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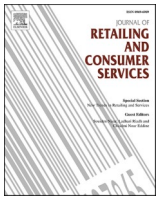

How can I Be as attractive as a Fitness YouTuber in the era of COVID-19? The impact of digital attributes on flow experience, satisfaction, and behavioral intention

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ABSTRACT

In the past decade, the social media platform has dramatically changed individuals' daily activities in real life and on the Internet, including shopping, socialization, entertainment, study, and even health and fitness. In the era of COVID-19, particularly, consumers tend to rely more on digital attributes of social media platforms for their decision-making process by reducing the physical touchpoint. Responding to this ongoing trend, this study investigates how fitness YouTube channel attributes and fitness YouTuber attributes influence flow experience, satisfaction, and behavioral intention of YouTubers who work out at home via a fitness YouTube channel during the COVID-19 pandemic. Based on the social media literature and the cognitive appraisal theory, this research formulates a research model that specifies the influence of three dimensions of fitness YouTube channel attributes (i.e., social interaction, information quality, and visual content) and three dimensions of fitness YouTuber attributes (i.e., social attractiveness, physical attractiveness, and attitude homophily) on flow experience, YouTube channel satisfaction, and behavioral intention in the context of YouTube. This study recruited participants in the United States who currently work out via a fitness YouTube channel through three waves of data collection during the COVID-19 era. The empirical results revealed that flow experience was significantly affected by information quality, visual content, and physical attractiveness. Also, YouTube channel satisfaction was significantly affected by social interaction, information quality, and visual content. Lastly, behavioral intention was significantly affected by flow experience and YouTube channel satisfaction. Based on the findings, this study proposes meaningful implications for the extant literature and social media industry during the COVID-19 pandemic.

1. Introduction

The evolution of social media platforms led to an increasing number of consumers who rely heavily on social media for their life development, such as online learning, online shopping, and online media consumption (Dey et al., 2020; Steils et al., 2019). Contemporary consumers with busy lifestyles and fragmented downtime tend to prefer an online environment rather than a physical environment where they can access the digital content anywhere and anytime (Dey et al., 2020). During the COVID-19 pandemic, in particular, consumers prefer to shop online more than in person because of social distancing practices and stay-at-home orders that protect them from the virus. In addition, consumers have attempted to maintain their physical and mental health in the COVID-19 era by converting their homes into a workout place or personal gym. In the United States, for example, the sales of home fitness products in March 2020 dramatically increased by 307% compared to those in March 2019 (i.e., right after World Health Organization officially announced COVID-19 outbreak a global pandemic in the second week of March 2020) (Stackline, 2020). In addition to the home fitness products, consumers have used YouTube for their workouts and fitness content consumption as social media enables the consumers to exercise via fitness YouTube channels before and/or after completing a daily task at home without regard to time and place (Stragier et al., 2016). Hence, the concept of a workout at home in this study means that consumers consume fitness YouTubers and their YouTube channels' digital content (e.g., YouTube videos) to have free workouts and online coaching to build their bodies and health condition and to receive exercising tips and experiences at home rather than a workout at a gym with a personal trainer (Sokolova and Perez, 2021). In other words, the digital content, including fitness YouTubers and YouTube channels, can be used as a

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digital personal trainer for healthier lifestyles or weight management to achieve an attractive body type among consumers (or YouTube users).

Compared to other social media platforms, particularly, YouTube concentrates primarily on shared video rather than texts and photos, allowing users to easily create and upload self-generated (or homemade) videos as well as view and share other users' videos with subscribers (Kietzmann et al., 2011; Lee and Watkins, 2016). As more and more people prefer to listen to and watch digital content rather than read it to access information, YouTube has played a role as a popular source of fitness- and health-related information, attracting experts in fitness and health to its platform (Basch et al., 2018; Sokolova and Perez, 2021). Experts in fitness and health can also take advantage of YouTube by showing real (or physical) practices that need more user attention (Kietzmann et al., 2011). YouTube's popularity has consequently led users to upload approximately 60 h of content every minute and create 4 billion page views every day (Basch et al., 2018). However, the information deluge on YouTube provides users with too many options for selecting and watching a YouTube video. According to the extant literature on YouTube as an information channel, one of the core drivers of a user's decision to select and watch a YouTube video is who delivers the information on the video and/or where the information originates (e.g., whether the communicator and the YouTube channel are more credible and attractive than others) (Basch et al., 2018; Sokolova and Kefi, 2020; Sokolova and Perez, 2021). In the case of health- and fitness-related content in particular, whether or not the communicators and their YouTube channels have a background in this field is critically important (or whether they are professional or not) for YouTube users, because those YouTubers and their channels' information can be directly used for the users' self-health management at home (Basch et al., 2018; Sokolova and Perez, 2021).

The approach of prior research on fitness product (or content) consumption has focused on identifying consumers' motivational factors of purchasing technology-oriented fitness products, such as a willingness to use fitness mobile apps and smartphones, and exploring their influences on behavioral intention and/or actual behavior to continuous exercise (Hosseinpour and Terlutter, 2019; Muntaner-Mas et al., 2019). In the context of working out at home via social media, however, this approach to motivational factors needs to be extended by emphasizing the roles of both the digital content of social media platforms and the (digital) persons who deliver the content to consumers (Sokolova and Kefi, 2020). Although previous studies have highlighted the critical roles of social media platforms and spokespersons in the consumers' decision-making process (Sokolova and Kefi, 2020; Stragier et al., 2016), they have not jointly considered the roles of YouTube channel content and YouTubers as integrated motivational factors for developing users' loyalty toward the YouTube channel. For example, social media users tend to use all the digital content of the fitness YouTube channels, including interaction with other subscribers, fitness-related information, visual content, and even appearance and attractiveness of its YouTuber for their evaluations, which consequently leads to emotional states and behavioral intention among the users according to the cognitive appraisal theory (Lazarus, 1982). More specifically, this theory is based on the notion that consumers' emotional states and behaviors are influenced by their cognitive evaluation of a physical environment they directly encounter (Kim and Stepchenkova, 2018; Lazarus, 1982). This study focuses on this fundamental notion of the theory by applying it to the virtual environment that consumers indirectly encounter via technology, such as YouTube. Hence, this study assumes that a digital environment's characteristics could be also evaluated by users and that the content of the digital environment (e.g., characteristics of fitness YouTubers and YouTube fitness channels) affects user's feelings and perceptions of the content while consuming it, which consequently result in their behavioral intention to continuously use it to achieve their goal. In the United States, 64% of consumers indicated that they used YouTube more frequently in March 2020 (or during the COVID-19 pandemic) than usual to keep them informed and entertained at home particularly (Tankovska, 2021). Consumers have been encouraged not to go to a fitness center or gym in the COVID-19 era, so the digital content (i.e., characteristics of fitness YouTubers as a virtual personal trainer and YouTube fitness channels as a virtual fitness center or gym in this study) would be a particularly critical component of consumers' evaluations for their self-health management at home (Kim, 2021). Hence, from a theoretical perspective, the current research extends the cognitive appraisal theory by conceptually proposing and empirically investigating the dimensionality of YouTube fitness channel attributes and fitness YouTuber (or spokesperson) attributes in a digital context. More specifically, this research provides scholars in the contexts of digital marketing and health management with a new standpoint to employ the identified digital attributes as significant determinants of increasing higher levels of positive emotions and loyalty toward the digital product (or environment).

In the context of working out at home via fitness YouTube channels, all aspects of the channels and their YouTubers should be considered, because the main reasons for subscribing to a fitness YouTube channel are to collect/share health- or fitness-related information from/with other users and the channels (i.e., fitness YouTube channel attributes in this study) and to exercise with and then physically look like the fitness YouTuber (i.e., fitness YouTuber attributes in this study) (Stragier et al., 2016). Based on prior research on social media (Balabanis and Chatzopoulou, 2019; Kim and Kim, 2017; Sokolova and Kefi, 2020), this study identifies social interaction, information quality, and visual content as fitness YouTube channel attributes, and social attractiveness, physical attractiveness, and attitude homophily as fitness YouTuber attributes. Therefore, based on the above notion, this research proposes the following research question:

> RQ 1: Can the cognitive appraisal theory be applied to a digital context, such as YouTube, investigating the impacts of digital attributes on consumers' health- and fitness-related behaviors during the COVID-19 pandemic?

More importantly, compared to the context of a workout at a gym, workouts at home may need more concentration and engagement among consumers due to home-related factors, such as physical interventions of family members, while exercising via a fitness YouTube channel. To do so, consumers should be completely concentrated on and engaged with both digital consumption and physical activity by feeling "flow states" while working out via the fitness YouTube channel at home (Hoffman and Novak, 2009; Kim and Kim, 2020). The fundamental notion of flow was developed by athletes' physical activity that enables them to be absorbed by emphasizing and becoming involved in the activity (Csikszentmihalyi, 1975). Since then, the flow construct has been applied to the Internet context, including web surfing and digital media consumption (Hoffman and Novak, 2009). By combining the approaches of previous studies to the role of flow in the digital consumption context (e.g., esports spectatorship from Kim and Kim, 2020) and the physical activity context (e.g., rafting from Wu and Liang, 2011), this study proposes the important role of the flow construct in the context of digital consumption for physical activity. Hence, the following research question is formulated:

> RQ 2: Do consumers feel flow experience during workouts via digital contents, leading to higher levels of YouTube channel satisfaction and intention and/or actual behavior to continuous exercise via technology, such as fitness YouTube channels?

The current research was designed and conducted in the COVID-19 era, so the empirical findings of this study would particularly reflect the ongoing trends, indicating that more consumers are more likely to work out at home via technology (i.e., the YouTube platform in this study) for their health management rather than at a gym via a personal trainer (Kim, 2021). Hence, it is expected that this study's research

model leads practitioners and scholars to deeply understand health- and fitness-related behaviors of their target consumers under the circumstance of COVID-19. This study proposes, practically, that consumers' behavioral intention will be loyal toward the YouTube channel as a final outcome of flow experience and YouTube channel satisfaction. Predicting online users' intention to be loyal toward the digital product (or environment) will provide YouTube fitness channels, YouTubers, and fitness media production companies with a new insight into managing consumers' levels of emotions during workouts and satisfaction, which in turn will lead consumers to become more loyal toward their digital products for their daily workouts (or self-health management) at home during and after the COVID-19 era.

