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Factors influencing TikTok engagement behaviors in China: An examination of gratifications sought, narcissism, and the Big Five personality traits

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ABSTRACT

As an over-the-top (OTT) and non-subscription-based video-on-demand media service, mobile short-form video application (e.g., TikTok or Douyin) is a free video-sharing social networking service (SNS) distributing short-form video content to smartphones, smart TVs, and tablets. This study investigates the roles of gratifications-sought, narcissism, and personality traits in TikTok engagement behaviors (i.e., contribution, enhancement, and creation) in China. Data were gathered from a sample of 526 TikTok users through an online questionnaire survey in 2020. Factor analysis confirmed nine gratifications sought: escape, fashion, entertainment, information seeking, money making, sociability seeking, navigability, modality, and interactivity. In particular, extraverts and people with the quality of being vain were most active in the contributing, enhancing, and creating TikTok engagement behaviors. The results also show that exhibitionists and people who are more open to new experiences were found to create more, while narcissists with an attitude of entitlement also engaging strongly in giving likes, commenting, forwarding TikToks, and following others. Theoretical and practical implications are also discussed.

1. Introduction

According to the United States Federal Communications Commission (FCC), over-the-top (OTT) services can be categorized into two groups (FCC, 2017): multichannel video programming distributors (MVPDs) and online video distributors (OVDs). MVPDs include such varied services as AT&T TV, Netflix, and YouTube TV whereas an OVD is defined as any entity that provides video livestreaming by means of the Internet or other Internet Protocol (IP)-based transmission path where the transmission path is provided by a person. As a type of over-the-top (OTT) media service and a creative space for expression, TikTok (or Douyin[1]) is a mobile short-form video mobile apps for social networking and for sharing video content through internet-connected smart devices such as smartphones, smart TVs, tablets, desktop, and laptop computers (Wang, 2020). Gaining in popularity in recent years, mobile short-form video apps are a form of Internet access to content independent of a facility or network dedicated to its delivery via, for example, cable or satellite.

Unlike subscription-based video-on-demand (SVoD) services, mobile short-form video platforms are free and their revenues are mainly generated from games, e-commerce, advertising, live rewards, and knowledge payment. In today's era of visual communication, mobile short-form video has become the latest must-have in the mobile Internet world. With its unique advantage, it has

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[1] TikTok is more popular in the West and Douyin is its equivalent for the Chinese market.

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quickly gained a firm foothold among mobile terminal applications. This is especially true with the 5G network, which continually promotes and improves its capabilities.

Launched in September 2016, TikTok is currently one of the most popular mobile short-form video apps with more than 400 million active users worldwide. On it, users create and share short, inventive videos and bizarre memes (TikTok, 2020). According to QuestMobile's semi-annual report on short-form video in June 2019, new users in the short-form video industry in China were close to 100 million, and total monthly active users (MAU) reached 820 million with an annual growth rate of 32 percent (Costese, 2019). Based on good social media ecology (i.e., the study of the impacts of social media, technology, and communication on evolving social media environments) (Arriagada & IbáñezFirst, 2020; Zhao, Lampe, & Ellison, 2016), the success of TikTok is due to three equally important components: the platform, the creators, and the fans. The *platform* provides technical support and traffic for the creators and provides content recommendations to fans; the *creators*, who produce videos for the platform, interact with fans by forwarding, commenting, liking, sharing, and following; and the *fans* launch challenges or supports to the creators by distributing content and engaging in community distribution on the platform. By June 2019, 69.4% of TikTok's users were between the ages of 19 and 35 (QuestMobile, 2019). Past research found that individuals' motivations for using short-form video are to record their lives, present themselves, and be recognized by others, beautify video production, make new friends, attract fans, and make money (Bondad-Brown, Ronald, Rice, & Pearce, 2012). However, more recent literature on short-form video has mainly focused on content operations, promotion of innovation, and profit models. Few sociological studies have examined why users are attracted to short-form video (Zhang, Wu, & Liu, 2019). Thus, grounded in the consideration of uses and gratifications theories (UGT), narcissism, and the Big Five personality traits, this study explores the social and psychological factors that drive the popularity and usage patterns of short-form video in China.

1.1. TikTok as a virtual playground

Unlike other mobile apps, TikTok offers quick video creation opportunity with integrated functions of recording, editing, and sharing videos that is similar to physical playground experiences where they keep in touch with friends and meet new ones. TikTok is a virtual playground allowing the users making looping 15-s video with elevated editing features including in-camera speed controls, image tracking composites, collaborative split-screen, camera motion, and visual effects which amplify traditional characteristics of play onto the mobile devices (Potter & Cowan, 2020). TikTok music videos are animated with video speed effects. In this virtual playground, TikTok also enhances playfulness in its capacity to mold imaginative images with image-tracking and augmented reality (AR) effects. The video creation app is an escape from reality through face-replacement in the video and can facilitate conversations by repurposing and remixing of peer contents which makes TikTok an incredibly addictive social playground (Crowe & Bradford, 2006; Ke, & Moon, 2018). It is against this backdrop that it is important to investigate the factors driving youngsters to this playful app for entertainment, escape, sociability, or interactivity. For app platform developers, marketers, parents, teachers, and policymakers, this research will provide critical information as to what personality types are most vulnerable and being most attracted to different engagement with what effects in TikTok use.

