports practices, is important. This fosters a deeper connection with the

audience and encourages sustained participation.

Therefore, accompanying images of people practising physical activity with information related to stress reduction, disconnection from everyday life, and the reduction of certain muscular pains or aches and pains can be a good strategy for the promotion of physical-sports practice habits in this population. This may be because these benefits are not as well known as the extrinsic benefits related to physical appearance. Thus, informing social media viewers about the stress-relieving properties of physical activity can resonate deeply, especially in today's fast-paced and stressful world. Regular engagement in physical-sports activities has been shown to lower stress levels, improve mood, and promote overall mental wellbeing. In addition, providing insights into how physical sports practice offers a valuable escape from the pressures of everyday life can be compelling. Highlighting the opportunity for individuals to disconnect from their routine and immerse themselves in an activity that brings joy and fulfillment can motivate greater participation. Finally, addressing concerns related to muscular pains or aches is essential for overcoming barriers to physical activity. By conveying how regular physical sports practices can help reduce muscular discomfort and improve overall physical comfort, campaigns can alleviate apprehensions and encourage sustained engagement. Additionally, highlighting the power of physical activity practices to prevent illnesses could be important. Hence, by aligning images of physical activity with informative content detailing these intrinsic benefits, campaigns can effectively capture attention, educate, and motivate individuals to embrace physical-sports habits. This integrated approach not only promotes the immediate advantages of physical activity but also fosters a deeper understanding of its long-term positive impacts on both physical and mental wellbeing, enhancing physical activity habits.

In this case, for the promotion of physical sports habits of UK social media users, the publication of images of nonstereotypical people practicing physical activity of the same sex as the users and accompanied by intrinsic motives (personal wellbeing) proved to be the most effective. Thus, the strategic alignment of visual imagery and accompanying textual content on social media platforms holds immense potential for promoting physical activity habits. By tailoring content to reflect the characteristics and preferences of the target population, emphasizing intrinsic motivations, and considering cultural sensitivities, physical activity promotion campaigns can achieve greater impact and resonance among diverse audiences. However, culture may influence these results. Therefore, these patterns or strategies may not prove to be as effective in promoting physical activity habits through social media in other countries. Therefore, aspects related to the culture of the country should also be considered when designing physical activity promotion campaigns. Thus, when designing physical activity promotion campaigns for other countries, it is crucial to consider aspects related to the culture of the target audience.

6.3. Limitations and future research lines

Finally, it is important to acknowledge that this study has certain limitations. First, the sample used is from a specific country. Thus, future studies should expand the sample to other countries and verify whether the results are similar. Second, it analyzes users' perceptions of the information published on physical activity on social media in general. Hence, future research endeavors should focus on expanding our understanding of perceptions regarding information management within specific social media platforms. Third, this is cross-sectional research assessing user perceptions of physical activity information on social media using only photos and text. Future studies, based on the results obtained, should carry out interventions and experimentally test the most effective information management measures to generate SME-PA by comparing both photos and videos with text.

7. Conclusions

This research enriches our understanding of the information systems literature and its intersection with social media marketing, specifically in the context of disseminating information related to physical activity. The study sheds light on how such information could foster engagement and encourage users to participate in physical activity, thus providing valuable insights to the existing body of knowledge in this domain. The higher engagement levels observed among social media users in response to physical activity content are not attributed to a singular factor but rather arise from a myriad of reasons, with a notable emphasis on trust in the disseminated information. Crucially, the research dispels the notion of a singular profile characterizing social media users predisposed to engagement with physical activity content, highlighting instead the existence of a diverse range of profiles. Understanding this diversity becomes imperative in tailoring information that aligns with specific user profiles, thereby effectively encouraging engagement and fostering physical-sports practices. The study suggested that engagement with social media content centered on physical activity has the potential to stimulate intentions to enhance physical fitness among users. However, for this impact to be realized, a nuanced comprehension and analysis of the targeted user profiles are essential. Crafting and delivering information congruent with these profiles has emerged as a key strategy for promoting effective engagement and encouraging physical sports practices. Notably, images featuring individuals who deviate from conventional perceptions of thinness and muscularity while accentuating the intrinsic benefits of physical sports practices related to personal well-being particularly resonate with users. Furthermore, aligning depicted individuals with the same gender as the user appears vital. These nuanced insights provide valuable guidance for tailoring content to maximize its impact on user engagement and improve physical fitness.

CRediT authorship contribution statement

Ferran Calabuig: Writing – review & editing, Writing – original draft, Resources, Methodology, Investigation, Funding acquisition, Conceptualization. **Josep Crespo-Hervás:** Validation, Supervision, Funding acquisition, Formal analysis, Conceptualization. **Manuel Alonso-Dos-Santos:** Writing – review & editing, Writing – original draft, Software, Resources, Formal analysis, Data curation, Conceptualization. **María Huertas González-Serrano:** Writing – review & editing, Writing – original draft, Validation, Methodology, Investigation, Conceptualization.

Declaration of Competing Interest

None.

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Appendix A. Supporting information

Supplementary data associated with this article can be found in the online version at doi:10.1016/j.ijinfomgt.2024.102803.

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