2. Literature review and hypotheses development

2.1. Theoretical background

Based on the notion that an individual's emotions serve as a root of cognitive appraisal or evaluation of a phenomenon and/or event, the cognitive appraisal theory was developed by Lazarus (1982). The theory assumes that an individual's positive or negative emotions toward a stimulus are the results of a cognitive evaluation of the stimulus (Smith and Lazarus, 1993). Initially, the term "appraisal" was used to explain how different emotional states, either positive or negative, are elicited before the theory was developed (Arnold, 1960). Arnold (1960) and Lazarus (1982) proposed that there are various appraisal dimensions, playing as the cognitive standard set of evaluation criteria among individuals, which distinguish positive or negative emotional states. Another proposition was that individuals tend to respond to the same stimulus in a different way, depending on the relative significance of the stimulus. In addition, individuals tend to use all of the aspects of the stimulus in their evaluation and generation of positive or negative emotions (Nezlek et al., 2008). Later, the various appraisal dimensions of the stimulus were conceptually categorized as goal congruence and goal relevance by cognitive appraisal theorists (Bagozzi et al., 1999; Choi and Choi, 2019; Lazarus, 1991). Goal congruence is based on the desire of a particular situation to a person, whereas goal relevance refers to how important a particular situation is to a person (Nyer, 1997). Based on this approach to appraisal dimensions, this study employs fitness YouTube channel attributes and fitness YouTuber attributes as YouTube channel subscribers use the digital channel and communicator for their health and workout that are important to and desired by them.

In the marketing literature, the cognitive appraisal theory has been used to capture subtle nuances of consumers' emotions and predict their actual behaviors from their positive or negative emotional states (Bagozzi et al., 1999; Watson and Spence, 2007). In particular, the emotional status has been studied to influence consumers' goal-driven behaviors (i.e., continuous exercise through the fitness YouTube channel in this study) as well as information processing before making a consumption-related decision (Johnson and Stewart, 2005; Roseman, 1991). This study is based on the fundamental notion of the cognitive appraisal theory, proposing that consumers elicit positive or negative emotions (i.e., flow and satisfaction in this study) from the cognitive evaluations of all aspects of the digital attributes on a fitness YouTube channel.

2.2. YouTube channel attributes

A YouTube channel serves as an online community that consists of a YouTuber and subscribers with a common interest. According to the information and communication technologies adoption and use (ICTAU) focusing on virtual communities and social media platforms, there are three key aspects of technology service: social interaction, information quality, and visual and textual content (Munar and Jacobsen, 2014; Yang et al., 2005). The key aspects of the ICTAU are based on members' motivations to become a particular virtual community, which means acquiring and sharing the knowledge they want and need and interacting with others who have a common interest. More specifically, members tend to decide to become a particular virtual community for its knowledge-related aspects (i.e., acquiring and sharing information and visual/textual content) and communication standpoints (i.e., social interaction with others having the same interest). Hence, members' decisions to become a virtual community or to subscribe to a YouTube channel (to become the YouTube channel's member) are associated with their cognitive evaluation of possible influences of its information/content/other members on their experiences with the virtual community (Bayer et al., 2016; Munar and Jacobsen, 2014; Yang et al., 2005). Because there is little empirical research that identifies YouTube channel attributes, this study conceptually proposes three dimensions of YouTube channel attributes, emphasizing its visual rather than its textual content, based on the extant literature on online community and social media (Adjei et al., 2010; Elliot et al., 2013; Kim and Kim, 2017; Kim et al., 2008):

(1) *Social interaction* – YouTube users who subscribe to a particular YouTube channel tend to recognize and relate to other subscribers according to their common interest in a particular topic, such as health, games, or cars. In other words, YouTube users tend to subscribe to a YouTube channel depending on the channel's functional objective and/or their personal preference for a channel that enhances their levels of engagement with the channel and its members (i.e., attempting to stay connected with others with shared interests) (Kietzmann et al., 2011). The high level of social interaction between subscribers through social media's engagement tools (e.g., comments and like or dislike buttons) leads subscribers to visit the YouTube channel and enjoy its digital content regularly and more frequently, because of a psychologically perceived connection to the YouTube channel and its members (Kim et al., 2008). Hence, the conversation function among YouTube channel subscribers helps to build their self-esteem and to find and meet new, like-minded virtual friends (Kietzmann et al., 2011). In addition, when interacting with other subscribers, a YouTube channel's subscribers are more likely to feel a bond attachment to the YouTube channel and its members, and share ideas, opinions, and values with them (Fiedler and Sarstedt, 2014). This is because social interactions among YouTube users tend to be aggregated and combined to become useful and rich regarding the same subject or topic on the YouTube channel, making users interact more with each other (Kietzmann et al., 2011). Additionally, a higher level of virtual interactions among users via social media platforms frequently influences the video content of a YouTuber's channel by creating a stronger voice and serving as a visible indicator by showing users' positive and negative evaluations of that YouTuber's content (Kaplan and Haenlein, 2010; Sokolova and Perez, 2021).

(2) *Information quality* – YouTube users tend to subscribe to a particular YouTube channel because they want to collect the interest-related information from the channel, and they trust the information more than that from other sources (Brown et al., 2002). This is because subscribers perceive the information offered by the YouTube channel as being accurate, complete, and updated (Elliot et al., 2013). In particular, YouTube users with a specific interest that requires high levels of knowledge, such as health and other professional fields, are more likely to regard information quality to learn about content from the YouTube channel. Thus, YouTube users may be able to maximize their psychologically perceived benefits by getting a high quality of information from the fitness YouTube channel.

(3) *Visual content* – Compared to other social media platforms, YouTube channels provide subscribers with visual content of a particular topic and its characteristics, and users can easily respond to the visual content and share it with others (Friesen,

2004). Visual content in this study refers to a wide range of videos, created and uploaded by YouTubers on their YouTube channels, that are aimed to deliver information to YouTube users as a visualized communication channel (John and De'Villiers, 2020). Hence, all types of movies, videos, and photos can be used as visual communication elements by YouTube users who search for information from visual content (John and De'Villiers, 2020). Hence, on YouTube, subscribers can quickly find and select video clips gratifying their desires (Kim and Kim, 2017). Fitness YouTube channel subscribers may have particular motives for their YouTube channel selection and visual content consumption, including workout videos, health information videos, and even YouTubers' vlogs. When perceiving that visual content generated not by a firm but by a YouTuber is credible and trustworthy, YouTube users tend to be influenced by the visual content for future (behavioral) plans and consumption of digital products (John and De'Villiers, 2020). Thus, YouTube users subscribe to a fitness YouTube channel to acquire visual content about workouts, fitness, and health that is accurate, relevant, understandable, timely, and complete for their self-health management at home or on behalf of a personal trainer at a physical gym (Basch et al., 2018; John and De'Villiers, 2020). Based on that notion, this study conceptually identifies three dimensions of fitness YouTube channel attributes: social interaction, information quality, and visual content.

2.3. YouTuber attributes

This study conceptually identifies three characteristics of a fitness YouTuber based on the fundamental notion of a spokesperson's persuasion (Sokolova and Kefi, 2020). More specifically, according to the persuasion theory (Petty and Cacioppo, 1986), consumers tend to rely more on a spokesperson's peripheral cues than on the arguments' credibility in the persuasion process (Crijns et al., 2017). Within the context of video-based social media platforms such as YouTube, the visual content and the spokesperson who delivers the content are particularly easier to absorb than the textual content, and their peripheral characteristics tend to be easily adapted to YouTube users (Sokolova and Kefi, 2020). Hence, the physical and social attractiveness of a spokesperson can serve as an argument-supportive factor for users in the YouTube context (Crijns et al., 2017). The physical attractiveness of a fitness YouTuber can be particularly considered as another credible argument factor for this particular context. Additionally, the persuasion theory assumes that a socially and physically attractive speaker leads the audience to become identified with the speaker (Crijns et al., 2017; Kelman, 1958). This is because the audience would love to become similar to the socially and physically attractive spokesperson by creating positive relationships with the speaker (e.g., subscribing to a fitness YouTuber's channel in this study) (Aubrey et al., 2020). Within the health- and fitness-related context, YouTube users tend to subscribe to a physically and socially attractive fitness YouTuber's channel in order to look like them by following their lifestyle, workouts, and even personalities (Sokolova and Kefi, 2020; Sokolova and Perez, 2021). When YouTube users believe their perceived similarity to the fitness YouTuber is related to the content, the perceived similarity particularly serves as a persuasion-facilitating factor, leading the users to trust the fitness YouTuber as a solution for losing their weight and having a physically and socially attractive body type (Aubrey et al., 2020; Sokolova and Perez, 2021). Based on the above notion, this study proposes three aspects of fitness YouTuber attributes:

(1) *Social attractiveness* – In the digital media context, social attractiveness is based on the social likability of a communicator (Liu et al., 2019). In other words, social attractiveness refers to the audience's perceptions of how the communicator is liked and respected by others (Lee and Watkins, 2016). This type of person with high levels of social attractiveness could be a famous athlete, celebrity, or even a vlogger with a high volume of followers (Liu et al., 2019). The perceptions of a communicator's social attractiveness by an audience tend to be formed by social, intellectual, and integral aspects (Lee and Watkins, 2016).