1.2. Comparing TikTok to other social media platforms

In a glossary of social media terms, Stec (2015) refers *Facebook* as a social media app that allows people to connect with friends, family members, and acquaintances by posting and sharing content such as photos and status updates. *Twitter* has been categorized as a microblogging site, where users interact with others (including their followers) in real-time by posting 280-character tweets. Users can converse using mentions, replies, and hashtags. *Instagram* is a photo-sharing mobile application that allows users to take pictures, apply filters to them, and share them on the platform itself, as well as on other platforms such as Facebook and Twitter. *Snapchat* is a social media mobile application that lets users send and receive time-sensitive photos and videos that expire after viewing. Compared to Facebook, Twitter, Instagram, and Snapchat, *TikTok* focuses more on short-form videos than pictures or words. This app allows users to quickly and easily create and upload 15-s videos and share them with friends.

1.3. TikTok engagement behaviors

New media environment is undermining traditional approaches to audience research. Past audience research primarily focused on a particular aspect of audience behavior (i.e., exposure), but the new media environment renews and revitalizes the field with alternative analytical approaches (Napoli, 2012). In conceptualizing marketing-related social media content usage, Muntinga et al. (2011) introduced a three-factor framework, namely consuming, contributing, and creating, to measure consumers' engagement activities. Scholars (such as Cao, Meadow, Wong, Xia, 2021; Dessart, 2017; Schivinski, Christodoulides, & Dabrowski, 2016) generally agree that these three dimensions constitute consumer behavioral engagement of social media content. Using this three-dimensional construct, Pentina et al. (2018) found that various engagement in social media sites represent different levels of engagement effort and creativity from "following" (lower level) to commenting (higher level). This study adapts this framework to study TikTok engagement behaviors. **Contribution** represents a minimum level of engagement, in which users passively consume TikTok content, e.g., TikTok allows users to react to the uploaders by liking, commenting, forwarding, following, and adding favorite videos into collection files. This means that they only view and react with a quick response of liking, forwarding, following, or commenting. **Enhancement** entails a higher level of engagement, involving TikTok users proactively use different functions to enhance the video quality of TikTok contents by adding special visual effects, background music, and subtitles. This reflects that they have more knowledge and interest in

the technology. This level of engagement allows users with impressive video quality enhancement functions such as beauty camera, filters, editing functions (such as transitions, split screen, and slow motion), employing a background music library, and adding subtitles. **Creation** is the highest level of engagement, in which TikTok users make short-form videos, streaming live video, interacting with their favorite creators by making similar videos, sending private messages to creators, and sending danmaku[2] while watching live streams.

1.4. Theoretical frameworks

1.4.1. Uses and gratification Theory—U&G 1.0

Uses and gratifications theory (UGT) assumes that people have innate needs that can be satisfied by media (Rubin, 2009). Gratifications are conceptualized as satisfactions that are obtained when a person's needs are met by certain types of media sources that match their expectations. A chief tenet of this theory is that media use is selective and motivated by a rational self-awareness of one's own needs and an expectation that those needs will be satisfied by particular types of media and content (Katz et al., 1974). In this context, needs are defined as "the combined product of psychological dispositions, sociological factors, and environmental conditions" that motivate media consumption or exposure (Katz et al., 1973, p. 179). Gratifications are the "perceived fulfillment" of the needs through media use (Palmgreen, 1984). The logic of UGT emphasizes that individuals are motivated to fulfill their needs and wants by taking particular actions and accessing content on selected platforms (Papacharissi & Rubin, 2000).

Originating from studies of traditional media, UGT has also been adopted to study new media based on modern telecommunication technologies such as mobile phones (Author, 2000), the internet (Stafford et al., 2004), social networking services (SNSs) (Lin et al., 2017), Facebook (Chen & Kim, 2013; Quan-Haase & Young, 2010; Smock et al., 2011), Instagram (Alhabash & Ma, 2017), Twitter (Chen, 2011), and Snapchat (Alhabash & Ma, 2017), to name a few. In response to the emergence of social media and SNSs, the U&G approach was extended to include a broader set of motivations and different forms of identifying usage behaviors (Alhabash & Ma, 2017).

Recent U&G research shows that the main types of gratifications in using Facebook can be summarized as follows: communication with other users, entertainment, habitual behaviors, getting a glimpse of what others are doing, receiving recognition from others, and seeking news/information (Chen & Kim, 2013; Quan-Haase & Young, 2010; Smock et al., 2011). Similarly, Chen (2011) found that the types of gratifications when people use Twitter include information-sharing, passing time, social interaction, convenience, entertainment, connection, self-documentation, and self-expression. In Instagram research, Alhabash and Ma (2017) revealed that the gratifications people sought were entertainment, convenience, medium appeal, passing time, self-expression, self-documentation, social interaction, and information sharing. As for Snapchat, it was found that entertainment, convenience, medium appeal, passing time, self-expression, self-documentation, social interaction, and information sharing were the key gratifications sought (Alhabash & Ma, 2017). And recently, Kearney (2018) analyzed selfie posting behavior on social media and found eight gratifications: self-presentation, attention-seeking, communication, archiving time, entertainment, habit, escapism, and status-seeking. As for TikTok, using an online survey, Omar and Wang (2020) were able to find only social interaction, archiving, self-expression, peeking, and escapism as the main motivations. As discussed earlier, we believe that the list is incomplete and additional motivations can be found in the case of this dynamic social media platform.

1.4.2. Uses and gratification Theory—U&G 2.0

Lichtenstein and Rosenfeld (1983) first proposed that medium-specific gratifications can be predicted by the characteristics of media themselves rather than innate needs or perceptions of use. This essentially means that certain gratifications can be predicted by considering different types of technologies rather than perceived needs. Sundar and Limperos (2013) reviewed past U&G studies regarding different media technologies and discussed potential gratifications suggested by four classes of affordances in modern digital media including modality, agency, interactivity, and navigability, which gave rise to the MAIN model in the context of U&G 2.0.

Modality-based gratifications. Modality refers to the different methods of presentation (e.g., audio or pictures) of media content appealing to different aspects of the human perceptual system (e.g., hearing, seeing). TikTok's ability to provide content in multiple modalities (text, pictures, audio, and video) is one of the reasons why it is so popular. The MAIN model argues that the visual modality is more trusted than text, leading us to conclude that if something recorded in a photo or a video, then it must be perceived as more real than if it is written about in textual form. More advanced modalities such as virtual reality (VR) or augmented reality (AR) can cue the "being-there heuristic," leading us to factor in the authenticity and intensity of our experience when making judgments about the content delivered through that experience (Sundar & Limperos, 2013).

According to Sundar and Limperos (2013), "modality could be narrowed into four types of satisfaction, including realism, coolness, novelty, and being there." When mapped onto traditional U&G 1.0 communication orientations, realism and being-there gratifications would likely serve an *instrumental* purpose, whereas coolness and novelty would apply more to a *ritualized* use of the medium (Sundar & Limperos, 2013). We anticipate greater realism from apps that have live video feeds in addition to text and fully expect to enter a new world when browsing a virtual environment. These are examples of gratifications made possible by innovations in the modality affordance of the technologies underpinning modern-day media.

Agency-based gratifications. Under the MAIN Model, the agency affordance of the internet allows us all to be agents or sources of

[2] Danmaku is an emerging feature on online video platforms in Japan and China that allows real-time comments from viewers to fly across the screen like bullets.

information. While the role of gatekeeping has historically been the domain of a privileged few, now anybody can serve as a gatekeeper of content on the Internet. Blogs allow us to broadcast our own content or filter other content on the Web. The rise of user-generated content (UGC) on platforms and sites such as YouTube and Facebook has profoundly altered the sender-receiver equation of communication and, more importantly, has given rise to new gratifications (Shao, 2009). Studies show that digital media users are more 'agentic' and more likely to assume the role of a sender or source of information (Sundar et al., 2012). They are also motivated to build community, as manifested in efforts to participate in online forums in large numbers and post comments on others' blogs (Sundar & Limperos, 2013). In general, agency-based gratifications such as agency enhancement, community building, bandwagons, filtering/tailoring, and ownness have been made possible by a suite of new interface tools related to customization and crowd-sourcing that serve mostly instrumental goals (such as recording, special effects, web glow, clips, music, and subtitles) of highly motivated and involved users, which significantly improve user engagement.

Interactivity-based gratifications. The interactivity affordance fosters audience activity by allowing users to interact with and through the medium. News presentation is no longer static; instead, the consumer dynamically manages it (Sundar & Limperos, 2013). As a result, activity, responsiveness, choice, control, and flow experience may well be the next set of gratifications that we seek from interactive media (Sundar & Limperos, 2013).

TikTok has a live broadcasting function, and users watching it can communicate with the broadcasters in real-time by sending bullet screen comments and virtual gifts. Bullet screen is a feature that allows viewers to send comments that travel across the screen in real-time. Additionally, TikTok has the @friend function, which can remind a follower to watch a video, enhancing the interaction between uploaders and fans and the possibility of a user's content being seen and conveyed.

Navigability-based gratifications. Navigability is the affordance that allows user movement through the medium; navigation is a vital aspect of the online user experience. By adopting big data technologies, TikTok continuously optimizes its core technologies and algorithms, conducts in-depth analysis of users' browsing habits, interests, content sources, channels and regions, and recommends more fresh content in line with users' preferences (Zhu & Cui, 2018). Additionally, it provides users with a search function, allowing them to seek whatever they want to see.

Building on the existing literature, we propose the following research question:

RQ_1: What are the gratifications sought in the context of U&G 1.0 and 2.0 that can be uniquely identified among TikTok users in China?

1.5. Narcissism

Narcissism is a personality disorder associated with a fixation on the self. It entails feelings of uniqueness, needs for admiration from others, and concerns of being the center of attention (Brown, Budzek, & Tamborski, 2009). Bushman and Baumeister (1998) characterized narcissistic people as those who manifest an infatuation and obsession with oneself and display an aspiration to attain self-gratification, achieve dominance, and satisfy ambitions. Scholars often measure a person's narcissistic personality using a scale called the Narcissistic Personality Inventory (NPI) (Author, 2013). By reducing the inventory and clustering it into fewer components, Raskin and Terry (1988) proposed that narcissism includes seven dimensions: exhibitionism (i.e., showing off), entitlement (i.e., believing that one deserves the best), exploitativeness (i.e., taking advantage of others), superiority (i.e., feeling better than others), authority (i.e., feeling like a leader), self-sufficiency (i.e., valuing independence), and vanity (i.e., focusing on one's appearance).

Given that narcissism is associated with the use of personal interaction as a means for self-enhancement and self-promotion (Wallace & Baumeister, 2002), various attributes of SNSs make them seem like an ideal tool for achieving narcissistic goals. SNSs allow users to dwell on past self-expressions and the popularity of those self-expressions, as manifested in various metrics such as "likes" or "shares" in the case of Facebook, "followers" or "re-tweets" in the case of Twitter, and "comments" or "@s" in the case of TikTok. Previous research found that narcissism was positively correlated with the levels of social activity and intentions for self-promotion; that is, the more narcissistic a person was, the more likely they were to interact with other people in the online community and to post self-promoting content (Buffardi & Campbell, 2008). Author (2013) found that those who used social media to satisfy their cognitive needs tended to be narcissists who believed that they were superior to others; they were frequent users of forums but made limited use of Facebook to broaden their knowledge of the world.

In this research, we adopt the seven-dimension model of narcissism from Raskin and Terry (1988). Thus, the following hypothesis is proposed:

H_1: Narcissism will be positively related to TikTok engagement behaviors such that more narcissistic users will report higher activities in the areas of (a) contribution, (b) enhancement, and (c) creation when they use TikTok.