(2) *Physical attractiveness* – According to the attractive halo effect, physically attractive communicators tend to be perceived as more positive persons than less physically attractive ones (Lorenzo et al., 2010). The virtual environment, such as a YouTube channel, is also involved in giving (i.e., from communicators, such as a YouTuber) and receiving (i.e., to audience, such as YouTube users), which leads to perceptions of attractiveness of the communicators (Write, 2012). Because YouTube is based on a video-oriented platform, it is more likely to increase users' perceptions of physical attractiveness of a YouTuber. Hence, the digital content of a YouTuber with a high level of physical attractiveness (e.g., video, comment, and post) positively influences the perceptions of the content's credibility among subscribers (Tong et al., 2008).

(3) *Attitude homophily* – In this study, attitude homophily is related to the perceived similarity of subscribers to a fitness YouTuber (Sokolova and Kefi, 2020). More specifically, the perception of similarity to a YouTuber can be formed by similar education, beliefs, and social status that are perceived by subscribers (Prisbell and Andersen, 1980). Although subscribers do not have direct physical interactions with the YouTuber, they tend to view the YouTuber as a social figure who matches their self-image, beliefs, and attitudes according to the social identity theory (Sukhdial et al., 2002). In the virtual environment, particularly, attitude homophily can reduce the YouTuber's ambiguity by making subscribers' communication with the YouTuber easier (Ladhari et al., 2020). Therefore, if subscribers perceive the fitness YouTuber as an expert and have repeated interactions with the YouTuber, they are more likely to develop perceived similarity with the YouTuber (Brown and Basil, 2010). Also, when a YouTuber delivers health- and/or fitness-related information to subscribers, attitude homophily leads subscribers to increase credibility perceptions of the information and to perceive the information as persuasive (Ladhari et al., 2020).

2.4. Outcomes of YouTube channel attributes and YouTuber attributes

(1) *Flow* – Csikszentmihalyi (1975) introduced the concept of flow to explain how individuals feel high fulfilment and enjoyment from activities, such as sport games, musical performances, and learning. According to the flow theory (Csikszentmihalyi, 1975), individuals experiencing flow states tend to be intense and focused on what they are doing (i.e., an activity). Also, the individuals are more likely to feel a sense of control over their behaviors and experience a loss of self-consciousness. Furthermore, while feeling in a flow state, the individuals have a distortion of time and place by perceiving the activity as intrinsically rewarding (Buil et al., 2018). Thus, an individual's flow state refers to a combination of self-control, enjoyment, time and place distortion, loss of self-consciousness, focused concentration, interest, engagement, and immersion (Hamari et al., 2016; Moon et al., 2014; Tsai et al., 2016). More recently, the elements of flow state are categorized as enjoyment, absorption, and intrinsic motivation based on the fundamental concept of flow initially proposed by Csikszentmihalyi (Buil et al., 2018). First, enjoyment refers to how individuals assess a particular activity's quality. Second, absorption is based on how individuals concentrate and immerse themselves in the activity by forgetting everything else around them. Third, intrinsic motivation refers to how individuals want the activity to make them feel satisfied and pleased in undertaking the activity. This study proposes that the

elements of a flow state can be also applied to physical activity settings through digital content because YouTube subscribers' flow state during a workout via a fitness YouTube channel is positively associated with their workout skills, the task challenge, goal clarity (e.g., for health), and real-time feedback provided by the YouTuber through live streaming (Bakker, 2005).

(2) *Satisfaction* – According to the expectancy-disconfirmation paradigm, customers either feel pleased or disappointed when perceiving that a product or service performance does or does not conform to their prior expectations (Teeroovengadum, 2020). In the digital service context, customers' emotional states tend to serve as a determinant of formulating satisfaction due to intangibility and dependence on environmental cues for assessing digital content performance. Hence, in this study, satisfaction refers to YouTube subscribers' overall emotional status following their cumulative experiences with digital content on the fitness YouTube channels. Interestingly, they tend to feel satisfied with the digital product or service at the end of the consumption procedure rather than in the middle of the consumption process (Oliver, 2000). Therefore, this study considers satisfaction with the fitness YouTube channel instead of the fitness YouTuber who is exercising with subscribers.

(3) *Behavioral intention* – Consumers' behavioral intention in the context of virtual environments has been studied as a core determinant of loyalty toward the virtual environment, such as a virtual community (Lin, 2006). This is because the behavioral intention construct results in users' actual actions that contribute to the virtual environment, including active participation (Lin, 2006) and continuous consumption of its digital content in their daily life (Kim, 2021). Hence, behavioral intention tends to be expressed as consumers' higher levels of commitment to a virtual environment via favorable behavioral intentions, such as a willingness to pay more and positive word-of-mouth (Kim, 2021). Based on that notion, behavioral intention in this study refers to the biased behaviors of fitness YouTube subscribers as a pattern of continuous workout through the fitness YouTube channel, positive word-of-mouth, and recommendation of workouts via the channel (Cossío-Silva et al., 2016). By exercising with the fitness YouTube channel, subscribers are more likely to be involved in positive word-of-mouth and recommendations, and then build a true commitment to the YouTube channel through continuous workouts with it (Cossío-Silva et al., 2016; Rauyruen and Miller, 2007). This study considers behavioral intention as a result of the interplay between behaviors (positive word-of-mouth and recommendations) and commitment (continuous workouts via the fitness YouTube channel). These combined aspects of the behavioral intention construct provide YouTubers and their YouTube channels, who face constant competition on YouTube, with competitive advantages (Kim, 2021).

2.5. Research hypotheses development

This study is based on the cognitive appraisal theory, assuming the fitness YouTube channel subscribers' emotional states of flow experience and satisfaction are influenced by their evaluations and

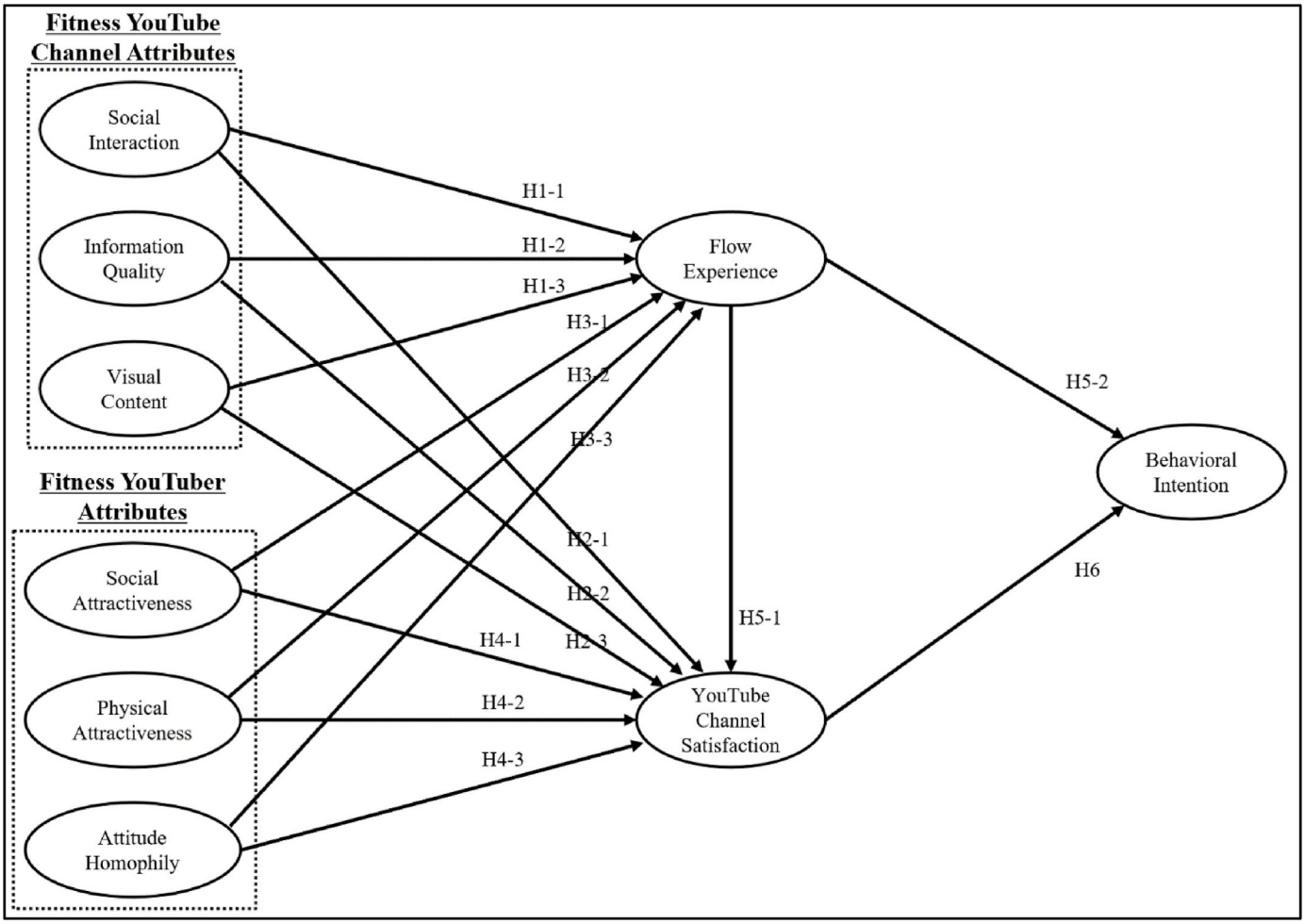

Fig. 1. A research model.

interpretations of the digital channel attributes and YouTuber attributes (Lazarus, 1991). In other words, the cognitive appraisal of the digital environment results in subscribers' emotional states during a workout via a fitness YouTube channel (i.e., flow experience) and after a workout (i.e., YouTube channel satisfaction). Following the fundamental notion of the cognitive appraisal theory, this study expands the theory by considering both the YouTube channels' attributes of social interaction, information quality, and visual content, and the YouTubers' attributes of social attractiveness, physical attractiveness, and attitude homophily, as evaluation criteria among fitness YouTube channel subscribers (see Fig. 1).