1.6. Big Five personality traits

According to the "Big Five" personality model, individuals vary in five broad domains: extraversion, neuroticism, openness to experience, agreeableness, and conscientiousness (Costa and McCrae, 1992; Gosling et al., 2003). *Extraverted* people are gregarious, talkative, and cheerful. They tend to use social media as a tool to communicate and socialize (Seidman, 2013). As reflected in their more frequent use of social media (Gosling et al., 2011; Marengo, Sindermann, Elhai, & Montag, 2020), extraverts tend to have a higher number of online friends (Amichai-Hamburger & Vinitzky, 2010) and prefer features of SNSs that allow active social contribution, such as status updates (Ryan & Xenos, 2011). Through the display of their strengths and talents, they can receive comments and likes from their audience, attract followers, and even become celebrities. Existing studies have offered two differing explanations for the relationship between extraversion and SNS use: "the-rich-get-richer" and "social compensation" (Ong et al., 2010). Both

explanations have received some empirical support. For example, Correa, Hinsley, and De Zuniga (2010) found that extraversion was positively correlated with the time spent on SNS and that extraverts tended to be members of several SNS groups. Similar conclusions were drawn by other researchers (e.g., Ehrenberg, Juckes, White, & Walsh, 2008; Gosling et al., 2011; Ryan & Xenos, 2011; Seidman, 2013; Wilson et al., 2010). However, contradictory findings showed that extraverts spent significantly less time on SNS (Moore & McElroy, 2012) and tended to make less use of the communicative features on Facebook (Ross et al., 2009). Other findings showed that extraversion was not related to the number of Facebook groups to which the user belonged but was positively related to the actual number of Facebook friends (Amichai-Hamburger & Vinitzky, 2010). Similarly, previous findings showed that extraverts tended to engage more frequently in self-disclosure and to generate more Facebook content than other personality types did and that extraverts posted less personal information on their Facebook profiles (Amichai-Hamburger, Kaplan, & Dorpatcheon, 2008; Amichai-Hamburger & Vinitzky, 2010). Amiel and Sargent (2004) noted that extraverts perceived social networks as forums for sharing information and opinions rather than as substitutes for face-to-face interaction. Based on this literature, we expected that the more extraverts use TikTok, the more likely they are to engage in TikTok to help them express themselves. Thus, the following hypothesis is proposed:

H_2: Extraversion will be positively related to TikTok engagement behaviors such that more extraverted users will report higher activities in the areas of (a) contribution, (b) enhancement, and (c) creation when they use TikTok.

Neuroticism is characterized by anxiety and sensitivity to threat, low levels of emotional stability, and high levels of anxiety. Neurotic individuals may use Facebook to seek attention and social support that may be missing from their lives offline (Marengo et al., 2020; Ross et al., 2009). Accordingly, neuroticism is positively correlated with frequency of social media use (Correa et al., 2010), the use of Facebook for social purposes (Hughes et al., 2012), and engaging in emotional disclosure on Facebook, such as venting about personal problems (Seidman, 2013). Previous findings have also shown that neurotic people used Facebook more frequently to keep up with others, to feel a sense of "belonging," and to stay informed (Amiel & Sargent, 2004; Moore & McElroy, 2012). Other findings suggested that neurotic people are more likely to engage in computer-mediated communication (CMC) because it may allow them to spend more time reviewing messages in a non-face-to-face environment, thus reducing the anxiety in interpersonal communication (Ehrenberg et al., 2008). Thus, it is reasonable that neurotic persons, motivated by the need for self-assurance, strive to share more information in a non-threatening and secure place (Amichai-Hamburger & Vinitzky, 2010). Therefore, we state the following hypothesis:

H_3: Neuroticism will be positively related to TikTok engagement behaviors such that subjects who score high in neuroticism will report higher activities in the areas of (a) contribution, (b) enhancement, and (c) creation when they use TikTok.

The personality trait, *openness*, is the tendency to be curious, creative, intellectual, imaginative, cultured, original, broad-minded, and intelligent to think deeply in a variety of ways, and to enjoy artistic pursuits (Barrick & Mount, 1991). Openness is positively associated with frequency of social media use (Correa et al., 2010; Marengo et al., 2020). Though some previous studies found no relationship between openness and the use of Facebook (Moore & McElroy, 2012), others found that open people tended to have more friends, engage in more activities, and express more about themselves on their profiles and were more likely to engage in blogging (Correa et al., 2010; Guadagno et al., 2008).

In the context of TikTok use, it is reasonable that open people would take advantage of the TikTok platform to engage in video making and willing to try new functions in TikTok. Therefore, we state the following hypothesis:

H_4: Openness will be positively related to TikTok engagement behaviors such that users who are more open to experiences will report higher activities in the areas of (a) contribution, (b) enhancement, and (c) creation when they use TikTok.