First, social interaction between in-group members leads them to build collaborative relationships and conform to group norms established by the community and its members (Kim and Kim, 2017). Hence, social interaction on fitness YouTube channels leads subscribers to encourage others to work out together to conform to the internally established group norm by building strong friendships with other users (Ozkara et al., 2017). This social interaction may cause fitness YouTube channel subscribers to be more engaged in exercise via the channel. Second, when subscribers perceive that fitness YouTube channels provide a high quality of information about workouts, fitness, and health, they are more likely to believe that the information is accurate and complete for their workout, leading them to concentrate more on working out via the channel (Elliot et al., 2013). Third, if fitness YouTube channels provide useful and interesting visual content for their subscribers, the subscribers may spontaneously use it for their workout (Kim and Kim, 2017; Ozkara et al., 2017). Compared to other social media platforms, YouTube is based on video content, offering fascinating information and visual content to users. Thus, fitness YouTube channels' visual content also makes users feel flow experience during workouts via the channel. Based on that notion, this study formulates the following research hypotheses:

H1. Fitness YouTube channel attributes are positively associated with flow experience.

H1-1. Social interaction is positively associated with flow experience.

H1-2. Information quality is positively associated with flow experience.

H1-3. Visual content is positively associated with flow experience.

Members with a high level of social interaction within an online community are more likely to be satisfied with the community (i.e., a fitness YouTube channel in this study) because it provides the members with an emotional connection to others, a sense of membership, and influence to others as well as the community (Kim et al., 2020). The social media platform that supports users' social interaction leads them to form and maintain a positive attitude toward the particular online community (i.e., YouTube channel satisfaction in this study) (Chang et al., 2016; Kim et al., 2020). Also, YouTube channel satisfaction can be formed by getting a high quality of information and visual content regarding workouts and fitness from the channel (Kim and Thapa, 2018). Initially, YouTube users subscribe to a fitness YouTube channel to gain valuable information they need and want from the channel. When fitness YouTube channel subscribers perceive that the channel adds more value for subscribers, such as a high quality of information and visual content, they are satisfied with the channel based on the perceived evaluation (Hume and Mort, 2010). Hence, the following hypotheses are proposed:

H2. Fitness YouTube channel attributes are positively associated with YouTube channel satisfaction.

H2-1. Social interaction is positively associated with YouTube channel satisfaction.

H2-2. Information quality is positively associated with YouTube channel satisfaction.

H2-3. Visual content is positively associated with YouTube channel satisfaction.

Social psychological research proposes the importance of the attractiveness of individuals by considering a pervasive physical attractiveness stereotype (Sakib et al., 2020). More specifically, compared to less physically and socially attractive ones, individuals with high levels of physical and social attractiveness tend to be perceived by others as kinder, warmer, more intelligent, and more sensitive (Langlois et al., 2000). Based on that notion, prior research considers individuals' attractiveness as a direct source of others' evaluation of the individuals' credibility or competence (Grönroos, 2000). Hence, in the information delivery setting, the attractiveness of a spokesperson positively or negatively influences the persuasiveness of information, depending on desirable attributes (Sakib et al., 2020). For example, the study of Regan (2011) revealed that a spokesperson's attractiveness plays a critical role in eliciting certain types of emotions, perceptions, attitudes, and even behaviors as a powerful cue in the media setting. In addition, attitude homophily influences the effectiveness of the message exchange process (from spokesperson to audience) (Lee and Watkins, 2016). More specifically, a high level of attitude homophily leads an audience to decode the message's common meaning more carefully and listen to the message more attentively, which makes the influence of the message on the audience stronger (Gotlieb and Sarel, 1992; Rogers et al., 2001). Therefore, fitness YouTube channel subscribers with a high level of attitude homophily with the YouTuber are more likely to get engaged in the YouTuber's workout and health- and fitness-related information, leading them to feel a flow state during a workout:

H3. Fitness YouTuber attributes are positively associated with flow experience.

H3-1. Social attractiveness is positively associated with flow experience.

H3-2. Physical attractiveness is positively associated with flow experience.

H3-3. Attitude homophily is positively associated with flow experience.

Also, satisfaction with a fitness YouTube channel can be influenced by its YouTuber attributes. For example, based on the attractive halo effect (De Veirman, Hudders and Nelson, 2019), a digital endorser with high levels of social and physical attractiveness may be perceived as more believable, credible, honest, persuasive, and knowledgeable by increasing the effectiveness of information that the endorser's company wants to provide to customers (Flanagin and Metzger, 2007). Consequently, customers are more likely to be satisfied with the endorser and the company simultaneously (Flanagin and Metzger, 2007). Also, in addition to likeability (i.e., attractiveness), perceived familiarity and similarity (i.e., attitude homophily) serve as significant sources of building customer satisfaction (De Veirman et al., 2019). For example, attitude homophily contributes to customers' identification with the spokesperson (i.e., a fitness YouTuber in this study), which in turn leads customers to adopt their emotions, perceptions, attitudes, and behaviors toward the spokesperson's product and company (i.e., a fitness YouTube channel in this study) (Basil, 1996). Therefore, this study assumes that as the YouTube channel subscribers pair themselves with a fitness YouTuber, their positive emotion toward the YouTuber may be transferred to the YouTube channel that includes the YouTuber:

H4. Fitness YouTuber attributes are positively associated with YouTube channel satisfaction.

H4-1. Social attractiveness is positively associated with YouTube channel satisfaction.

H4-2. Physical attractiveness is positively associated with YouTube channel satisfaction.

H4-3. Attitude homophily is positively associated with YouTube

channel satisfaction.

A positive customer experience during and after the decision-making process serves as a component for formulating satisfaction with the product or service because satisfaction refers to the accumulated transaction relationships between a customer and a product or service (Kim and Ko, 2019; Kim and Thapa, 2018). The relationships can provide customers with increased satisfaction by transforming the product or service into positive experience delivery (i.e., flow experience in this study) (Chang and Zhu, 2012). Hence, customers' positive emotional experiences, such as flow, can have an influence on their levels of satisfaction with the characteristics of an environment including the virtual setting (Kim and Ko, 2019). Consistent with prior research (Chang and Zhu, 2012; Kim and Ko, 2019; Xin Ding et al., 2010), this study hypothesizes that a flow experience is a predictor of YouTube channel satisfaction:

H5-1. Flow experience is positively associated with YouTube channel satisfaction.

Customers' perceived pleasure and enjoyment while using a product or service affects their intention to continuous use and favorable attitude toward it (Kim and Thapa, 2018). As an optimum emotional state of an experience, customers' flow state enhances their level of loyalty toward a product or service that offers a positive experience (Kim and Ko, 2019). This is because the product or service leads customers to have challenges, enjoyment, concentration, and control while using the product or service, influencing their repurchase and positive word-of-mouth intention (Zhou et al., 2010). In addition, participation in digital content consumption provides a flow experience to users via enjoyment that contributes to their loyalty toward the digital environment, such as fitness YouTube channels (Zhou et al., 2010). Based on that notion, this study formulates the following hypothesis:

H5-2. Flow experience is positively associated with behavioral intention.

The positive relationship between satisfaction and loyalty has been well-documented in the extant marketing literature. More specifically, prior research revealed that high satisfaction leads to high loyalty among existing customers (Al-dweeri et al., 2017; Oliver, 1999). For example, customers with a higher level of satisfaction with a product or service are more likely to repurchase and recommend the product or service to others than those with a low level of satisfaction (Limbu et al., 2011). Hence, because customers are satisfied with a product or service that meets their prior expectations, fitness YouTube channel subscribers are also likely to build loyalty toward the channel, meeting their prior expectations of online workout and fitness- and health-related information (Al-dweeri et al., 2017). Thus, this study proposes the following hypothesis:

H6. YouTube channel satisfaction is positively associated with behavioral intention.

According to Guba and Lincoln's work (1994), this study's approaches are considered from the perspectives of its epistemological and ontological backgrounds. First, epistemology refers to the nature of knowledge, meaning that a hypothesis is verified and established as a fact or law when an empirical finding is significant. Hence, this study establishes the previously stated research hypotheses based on the extant literature's empirical and theoretical insights and prior research in the context of the social sciences (i.e., consumer behavior in this study particularly). This study then designs a survey and performs data analyses to verify whether each research hypothesis can be true according to empirical findings. Second, ontology refers to the nature of reality, meaning that there is a reality that scholars can apprehend (i.e., determining what is there). Ontology is also based on the notion that reality tends to be virtually shaped by economic, cultural, social, and political situations (Allison and Pomeroy, 2000). Thus, the assumption of the current research is that reality exists to be discovered on the YouTube platform. In other words, as indicated in the introduction section, the COVID-19 era has influenced society by making consumers work out at home via technology (i.e., YouTube fitness channels in this study particularly) rather than at a gym via a personal trainer (Kim, 2021). The perspectives of this study's epistemological and ontological backgrounds indicate that it is unified in its approaches and methodologies to discover and verify each research hypothesis to be true.

In particular, this study employs a survey approach and will propose empirical findings based on data to deeply understand and comprehensively explain consumer behavior in the digital world along with the COVID-19 pandemic (i.e., the current social situation). From an epistemological perspective, the description of the significant associations between variables in this study enables us to introduce a new empirical goal of securing foundations for knowledge by achieving another epistemological goal in the social science fields (Rogers, 2015). Also, from a perspective of ontological implications, the empirical findings of this study will make social phenomena observable from the perceived aspects of the digital world under the era of COVID-19. In other words, although the social phenomena in the digital world are unobserved, the empirical findings of this study enable us to create the realm of the actual. They will bring ontological depth to scholars in the social science fields (Guba and Lincoln, 1994; Rogers, 2015).

3. Method

3.1. Data collection

The unit of analysis in this study was YouTube users in the United States who follow a fitness YouTube channel and work out primarily via the channel at home rather than going to a physical fitness center. This study conducted three waves of data collection to increase generalizability and avoid any sample selection bias. From the triangulation perspective on generalizability, more specifically, when using multiple data from different approaches or using multiple data collection methods, researchers can merge evidence via systematic approaches to collecting data with depth and detail, enabling the reaching of a consensus about empirical findings in the data (Forman et al., 2008). From the reflexivity standpoint, generalizability can be greatly enhanced via frequent data collection based on multiple approaches and analyses in one study. This study regularly conducted data collection waves and analyzed data to reveal clear evidence in the data (Forman et al., 2008). Furthermore, survey-based research relies heavily on a cross-sectional study design through one-time data collection; thus, it has generally been criticized by other scholars of consumer behavior (Davis et al., 2011). More specifically, a cross-sectional study design (or one-time data collection) may be unable to reflect complex and dynamic aspects of a current market due to the fact that one-time data collection embraces its limited aspects only when the data is collected (Davis et al., 2011; Stewart, 2009). Scholars in consumer behavior who conduct multiple waves of data collection from target population may be able to produce more robust empirical results and reduce potential sampling biases, reflecting a current market's complex and dynamic situations (Davis et al., 2011; Stewart, 2009). Each data collection wave was conducted time periodically. A snowball sampling approach was employed for the first wave of data collection from representative samples because the target population's characteristics were rare, such as consumers who were exercising at home primarily via a YouTube fitness channel instead of at a gym via a personal trainer during the COVID-19 era. Additionally, prior research in the context of physical activity argued that snowball sampling enables scholars to collect data from a population with similar demographic and health-related characteristics, leading participants to respond to the questionnaire more correctly within the comfortable environment, just like the neighborhood survey (Perez et al., 2013). During the month of August 2020, the author randomly reached out to 10 individuals from local religious community members who exercise with fitness YouTubers at least three times a week at home (i.e., 50% male, 50% self-employed and 50%

student, average age = 29.5 years) and asked them to share the survey link with others who work out via fitness YouTube channels. By following the procedure of snowball sampling, the author asked 10 individuals to recruit other similar neighborhood members who met the sample selection criteria (i.e., [1] workouts primarily via any YouTube fitness channels at home at least three times a week; and [2] not going to a gym for workouts during the COVID-19 era), which could increase others' willingness to accept a survey participation request (Perez et al., 2013). The first data collection wave was completed on August 31, 2020. For the second wave of data collection, during the month of September 2020, the author posted the survey link along with the invitation description in the comment sections on YouTube channels that were randomly selected by an online random selection tool. The second wave of data collection was completed on September 30, 2020. For the third wave of data collection, during the last week of September 2020, the author hired an online survey company in the United States to collect data from its appropriate online panels among members in the database via two filter questions that required indicating whether they were following any fitness YouTube channels and exercising with fitness YouTubers at home more than three times a week (i.e., they must answer "yes" for two questions to move to the survey questions). The third data collection wave was also completed on September 30, 2020. The first page of the questionnaire for all data collection waves had two open-ended questions to arouse each participants' perceptions of a fitness YouTube channel and its YouTuber: (1) "What is the first characteristic that comes to mind when thinking of the fitness YouTube channel you are subscribing to?"; and (2) "What is the first characteristic that comes to mind when thinking of the fitness YouTuber you are exercising with?" All participants of the three data collection waves had to answer those questions in order to move forward to the second page of the questionnaire that comprised all measures in this study. Before the dataset was finalized, each answer in all data collection waves was carefully analyzed by the author to check whether the characteristics were appropriate. During this sample purification procedure (i.e., the author carefully reviewed the two open-ended questions by checking whether the characteristics of the YouTube fitness channel and the fitness YouTuber were appropriately described for this study [e.g., appropriate: inspiring, caring, well-organized, hard work vs. inappropriate: none, not at all, color, thank you]), 22 samples were removed due to inappropriateness. Consequently, 379 samples were used for multivariate analyses to test the research hypotheses (i.e., first wave = 42.6% [N = 161], second wave = 30.4% [N = 115], third wave = 27.0% [N = 102]), such as reliability analysis, confirmatory factor analysis, and structural equation modeling (SEM). However, since the number of participants from each data collection wave was different, the author first randomly selected 20 of the participants collected during the first data collection wave, 20 of the participants collected during the second data collection wave, and 20 of the participants collected during the third data collection wave, equally, via an online random pick tool (Kim, 2021). The author next moved on to the multivariate analyses stages to empirically verify the sample selection and process bias and, finally, checked whether the quality of responses from the three sampling approaches was significantly different (Goodman and Blum, 1996; Kim, 2021). To do so, the author performed a one-way analysis of variance (ANOVA) for the three groups. The empirical finding did not reveal any significant differences in the mean values of all dependent variables (i.e., social interaction, information quality, visual content, social attractiveness, physical attractiveness, attitude homophily, flow experience, YouTube channel satisfaction, and behavioral intention) among three groups (the first wave vs. the second wave vs. the third wave). Hence, it was concluded that there was no serious sampling bias due to this study's sample selection and data collection process. The demographic characteristics of the study participants are indicated in Table 1.

Table 1
Demographic analysis of respondents.

Variables (N = 378)	Characteristics	Frequency (%)
Gender	Male	222 (58.7%)
	Female	156 (41.3%)
Age	18–29	110 (29.2%)
	30–39	113 (29.8%)
	40–49	117 (30.9%)
	50 or above	38 (10.1%)
Education	High school	111 (29.4%)
	2-year or 4-year college	257 (68.0%)
	Graduate school	10 (2.6%)
Number of hours per workout	Less than 1 h	45 (11.9%)
	Between 1 h and 2 h	273 (72.2%)
	More than 2 h	60 (15.9%)
Occupation	Self-employed	207 (54.8%)
	Employed	75 (19.8%)
	Student	96 (25.4%)
Number of participants in each wave of data collection	First wave	161 (42.6%)
	Second wave	115 (30.4%)
	Third wave	102 (27.0%)

3.2. Measures

The author adapted multiple items from prior research in the social media and physical activity contexts and then revised them for this study's particular context, a workout via a fitness YouTube channel (or a fitness YouTuber). The criteria for item selection were rigorousness of the data analysis (i.e., high levels of reliability and validity) in previous studies and appropriate conceptualization of each variable in the research context, such as social media (i.e., conceptual rigorousness). Before finalizing the questionnaire and proceeding with data collection, the revised items were reviewed by two professionals in this field, and a pilot study was conducted with 30 undergraduate students (43% female, average age = 20.8 years) enrolled in marketing courses at a United States public university who were subscribing to a fitness YouTube channel and exercising with a fitness YouTuber at least three times a week. The samples for the pilot study were not included in the main studies as they were only used to check the content and flow of the finalized questionnaire. To avoid common method bias, lastly, the author included the statement, "There are no right or wrong answers, and please answer the questions as honestly as possible," in the cover letter of the questionnaire to protect participants' evaluation apprehension as well as anonymity that may create common method bias (Kim and Kim, 2021; MacKenzie and Podsakoff, 2012). In addition, the author randomly ordered the survey items for one of the procedural remedies suggested by MacKenzie and Podsakoff (2012). Furthermore, the author attempted to make all items for measuring each construct simple, specific, and concise in order to reduce each participant's central tendency and leniency biases (Kim and Kim, 2021). These remedies also prevented participants from being less thorough in judgment, memory retrieval, and item comprehension due to the redundancy and similarity of the survey items (MacKenzie and Podsakoff, 2012).

All items were anchored by 1 = strongly disagree to 7 = strongly agree, except for flow experience (i.e., 1 = never to 7 = always) via a 7-point Likert scale. The fitness YouTube channel attributes construct was operationalized as three subdimensions of social interaction, information quality, and visual content, measured with 12 items from Kim and Kim (2017). The fitness YouTuber attributes construct was operationalized as three subdimensions of social attractiveness, physical attractiveness, and attitude homophily, measured with 13 items from Sokolova and Kefi (2020). The flow experience construct was measured

with 3 items from the study of Novak et al. (2000) along with the description.[1] The YouTube channel satisfaction construct was operationalized with 3 items from Kim and Thapa (2018). Lastly, the behavioral intention was measured with 3 items from the studies of Kim and Thapa (2018) and Sun et al. (2013) (i.e., fitness YouTube channel followers' favorable behavioral intention for the channel).

4. Results

4.1. Measurement model

First, the author tested the normality of the data by estimating all measures' skewness and kurtosis via SPSS 27.0 as recommended by Hair et al. (2019). If skewness and kurtosis of a measure are not lower than −1 or greater than +1, it means that the measure is not too skewed and not flat, confirming its normal distribution. Table 2 indicates that all measures' skewness and kurtosis in this study were greater than +1 or lower than −1, signifying the normality of all measures (Kim, 2021). Second, the author conducted a principal component analysis (PCA) with varimax rotation to identify the dimensionality and validity of the difference scales used in this study. PCA enables scholars to identify patterns via a dimensionality reduction approach without significant loss of information in data. Consequently, PCA simply explores data and provides scholars with information about the number of factors from the data by assuming all measured variables are associated with every latent variable (Rocchi et al., 2017). As expected, the result of an exploratory factor analysis (EFA) significantly identified 9 dimensions: (1) social interaction; (2) information quality; (3) visual content; (4) social attractiveness; (5) physical attractiveness; (6) attitude homophily; (7) flow experience; (8) YouTube channel satisfaction; and (9) behavioral intention (i.e., Kaiser-Meyer-Olkin Measure of Sampling Adequacy = 0.926; Bartlett's Test of Sphericity = 12,708.886, degree of freedom = 528, $p < 0.001$; 83.045% of the total variance) (see Table 2).