People who are high in *agreeableness* tend to be cooperative, helpful, and interpersonally successful. Past studies have characterized agreeableness as "friendliness and social conformity" (Fiske, 1949), "compliance versus hostile non-compliance" (Digman & Takemoto-Chock, 1981), or "love" (Peabody & Goldberg, 1989). Traits associated with this personality type include being courteous, flexible, trusting, good-natured, cooperative, forgiving, soft-hearted, and tolerant (Barrick & Mount, 1991; Marengo et al., 2020). Although Ross et al. (2009) found no relationship between agreeableness and Facebook use, previous studies showed evidence of some links between them. For example, Seidman (2013) showed that agreeableness is an effective predictor of belongingness-related behaviors. Further, it has been shown that agreeable people tend to care more about receiving support from others and the appropriateness of the posted content (Moore & McElroy, 2012), and they usually view their pages and the pages of others more often and enjoy commenting on others' profiles (Gosling et al., 2011; Wang et al., 2012). It was also reported that people with lower levels of agreeableness showed less interest in learning about events concerning others and the world (Amiel & Sargent, 2004). Interestingly, Amichai-Hamburger and Vinitzky (2010) found a positive relationship between agreeableness and the pictures and contact information uploaded to Facebook, indicating that those who were the most agreeable tended to engage in higher levels of self-disclosure online to gain support or to protect self-esteem. Therefore, people who are high in agreeableness are more likely to show their support to uploaders through actions such as giving a like. Thus, the following hypothesis is proposed:

H_5: Agreeableness will be positively related to TikTok engagement behaviors such that users who score high in agreeableness will report higher activities in the areas of (a) contribution, (b) enhancement, and (c) creation when they use TikTok.

Conscientiousness describes people who are responsible, hard-working, goal-oriented, organized, and having a high level of self-control. Previous studies have found that conscientiousness was negatively correlated to self-presentational behaviors and the amount of time spent on Facebook (Amichai-Hamburger & Vinitzky, 2010; Devaraj, Easley, & Crant, 2008; Gosling et al., 2011; Ryan & Xenos, 2011; Seidman, 2013; Wilson et al., 2010). Previous findings have also shown that people with a high level of conscientiousness (i.e., tending to value efficiency and productiveness) were more likely to be cautious in their presentation of both themselves and others (Devaraj et al., 2008; Seidman, 2013), show fewer addictive tendencies in using SNS (Wilson et al., 2010), and spend more time online engaged in academic pursuits than in leisure activities (McElroy et al., 2007). They tend to use Facebook less frequently than people who score lower in conscientiousness (Gosling et al., 2011; Marengo et al., 2020). However, when they do use it, conscientious

individuals are diligent and discreet: they have more online friends (Amichai-Hamburger & Vinitzky, 2010), avoid badmouthing people (Stoughton et al., 2013), and they are less likely to post on SNSs to seek attention or validation (Seidman, 2013). In light of these findings, we expect that people who are more conscientious will show less exposure to using a new social media app such as TikTok. Thus, we propose the following:

H_6: Conscientiousness will be negatively related to TikTok engagement behaviors such that users who score high in conscientiousness will report lower activities in the areas of (a) contribution, (b) enhancement, and (c) creation when they use TikTok.

Previous research found that high agreeableness and neuroticism were the best predictors of belongingness-related behaviors and motivations (Ryan & Xenos, 2011). Extraversion was associated with more frequent use of Facebook to communicate with others. Self-presentational behaviors and motivations were best predicted by low conscientiousness and high neuroticism. These results suggest that conscientious individuals are more cautious in their online self-presentation (Marengo et al., 2020; Seidman, 2013). These findings suggest that the Big Five personality traits and narcissism are strong predictors of usage behavior of social media. Therefore, the current study poses the following research question:

RQ_2: To what extent can demographics, gratifications sought, narcissism, and personality traits predict TikTok engagement behaviors in the areas of (a) contribution, (b) enhancement, and (c) creation when they use TikTok?

2. Methods

2.1. Sample and sampling method

Data for this study were collected from an online survey with a convenience sample of respondents aged 18–54 years old who were Chinese residents in 2019. We excluded those who took less than 6 min or more than 30 min to complete the questionnaires, as these responses were not considered genuine. As a result, a total of 526 participants constituted the final sample. Before conducting the survey, a focus group was conducted with eight people who had been regular users of TikTok over the past three months. The purpose of the pre-survey focus group was to gather information for the design of the questionnaire, especially regarding additional items of gratifications sought and engagement behaviors on TikTok. All questionnaires were conducted through Sojump.com[3] and were pilot tested with 10 respondents to confirm the clarity and rationality of the questionnaire design. Initially designed in English, the survey instrument was translated into Chinese before pilot testing. Using the demographic information of the internet user population in China published by China Internet Network Information Center (CNNIC, 2020), data were weighted based on gender to ensure a representative sample of the population before data analysis. Of the 526 respondents, after weighting, 15.8% were in the age group between 18 and 22, 45.6% were between 23 and 38, and 38.6% were between 39 and 54. 51.9% of the sample were males. Over 24% of all respondents had a monthly household income over 1130 USD. In terms of education, 0.9% were only primary school graduates or below, 31.4% were secondary school students or graduates, and 67.6% were university students or graduates.

2.2. Measurement

U&G 1.0. Initially, relevant gratification items in social media platforms used in previous research, such as Facebook (Chen & Kim, 2013; Quan-Haase & Young, 2010; Smock et al., 2011), Instagram (Alhabash & Ma, 2017), Twitter (Chen, 2011), and Snapchat (Alhabash & Ma, 2017), were included in the survey questionnaire. We adopted 21 items in which respondents were asked how much they agreed with the gratifications sought statements using a five-point Likert scale, where "1" means "strongly disagree" and "5" means "strongly agree." Additional items relating to "making money" were also added to assess a potentially unique motive associated with TikTok usage. The final questionnaire consisted of 8 gratifications sought dimensions using 23 statements.

U&G 2.0. To measure the gratifications in the framework of the MAIN model, this study extracted 12 items from the 57-item inventory developed by Sundar and Limperos (2013). Using a five-point Likert scale, respondents were asked how much they agree with the gratification 2.0 statements.