Next, following the two-step approach by Anderson and Gerbing (1992), the author examined the reliability and validity of all indicators for each construct in this research via two ways. First, with SPSS 27.0, reliability was assessed by Cronbach's alpha coefficients of each construct, which must be more than the recommended minimum value of 0.70 in the social science field (Hair et al., 2019). Table 2 indicates reliabilities of all constructs were confirmed (i.e., social interaction = 0.933; information quality = 0.944; visual content = 0.892; social attractiveness = 0.938; physical attractiveness = 0.933; attitude homophily = 0.909; flow experience = 0.832; YouTube channel satisfaction = 0.912; and behavioral intention = 0.863). After evaluating the reliability, the author tested the validity of all indicators through a confirmatory factor analysis (CFA), specifying meaning, number, pattern, and association of free parameters (Anderson and Gerbing, 1992). Compared to PCA, CFA can rigorously specify which measured variable (or indicator) is significantly associated with a precise latent variable as well as the number of domains which are required in the data. In addition, CFA can be used to reject or confirm the measurement theory or model before conducting SEM (Rocchi et al., 2017). One item for measuring the social interaction construct was removed during this analysis stage because its standardized factor-loading was lower than the acceptable level of convergent validity (i.e., <0.50) (Hair et al., 2019). Consequently, the fit indices of the measurement model in this study were acceptable within the social science area: $\chi^2 = 1849.194$, degree of freedom = 459, $p < 0.001$, Root Mean Square Error of Approximation (RMSEA) = 0.080, Normed Fit Index (NFI) = 0.958, Comparative Fit Index (CFI) = 0.908, and the Tucker-Lewis Index (TLI) = 0.937, and all constructs' standardized factor loadings and composite construct reliability (CCR) exceeded 0.70 ($p < 0.01$) (Fornell and Larcker, 1981; Hair et al., 2019) (see Tables 2 and 3). The result of the CFA and the values of CCR signified the convergent validity of all constructs.

The author performed a correlation analysis and calculated the proportion of average variance extracted (AVE) for each construct to compare the squared correlation coefficients with the AVE values for testing discriminant validity (Fornell and Larcker, 1981). As indicated in Table 3, all constructs' discriminant validity was confirmed by showing that the respective squared correlations were smaller than the AVE values of each construct (e.g., social interaction [AVE = 0.782]: $0.137 \leq \Phi^2 \leq 0.472$; information quality [AVE = 0.810]: $0.174 \leq \Phi^2 \leq 0.566$; YouTube channel satisfaction [AVE = 0.624]: $0.162 \leq \Phi^2 \leq 0.517$).

The author checked whether the procedural remedy worked to avoid common method bias by employing Harman's one-factor test, a statistical remedy (Podsakoff et al., 2012). If the χ^2 and degree of freedom of the multiple-factors model (or the measurement model) are worse than those of the single-factor model, it can be concluded that the procedural remedy does not work and common method bias may be a serious threat in a study. In this study, the measurement model had 1849.194 (χ^2) and 459 (degree of freedom), whereas the single-factor model had 6490.604 (χ^2) and 496 (degree of freedom). Thus, it was confirmed that common method bias was successfully controlled in this research.

4.2. Testing of the hypothesized structural model

With AMOS 27.0, the author conducted SEM to investigate the hypothesized relationships rigorously and empirically among the constructs in this study. The author used covariance-based SEM (CB-SEM) because all variables were measured with reflective scales, and the research model comprised common factors along with effect indicators (e.g., when all variables are measured with formative scales and the research model consists of composite indicators, partial least squares SEM [PLS-SEM] should be used) (Sarstedt et al., 2016). Maximum likelihood estimates (MLE) for each parameter of the hypothesized paths in the research model are illustrated in Fig. 2 and indicated in Table 4. Compared to other estimation techniques, MLE provides scholars with more stable, valid, and unbiased empirical results when the number of samples for SEM is between 100 and 400 (Hair et al., 2019; Kim, 2021). For example, MLE-based CB-SEM enables scholars to correctly specify their research model, leading to better recovery of each parameter than PLS-SEM (Rigdon et al., 2017). The fit indices of the research model were estimated: $\chi^2 = 1898.178$, degree of freedom = 465, $p < 0.001$, RMSEA = 0.080, NFI = 0.955, CFI = 0.968, and TLI = 0.917 (i.e., when the number of samples is more than 250 [$N = 378$ in this study] and the number of observed variables is more than 30 [$m = 33$ in this study], the recommended value of RMSEA should be 0.08 or less with CFI above 0.92) (Hair et al., 2019).

H1 posited that users' perceptions of fitness YouTube channel attributes would make users feel flow states while working out via the fitness YouTube channel at home. The empirical findings revealed that flow experience was significantly affected by information quality (coefficient = 0.616, critical ratio = 9.012, $p < 0.01$) and visual content (coefficient = 0.183, critical ratio = 2.302, $p < 0.05$), supporting H1-2 and H1-3. H2 speculated that users' perceptions of fitness YouTube channel attributes would influence users' satisfaction with the YouTube channel. The empirical results indicated that YouTube channel satisfaction was

[1] "The word 'flow' is used to describe a state of mind sometimes experienced by people who are deeply involved in some activity. One example of flow is the case where a professional athlete is playing exceptionally well and achieves a state of mind where nothing else matters but the game, and the player is completely and totally immersed in it. The experience is not exclusive to athletics. Many people report this state of mind when playing games, engaging in hobbies or working. Activities that lead to flow completely captivate a person for some period of time. When one is in flow, time may seem to stand still, and nothing else seems to matter. Flow may not last for a long time on any particular occasion, but it may come and go over time. Flow has been described as an intrinsically enjoyable experience. Please think about your experience when exercising through the fitness YouTube channel."

Table 2
Measurement model from CFA.

Constructs	Items	Normal distribution		EFA	CFA	
		Skewness	Kurtosis	Factor Loading	Factor Loading	Critical Ratio
Social interaction (α = 0.933; Eigen value = 1.562; % of variance = 9.881) from Kim and Kim (2017)	In general, I actively interact with other members of this YouTube channel.	0.103	−0.724	0.788	0.874	Fixed
	In this YouTube channel, I share information about a particular subject with other members.	–	–	–	–	–
	In this YouTube channel, I share my skills and abilities with other members.	0.072	−0.353	0.743	0.883	24.228
	I can always count on getting many responses to my posts.	−0.179	−0.630	0.815	0.943	27.767
	I can always count on getting responses to my posts fairly quickly.	−0.248	−0.479	0.773	0.834	21.667
Information quality (α = 0.944; Eigen value = 15.639; % of variance = 19.426) from Kim and Kim (2017)	This YouTube channel provides complete information for workout and fitness.	−0.808	0.082	0.841	0.888	Fixed
	This YouTube channel provides useful information for workout and fitness.	−0.152	−0.086	0.862	0.907	26.870
	This YouTube channel provides timely information for workout and fitness.	−0.105	−0.607	0.811	0.928	28.364
	This YouTube channel provides accurate information for workout and fitness.	−0.317	−0.162	0.803	0.877	24.872
Visual content (α = 0.892; Eigen value = 0.750; % of variance = 5.437) from Kim and Kim (2017)	This YouTube channel seems to contain abundant visual content about what needs to be done.	0.013	−0.035	0.696	0.799	Fixed
	This YouTube channel appears to contain accurate visual content.	0.098	0.057	0.617	0.926	21.079
	This YouTube channel seems to demonstrate enough visual content that I need.	0.046	0.018	0.594	0.859	19.189
Social attractiveness (α = 0.938; Eigen value = 3.547; % of variance = 14.023) from Sokolova and Kefi (2020)	I think this YouTuber is respected by others.	−0.035	−0.394	0.795	0.830	Fixed
	I think this YouTuber receives approval from others.	−0.228	−0.383	0.844	0.886	21.895
	I think this YouTuber has lots of subscribers.	−0.318	−0.375	0.850	0.910	22.481
	I think this YouTuber well-liked by others.	−0.363	−0.124	0.838	0.869	21.194
	I think this YouTuber get support from others.	−0.192	−0.390	0.764	0.855	20.618
Physical attractiveness (α = 0.933; Eigen value = 1.346; % of variance = 9.102) from Sokolova and Kefi (2020)	I think this YouTuber is quite pretty (or handsome).	−0.033	−0.366	0.842	0.935	Fixed
	I think this YouTuber is good-looking.	−0.108	−0.375	0.824	0.939	32.593
	I find this YouTuber attractive physically.	−0.082	0.009	0.835	0.851	25.402
Attitude homophily (α = 0.909; Eigen value = 2.172; % of variance = 11.345) from Sokolova and Kefi (2020)	This YouTuber thinks like me.	0.097	0.034	0.698	0.770	Fixed
	This YouTuber shares my values.	−0.100	−0.101	0.735	0.760	15.523
	This YouTuber behaves like me.	−0.055	0.374	0.789	0.863	18.090
	This YouTuber is like me.	−0.449	0.378	0.743	0.856	18.125
	This YouTuber is similar to me.	−0.232	0.243	0.702	0.822	17.045
Flow experience (α = 0.832; Eigen value = 0.725; % of variance = 4.135) from Novak et al. (2000)	Do you think that you experienced flow during workout via this YouTube channel?	−0.024	−0.198	0.677	0.778	Fixed
	In general, how frequency would you say you have experienced flow when exercising via this YouTube channel?	−0.057	−0.237	0.691	0.768	15.325
	Most of the time when I exercise via this YouTube channel, I feel that I am in flow.	0.211	−0.108	0.667	0.822	16.562
YouTube channel satisfaction (α = 0.912; Eigen value = 0.615; % of variance = 2.058) Kim and Thapa (2018)	Overall satisfaction with this YouTube channel.	−0.072	0.348	0.690	0.791	Fixed
	Satisfaction with this YouTube channel when compared with my expectation.	0.183	−0.314	0.670	0.943	21.899
	Satisfaction with this YouTube channel when considering my invested time and effort.	0.023	−0.310	0.686	0.923	21.309
Behavioral intention (α = 0.863; Eigen value = 1.049; % of variance = 7.637) Kim and Thapa (2018) and Sun et al. (2013)	I will probably keep exercising via this YouTube channel in three months.	0.127	0.009	0.758	0.874	Fixed
	I will recommend this YouTube channel to others.	−0.165	−0.226	0.789	0.885	20.998
	I will encourage other people to exercise via this YouTube channel.	−0.371	−0.156	0.791	0.731	16.293