Narcissism. Raskin and Terry (1988) developed the original 40-item NPI to assess narcissism. However, this study only extracted 21 items from the inventory to make the questionnaire more manageable. A five-point Likert scale was used. As shown in Table 1, the principal component factor analysis yielded a six-factor narcissistic structure (after removing six items with extremely low communalities and items that failed to load on any factors) and accounted for 79.64% of the total variance. These factors included "Authority" ($\alpha = 0.82$), "Entitlement" ($\alpha = 0.76$), "Vanity" ($\alpha = 0.85$), "Exhibitionism" ($\alpha = 0.69$), "Superiority" ($\alpha = 0.63$), and "Self-Sufficiency" ($\alpha = 0.54$). Overall, the six narcissism factors were conceptually consistent with the theoretical origins described in the NPI scale (Emmons, 1984; Raskin & Hall, 1979).

The Big Five personality traits. Fifteen items extracted from the 44-item inventory to measure the Big Five personality traits were used in this research (John & Srivastara, 2011). Respondents were asked how much they agreed with these statements using a five-point Likert scale with 1 indicating "strongly disagree'' and 5 indicating "strongly agree.'' As shown in Appendix 1, all five personality traits were assessed by three items, including "Extraversion" ($\alpha = 0.84$), "Agreeableness" ($\alpha = 0.88$), "Conscientiousness" ($\alpha = 0.79$), "Neuroticism" ($\alpha = 0.81$), and "Openness" ($\alpha = 0.73$).

TikTok engagement behaviors. Respondents were asked, "In the past six months, how often have you engaged in the following 12

[3] Sojump.com is a service provider engaged in online questionnaires, examinations, and polls.

Table 1
Factor analysis of narcissism of TikTok usage.

How do the following statements describe you?	Mean	SD	Factors					
			1	2	3	4	5	6
Authority								
1. I see myself as a good leader.	3.19	.83	.85					
2. People always seem to recognize my authority.	2.95	.96	.78					
3. I have a natural talent for influencing people.	3.14	.93	.70					
Entitlement								
4. I have a strong will to power.	3.07	1.06		.82				
5. I will never be satisfied until I get all that I deserve.	2.95	1.08		.76				
6. I insist upon getting the respect that is due me.	3.77	.91		.69				
Vanity								
7. I like to look at myself in the mirror.	3.19	.94			.89			
8. I like to look at my body.	3.36	.97			.88			
Exhibitionism								
9. I get upset when people don't notice how I look when I go out in public.	2.55	.97				.84		
10. I like to be the center of attention.	2.84	1.04				.58		
Superiority								
11. I know that I am good because everyone keeps telling me so.	3.23	.87					.80	
12. I am a special person.	3.32	.95					.75	
13. I am an extraordinary person.	3.12	.95					.65	
Self-Sufficiency								
14. I always know what I am doing.	3.60	.78						.81
15. I can live my life in any way I want to.	3.26	.89						.70
16. I like to take responsibility for making decisions.	3.55	.82						.68
Eigenvalues			6.94	1.60	1.02	.91	.82	.65
Variance explained			17.63	14.41	13.66	13.06	10.91	9.97
Cronbach's alpha			.88	.76	.79	.91	.75	.73

Scale used: 1 = strongly disagree and 5 = strongly agree. N = 526.

activities across three categories on TikTok: (a) contribution (e.g., giving likes; commenting; forwarding; following; and adding favorite videos to one's collection on TikTok; $\alpha = 0.89$), (b) enhancement (e.g., using a beauty camera, filters, editing transitions, split screen, and slow motion; using video quality control functions or the background music library; and adding subtitles; $\alpha = 0.84$), and (c) creation (e.g., making videos; hosting live video streams; interacting with followers; sending private messages to the uploaders; and sending danmaku; $\alpha = 0.92$). The scale used was 1 = never, 2 = rarely, 3 = sometimes, 4 = often, and 5 = always.

Demographics. The study also assessed and recorded personal data, such as gender, age, educational background, and monthly income.

3. Findings

As shown in Table 2, the initial exploration of the relationships among predictor variables indicates weak to moderate correlations (mostly $r < 0.4$). Meanwhile, the variance inflation factors (VIFs) are all satisfactory at less than 5, which indicates that there is no multi-collinearity problem in our data.

3.1. Gratifications sought in TikTok usage

To explore what gratifications TikTok users in China sought, the researchers conducted a principal component factor analysis for U&G 1.0 factors with varimax rotation to determine the potential groupings of the 23 items. Seven items with extremely low communalities and items that failed to load on any factors were removed. The analysis yielded six factors and explained 79.15% of the variance (see Table 3a). The study also involved a principal component factor analysis for U&G 2.0 factors with varimax rotation to determine the potential groupings of 12 items. Three items with extremely low communalities and failed to load on any factors were also removed. The analysis yielded three factors that explained 78.52% of the variance (see Table 3b).

As shown in Table 3a, the first factor of U&G 1.0 was "Escape" ($\alpha = 0.84$), reflecting that people believed that by using TikTok they could get away for a while from their work or studies and from people around them (e.g., colleagues, family, or friends). The second factor was "Entertainment" ($\alpha = 0.81$), reflecting that people believed that TikTok could relax them. The third factor was "Fashion" ($\alpha = 0.82$), reflecting that people using TikTok wanted to look stylish and fashionable. The fourth factor was "Sociability seeking" ($\alpha = 0.80$), meaning that people wanted to keep in touch with friends and meet new people by using TikTok. The fifth factor was "Making money" ($\alpha = .86$), reflecting that TikTok users could earn money through livestream broadcasts and promoting products on TikTok. Finally, the sixth factor was "Information seeking" ($\alpha = 0.82$), indicating that people use TikTok to find out what has happened recently and look for interesting information.

Similarly, as shown in Table 3b, the first factor of U&G 2.0 was "Navigability" ($\alpha = 0.80$), illustrating that people believed that TikTok could suggest trendy videos they were interested in and allow them to search for a wide variety of information. The second factor was "Modality" ($\alpha = 0.79$), reflecting that people believed TikTok could provide a feeling of a real face-to-face conversation.

Table 2
Zero-order Pearson correlations among key variables.

	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
1	.42***	.38***	.55***	.24***	.17***	.17***	-.01	.20***	.09*	.20***	.09*	.21***	-.00	.04	.11*	.33***	.11**	.13**	.05	.14**	.25***	.35***	.22***
2		.71***	.66***	.29***	.22***	.19***	-.02	.29***	.17***	.15***	.16***	.30***	.05	.07	.03	.17***	.21***	.19***	.25***	.10*	.18***	.44***	.21***
3			.74***	.34***	.25***	.25***	-.03	.35***	.24***	.15***	.18***	.22***	.17***	.10*	.14**	.11**	.18***	.25***	.37***	.08	.08	.42***	.33***
4				.37***	.33***	.34***	-.09*	.34***	.16***	.22***	.17***	.29***	.01	.13**	.06	.28***	.22***	.29***	.16***	.11*	.28***	.49***	.30***
5					.61***	.61***	-.20***	.47***	.42***	.19***	.29***	.14***	.04	.35***	-.02	.19***	.21***	.18***	.13**	.20***	.23***	.25***	.24***
6						.66***	-.02	.45***	.32***	.18***	.27***	.11**	-.10*	.34***	.01	.24***	.15***	.16***	.06	.20***	.33***	.21***	.17***
7							-.13**	.45***	.32***	.25***	.28***	.09*	-.08	.42***	.03	.24***	.20***	.16***	.08	.18***	.30***	.27***	.19***
8								.17***	-.00	.05	.01	.01	.23***	-.18***	.21***	-.04	.03	-.05	-.03	.00	.01	-.13**	-.06
9									.32***	.22***	.23***	.27***	.14***	.28***	.13**	.16***	.25***	.11**	.12**	.22***	.28***	.25***	.12**
10										.00	.00	-.00	-.00	-.00	-.01	.01	.16***	.16***	.17***	.08	.04	.10*	.20***
11											.00	.00	.00	.00	.14***	.19***	.11**	-.05	.04	.09*	.19***	.08	.05
12												.00	.00	.00	.02	.15***	.08	.07	.10*	.07	.11**	.18***	.08
13													.00	-.00	.11*	.15***	.21***	-.00	.02	-.01	.12**	.25***	.07
14														.00	.31***	-.12**	.06	.08	.15***	.06	-.15***	-.08	.19***
15															.02	.09*	.03	.12**	.04	.12**	.16***	.15***	.04
16																.00	.00	.00	.00	.00	-.04	.10*	.13**
17																	-.00	.00	.00	.00	.37***	.19***	.17***
18																		.00	.00	.00	.18***	.20***	.13**
19																			.00	.00	.07	.25***	.25***
20																				.00	-.08	.13**	.35***
21																					.26***	.02	.07
22																						.00	.00
23																							.01
24																							

Notes: ***p < .001; **p < .01; *p < .05; N = 526.
1 = Intensity; **TikTok Usage Pattern:** 2 = Enhancement; 3 = Creation; 4 = Contribution; **The Big Five Personality:** 5=Extraversion; 6 = Agreeableness; 7 = Conscientiousness; 8 = Neuroticism; 9 = Openness; **Narcissism:** 10 = Authority; 11 = Entitlement; 12 = Superiority; 13 = Vanity; 14 = Exhibitionism; 15 = Self-Sufficiency; **U&G 1.0:** 16 = Escape; 17 = Entertainment; 18 = Fashion; 19 = Sociability seeking; 20 = Making money; 21 = Information seeking; **U&G 2.0:** 22 = Navigability; 23 = Interactivity; 24 = Modality.

Table 3a
Factor analysis of uses and gratifications 1.0 of TikTok usage.

I use TikTok …	Mean	SD	Factors					
			1	2	3	4	5	6
Escape								
1. to get away from what I'm doing, like work or study for a while.	2.40	1.08	.87					
2. to get away from people around me, like colleagues, family or friends for a while.	2.35	1.05	.86					
3. to forget about school, work or other things.	2.82	1.10	.83					
Fashion								
4. to look stylish.	3.48	.98		.83				
5. to look fashionable.	3.38	1.00		.82				
6. to not look old-fashionable.	3.49	1.04		.74				
Entertainment								
7. because it relaxes me.	3.95	.86			.81			
8. because it allows me to unwind.	3.43	1.01			.74			
9. because it is a pleasant rest.	3.76	.87			.71			
Information seeking								
10. to find out what happened recently.	3.87	.80				.82		
11. to look for information like news.	3.63	.96				.79		
12. to look for interesting information.	3.97	.76				.71		
Making money								
13. because I can earn money by live stream broadcast.	2.18	.95					.93	
14. because I can earn money by promoting products on TikTok.	2.32	.98					.92	
Sociability seeking								
15. to keep in touch with friends you haven't seen in a long time.	2.89	1.09						.88
16. meet new people.	2.96	1.07						.81
Eigenvalues			5.99	2.16	1.44	1.32	1.05	.70
Variance explained			15.24	14.26	13.67	13.54	11.73	10.71
Cronbach's alpha			.91	.82	.81	.82	.86	.80
Scale used: 1 = strongly disagree and 5 = strongly agree. N = 526								

Table 3b
Factor analysis of uses and gratifications 2.0 of TikTok usage.