$\chi^2 = 1849.194$, degree of freedom = 459, $p < 0.001$, RMSEA = 0.080, NFI = 0.958, CFI = 0.908, TLI = 0.937.

significantly affected by social interaction (coefficient = 0.121, critical ratio = 2.437, $p < 0.05$), information quality (coefficient = 0.469, critical ratio = 5.879, $p < 0.01$), and visual content (coefficient = 0.264, critical ratio = 3.824, $p < 0.01$), supporting H2-1, H2-2, and H2-3. H3 predicted that users' perceptions of fitness YouTuber attributes would make users feel flow states while working out via the fitness YouTube channel at home. The empirical outcomes addressed that flow experience was significantly influenced by physical attractiveness (coefficient = 0.225, critical ratio = 4.404, $p < 0.01$), supporting H3-2 only. H4 assumed that users' perceptions of fitness YouTuber attributes would affect users' satisfaction with the YouTube channel. The empirical findings found that YouTube channel satisfaction was not significantly influenced by social attractiveness, physical attractiveness, and attitude homophily, not supporting H4-1, H4-2, and H4-3. H5 anticipated that users' flow experience while working out via the fitness YouTube channel at home would lead to high levels of YouTube channel satisfaction and behavioral intention to be loyal toward the YouTube channel. The empirical outcome revealed that flow experience had significant impacts on YouTube channel satisfaction (coefficient = 0.202, critical ratio = 2.277, $p < 0.05$) and behavioral intention (coefficient = 0.286, critical ratio = 3.048, $p < 0.01$), supporting H5-1 and H5-2. H6 speculated that users' satisfaction with the YouTube channel would influence their behavioral intention to be loyal toward the YouTube channel. The empirical finding indicated that YouTube channel satisfaction significantly influenced behavioral intention (coefficient = 0.407, critical ratio = 4.425, $p < 0.01$), supporting H6.

Table 3
Construct intercorrelations (Φ), mean, and standard deviation (SD).

Construct	1	2	3	4	5	6	7	8	9
1. Social interaction	1								
2. Information quality	0.469**	1							
3. Visual content	0.519**	0.713**	1						
4. Social attractiveness	0.687**	0.418**	0.466**	1					
5. Physical attractiveness	0.371**	0.452**	0.489**	0.491**	1				
6. Attitude homophily	0.410**	0.608**	0.689**	0.420**	0.566**	1			
7. Flow experience	0.411**	0.752**	0.654**	0.410**	0.521**	0.546**	1		
8. YouTube channel satisfaction	0.492**	0.715**	0.732**	0.403**	0.472**	0.575**	0.719**	1	
9. Behavioral intention	0.392**	0.521**	0.518**	0.375**	0.484**	0.570**	0.493**	0.580**	1
Mean	4.036	4.222	4.110	4.185	4.394	4.173	4.163	4.411	4.355
SD	1.415	1.103	1.099	1.246	1.210	1.017	1.111	1.989	1.122
CCR[a]	0.935	0.945	0.897	0.940	0.935	0.908	0.832	0.918	0.871
AVE[b]	0.782	0.810	0.745	0.758	0.827	0.665	0.624	0.789	0.694

$^{**}p < 0.01$.
$^{*}p < 0.05$.
[a] Composite construct reliability.
[b] Average variance extracted.

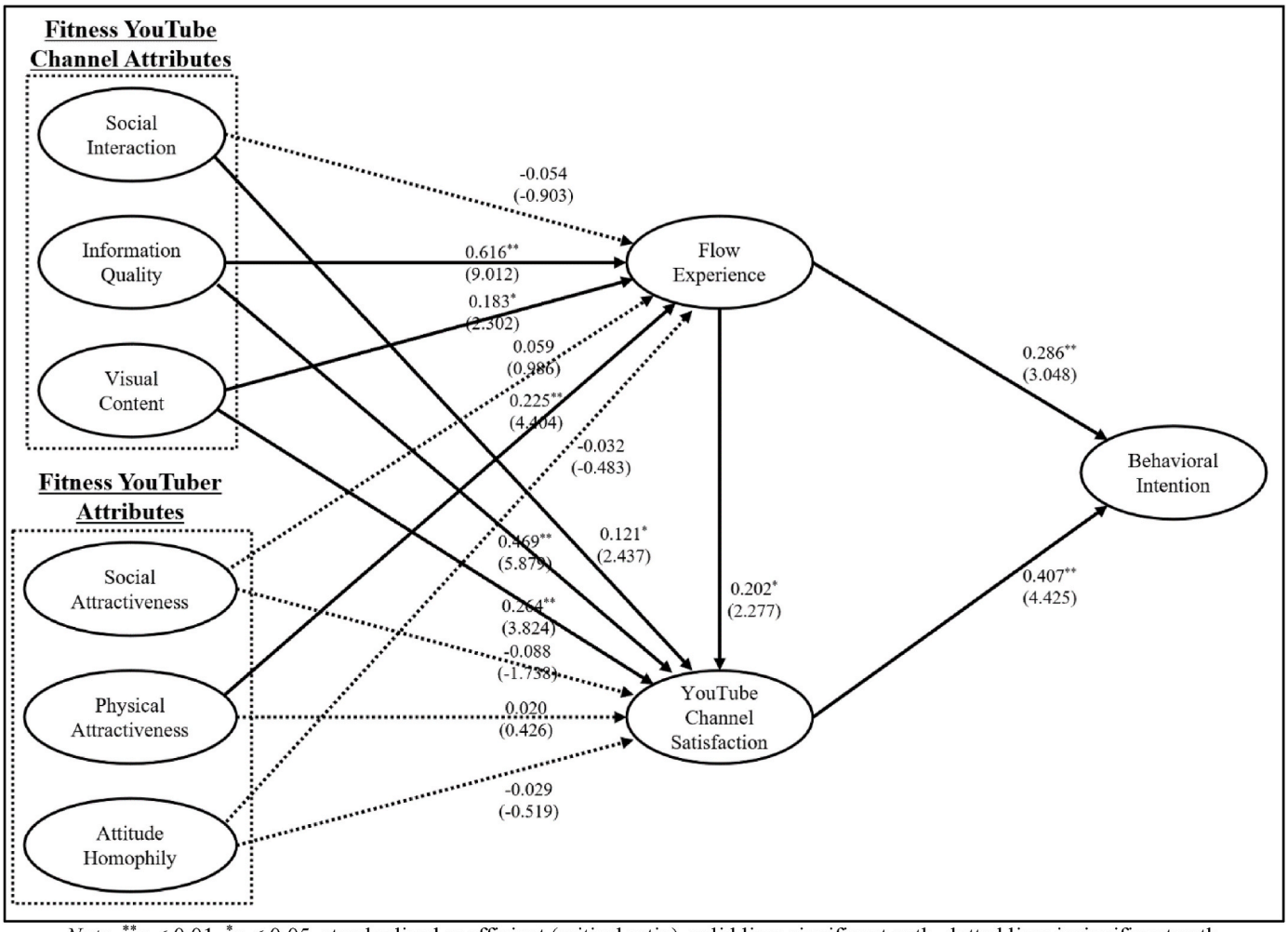

Fig. 2. Estimates of structural equation modeling
Note. $^{**}p < 0.01$, $^{*}p < 0.05$, standardized coefficient (critical ratio), solid line: significant path, dotted line: insignificant path.

5. Discussion and implications

5.1. Theoretical implications

This research focused on the roles of fitness YouTube channel attributes and fitness YouTuber attributes in formulating higher levels of flow experience and YouTube channel satisfaction among YouTube users, which consequently led them to exercise with and behave favorably toward the channel, such as with positive word-of-mouth and recommendations. To do so, this study aimed to conceptually and

Table 4
Standardized structural estimates.

Path		Standardized estimates	Standardized error	Critical ratio
H1-1	Social interaction → Flow experience	−0.054	0.041	−0.903
H1-2	Information quality → Flow experience	0.616	0.066	9.012**
H1-3	Visual content → Flow experience	0.183	0.078	2.302*
H2-1	Social interaction → YouTube channel satisfaction	0.121	0.032	2.437*
H2-2	Information quality → YouTube channel satisfaction	0.469	0.071	5.879**
H2-3	Visual content → YouTube channel satisfaction	0.264	0.063	3.824**
H3-1	Social attractiveness → Flow experience	0.059	0.052	0.968
H3-2	Physical attractiveness → Flow experience	0.225	0.041	4.404**
H3-3	Attitude homophily → Flow experience	−0.032	0.073	−0.483
H4-1	Social attractiveness → YouTube channel satisfaction	−0.088	0.040	−1.738
H4-2	Physical attractiveness → YouTube channel satisfaction	0.020	0.034	0.426
H4-3	Attitude homophily → YouTube channel satisfaction	−0.029	0.056	−0.519
H5-1	Flow experience → YouTube channel satisfaction	0.202	0.082	2.277*
H5-2	Flow experience → Behavioral intention	0.286	0.092	3.048**
H6	YouTube channel satisfaction → Behavioral intension	0.407	0.098	4.425**
Endogenous variables		Squared Multiple Correlations (R^2)		
	Flow experience	0.782 (78.2%)		
	YouTube channel satisfaction	0.788 (78.8%)		
	Behavioral intension	0.435 (43.5%)		

$\chi^2 = 1898.178$, degree of freedom = 465, $p < 0.001$, RMSEA = 0.080, NFI = 0.955, CFI = 0.968, TLI = 0.917.
**$p < 0.01$.
*$p < 0.05$.

empirically identify YouTube fitness channel attributes based on the key aspects of the ICTAU, emphasizing users' motivations to subscribe to a particular fitness YouTube channel (i.e., social interaction, information quality, and visual and textual content) (Kim and Kim, 2017) and fitness YouTuber attributes based on the persuasion theory, emphasizing a spokesperson's peripheral cues (i.e., social attractiveness, physical attractiveness, and similarity) (Sokolova and Perez, 2021). This study proposed new aspects of digital attributes, particularly within the context of YouTube fitness channels for users' body condition self-management at home during the COVID-19 era, by integrating these aspects of the YouTube platform.

From a theoretical standpoint, first, this research aims to expand the cognitive appraisal theory by formulating a new research model in the context of home exercise with digital content (i.e., fitness YouTube channels and YouTubers in this study) rather than at a fitness center or gym (Lazarus, 1982). This study proposes that social media users' emotional states while exercising at home, such as flow and satisfaction, come from evaluating or appraising personally relevant attributes of both fitness YouTube channels and YouTubers. In other words, the approach of our study assumes that social media users' emotional states can be formed by digital attributes, expanding the cognitive appraisal theory. More specifically, this study categorized digital attributes into YouTube channels and YouTubers, emphasizing the distinct roles of the digital content/platforms itself (i.e., fitness YouTube channels in this study) and digital content providers (i.e., fitness YouTubers in this study) to explain the psychological process of forming subscribers' emotional states and behavioral intention in social media. However, previous studies in social media focused primarily on either the influence of social media attributes on consumers' attitudes and behavioral intention for a product/service or the impact of influencers' attributes on consumers' attitudes and behavioral intention for a product/service the influencers promoted (Habibi et al., 2016; Sokolova and Kefi, 2020). The approach of previous studies has a limitation because social media users tend to consume digital content of the YouTube channels while simultaneously interacting with the channels' YouTuber. This argument would be supported by the empirical findings of our study that revealed the distinct impact of YouTube channel attributes and YouTuber attributes on users' emotional response to exercise. Hence, this study provides an avenue for formulating an integrated model of social media users to explain the development of their emotional states and behavioral intention.

Second, compared to prior research on physical activity, this study applies this context to a social media platform, such as YouTube. For example, previous studies have focused on technology, such as fitness mobile apps and smartphones, to predict users' behavioral intention to continuously exercise for their health (Hosseinpour and Terlutter, 2019; Muntaner-Mas et al., 2019). However, the technology is used primarily as a tool for supporting users' physical activity, and particularly, the current trend under the COVID-19 era leads users to work out at home without any physical support from professionals (e.g., health information and know-how of workouts without injury). Consequently, there have been an increasing number of users who rely heavily on the social media platforms to collect health information and learn more about the ways to maintain health conditions at home (Mattioli et al., 2020). Responding to this ongoing trend, particularly during the COVID-19 outbreak, this research focuses on social media platforms, such as fitness YouTube channels, and fitness YouTubers to predict users' behavioral intention to maintain their health condition by exercising with a fitness YouTube channel and its YouTuber. Hence, this research provides a new perspective on physical activity by emphasizing the role of social media platforms (or digital content) rather than that of mobile apps and smartphones (technology) in leading users to engage in physical activity through the attributes and emotional states (Hosseinpour and Terlutter, 2019; Muntaner-Mas et al., 2019).

Third, this study found that social media users' flow experience could be applied to digital content consumption and physical activity situations at the same time. This empirical finding provides a meaningful addition to the existing literature on flow experience in the context of digital consumer behavior. More specifically, in previous studies, the flow experience construct was applied to the context of outdoor recreation or sports activity, such as rafting and hiking (Wu and Liang, 2011). Based on the assumption of the flow theory, prior research has applied the flow experience construct to the context of consumers' digital content consumption, such as computer games or online shopping (Baker et al., 2019; Kim and Kim, 2020). The fundamental notion of that approach is that digital content can be a core source that leads consumers to feel the flow states while engaged with it. However, the situation of prior research's approach does not require a high level of physical activity by consumers (e.g., watching and playing the game or exploring websites). Consequently, compared to previous studies on the flow experience and digital content (Baker et al., 2019; Kim and Kim, 2020), this research proposes that social media users should feel the flow states while exercising through a fitness YouTube channel and with its YouTuber (i.e., while consuming its digital content simultaneously). In particular, the role of the flow experience construct is particularly critical in exercising at home because of other contextual factors, such as

social media messages and family members' disturbance during workouts. Furthermore, one of the most influential motivators for physical exercise is an individual's emotional state, such as flow experience and satisfaction (Muntaner-Mas et al., 2019). Therefore, this research provides a new application of the flow experience construct to users' physical activity through digital content consumption based on the theory of flow in the physical activity and social media contexts.

5.2. Managerial implications

From a managerial perspective, first, fitness YouTube channels should emphasize the development of a socially friendly environment among subscribers (i.e., social interaction), leading the subscribers to be satisfied with the channels. Although the users' main purpose of subscribing to a YouTube channel may be to communicate and interact with a YouTuber via the comment option, the communication and interaction among subscribers would be a satisfactory attribute of the channel. Thus, a fitness YouTuber could encourage subscribers to discuss their feelings and opinions about the channel's content and information through the YouTube community and YouTube tools, such as the comment and direct message functions. However, more importantly, as a moderator, a fitness YouTube channel should strictly manage the communication manner, quality, and policy among subscribers to avoid any conflict on the comment sections among subscribers. This effort enables subscribers to be satisfied with the fitness YouTube channel, which consequently leads to their loyalty toward the channel.

Second, fitness YouTube channels should serve as a vehicle that delivers health- and workout-related information to their subscribers to make their subscribers feel higher levels of flow and satisfaction with the channel. YouTube users subscribe to fitness YouTube channels to work out with their YouTubers at home (or by themselves without others' physical support) and gather information about health and workouts in an effective and efficient manner by purposely selecting some video clips on the channel. Some of the fitness YouTubers provide that information based on their personal workout experiences and according to what they've learned from other professionals. However, YouTube users who subscribe to fitness YouTube channels do not want to get general and public information about workouts and health, but are eager to collect more credible and reliable information about workouts and health based on scientific results, such as academic papers or technical reports, that general individuals cannot easily understand. The high level of information quality leads the subscribers to be satisfied with the fitness YouTube channel as well as to experience a flow state while exercising with the YouTuber. Therefore, fitness YouTube channels need to cite credible sources when providing health- and workout-related information to subscribers, and should collaborate with professionals, such as a doctors, athlete coaches, and physiology and kinesiology professors, to deliver high-quality information about physical exercise.

Third, compared to other social media platforms, YouTube enables users to enjoy visual content more interactively. The empirical findings indicated that visual content of fitness YouTube channels can result in subscribers' flow experience and satisfaction with the channels. For example, fitness YouTube channels can indicate which body section (or muscle) should be used separately while exercising with their YouTubers. Also, each workout video clip should include aggressive music along with visual content to increase subscribers' excitement level of workout. Furthermore, rather than always showing one fitness YouTuber's workout, the YouTube channels frequently invite their subscribers to a physical place to provide an opportunity to exercise with their YouTubers, and record a group workout video for other subscribers (e.g., how their body has been changed). These efforts for visual content development help the users to concentrate on physical exercise with the fitness YouTubers (i.e., flow experience) and be satisfied with the channels, consequently leading to user loyalty toward the channel.

Fourth, fitness YouTubers' physical attractiveness is one attribute of subscribers' flow experience. In other words, subscribers tend to feel flow status while working out with physically attractive fitness YouTubers regardless of the perceived similarity with and social attractiveness of the YouTubers. Based on the empirical finding, it can be interpreted that one of the influential motivations to exercise with a fitness YouTuber at home is to be physically like the YouTuber. Thus, when producing a workout video clip, the fitness YouTube channels should use their YouTubers' physical body as a reference rather than use general individuals' physical bodies. The fitness YouTube channels should continuously address how their fitness YouTubers have physically improved their body conditions and performance from the workout session and health-related information they have provided to their subscribers. This enables the subscribers to emotionally concentrate on working out through the fitness YouTube channel (with the fitness YouTubers) (i.e., flow experience while exercising). Consequently, the subscribers can form higher levels of satisfaction and loyalty toward the fitness YouTube channel.

5.3. Limitations and directions for future research

The author suggests some directions for future research in the physical activity and social media (or digital consumption) contexts based on three limitations of this study. First, although this research revealed the significant influences of fitness YouTube channel attributes and fitness YouTuber attributes on flow experience, YouTube channel satisfaction, and behavioral intention among subscribers who were exercising through the channel, there might be a difference among types of YouTube channels in physical activity, such as aerobic, yoga, muscle-strengthening, and stretching. For example, muscle-strengthening activity may require higher levels of a fitness YouTuber's physical attractiveness than aerobic activity. Hence, future studies should consider the various physical activity types as a moderator in the proposed relationships. Second, this study did not consider the potential impact of participants' demographic characteristics, such as gender and age, on the hypothesized associations. Although the author conducted multigroup analyses to find significant differences in demographic characteristics, no significant impact was found. However, there might be a possibility of the influence of individual factors on users' feelings of flow state, satisfaction, and behavioral intention for the fitness YouTube channel. Third, the subdimensions of the fitness YouTube channel attributes and fitness YouTuber attributes were identified by the author, which might lead to a potential bias although they were well-documented in the existing literature. Therefore, future research should be conducted employing mixed-method approaches, such as in-depth interviews, surveys, and experiments, to identify any missed YouTube channel attributes and YouTuber attributes (e.g., focusing on the specific characteristics of the YouTube platform, such as a channel's ownership, its content and its quality, the frequency and length of its visual content, the visual content viewership, and ratings) that might influence flow experience, satisfaction, and behavioral intention of users who were exercising via the YouTube channel and its YouTuber. Lastly, the current study focused primarily on the two aspects of loyalty toward the YouTube fitness channel: behaviors (positive word-of-mouth and recommendations) and commitment (continuous workouts via the channel). However, future research focusing on this social media platform needs to consider various levels of consumer engagement behaviors as a dependent variable, including active engagement behaviors (e.g., positive/negative content contribution and content co-creation) and passive forms of engagement behaviors (e.g., content attachment and content consumption) (Dolan et al., 2016). This approach enables scholars in this field to deeply understand consumer engagement behaviors via fitness-focused social media content.

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