I use TikTok …	Mean	SD	Factors		
			1	2	3
Navigability					
1. to watch videos that I am interested in.	3.73	.79	.87		
2. to let me know what videos are trending in real time.	3.68	.81	.85		
3. to search a wide variety of information.	3.62	.79	.77		
Modality					
4. when watching the live video, it's like a face-to-face conversation.	2.79	.99		.85	
5. to experience the content of the video that is real and not made up.	2.61	.98		.84	
6. to enjoy many unique and innovative functions.	3.36	.94		.68	
Interactivity					
7. to interact with the interface (for example, I can write comments or send danmaku while watching live stream broadcast).	3.24	.83			.87
8. to receive "likes" for my videos or my comments.	3.37	.86			.81
Eigenvalues			4.33	1.22	.73
Variance explained			30.14	26.31	22.07
Cronbach's alpha			.87	.79	.85

Scale used: 1 = strongly disagree and 5 = strongly agree. N = 526.

"Interactivity" was the third factor (α = 0.76), showing that TikTok users believed they could interact with other uploaders by posting comments or sending danmaku while watching livestream broadcasts.

Overall, these factors were conceptually consistent with the theoretical expectations and the theoretical origins described by Alhabash and Ma (2017) regarding U&G 1.0 and the MAIN model in U&G 2.0 (Sundar & Limperos, 2013).

3.2. Hypotheses testing

H_1 hypothesized that narcissism would be positively related to TikTok engagement behaviors such that more narcissistic users would report higher activities in the areas of (a) contribution, (b) enhancement, and (c) creation when they use TikTok. The regression analyses shown in Table 4 indicate that the entitlement dimension of narcissism is significantly related to the contribution dimension in TikTok engagement behaviors, while exhibitionism is only significantly associated with creation. Interestingly, vanity was also found to be significantly related to all three engagement behaviors: creation, enhancement, and contribution. Therefore, H_1 was

Table 4
Regression analysis of TikTok engagement behaviors using demographics, Big Five personality, narcissism, U&G 1.0, and U&G 2.0 as predictors.

Predictors	TikTok Engagement Behaviors		
	Contribution	Enhancement	Creation
Block 1: Demographics			
Gender (male = 1)	.04	-.14***	.03
Age	-.05	-.17***	-.04
Education	.13***	.13***	.18***
Income	.04	-.04	.03
$\triangle R^2$	.06***	.07***	.04***
Block 2: The Big Five Personality			
Extraversion	.08*	.10**	.11***
Neuroticism	-.02	.03	.01
Openness	.06	.04	.06
Agreeableness	.06	.04	.05
Conscientiousness	.02	-.01	.01
$\triangle R^2$	.16***	.11***	.12***
Block 3: Narcissism			
Authority	-.04	.02	.02
Entitlement	.09**	.05	.06
Vanity	.11**	.12**	.07*
Exhibitionism	.03	.05	.11**
Superiority	-.00	.01	.03
Self-Sufficiency	-.02	-.02	-.02
$\triangle R^2$	.04***	.12***	.06***
Block 4: U&G 1.0			
Escape	-.03	-.04	.05
Entertainment	.04	-.00	-.00
Fashion	.02	.04	.04
Sociability seeking	.15***	.10*	.14***
Making money	.05	.20***	.27***
Information seeking	.04	.06	.07
$\triangle R^2$	.13***	.02***	.15***
Block 5: U&G 2.0			
Navigability	.17***	.12***	.04
Interactivity	.34***	.29***	.26***
Modality	.20***	.11*	.12**
$\triangle R^2$	.11***	.06***	.06***
R^2	.48	.38	.43
Adjust R^2	.46	.36	.41
F	27.17***	21.10***	22.21***

Notes: Figures are standardized beta coefficients at the final step. *$p < .05$; **$p < .01$; p***<0.001; N = 526.

partially supported.

H_2 hypothesized that extraversion would be positively related to TikTok engagement behaviors such that more extraverted users would report higher activities in the areas of (a) contribution, (b) enhancement, and (c) creation when they use TikTok. As shown in Table 4, the regression results indicate that extraverted users tended to contribute, enhance, and create more when using TikTok. Therefore, H_2 was largely supported.

H_3 hypothesized that neuroticism would be positively related to TikTok engagement behaviors such that more neurotic users would report higher activities in the areas of (a) contribution, (b) enhancement, and (c) creation when they use TikTok. The regression analyses shown in Table 4 indicate that relationships between neuroticism and contribution, enhancement, and creation (all with $p >$ .05) were insignificant. Therefore, H_3 was rejected.

H_4 hypothesized that openness to experiences would be positively related to TikTok engagement behaviors such that users who are open to experience would report higher activities in the areas of (a) contribution, (b) enhancement, and (c) creation when they use TikTok. The results shown in Table 4 indicate that openness was not significantly related to contribution, enhancement, or creation (all with $p > .05$). Therefore, H_4 was rejected.

H_5 hypothesized that agreeableness would be positively related to TikTok engagement behaviors such that users who are agreeable would report higher activities in the areas of (a) contribution, (b) enhancement, and (c) creation when they use TikTok. As shown in Table 4, the regression results indicate that relationships between agreeableness and contribution, enhancement, or creation were all insignificant (all with $p > .05$). Therefore, H_5 was also rejected.

H_6 hypothesized that conscientiousness would be negatively related to TikTok engagement behaviors such that users who are conscientious would report lower activities in the areas of (a) contribution, (b) enhancement, and (c) creation when they use TikTok. The results shown in Table 4 indicate that conscientiousness is not significantly correlated with contribution, enhancement, or creation (all with $p > .05$). Therefore, H_6 received no support.

3.3. Predicting TikTok engagement behaviors

To examine the factors that can predict TikTok engagement behaviors, the study ran three parallel multiple regressions analyses regarding contribution, enhancement, and creation as dependent variables, respectively. The results shown in Table 4 indicate that individuals who engaged more in terms of contribution on TikTok tended to be more educated extraverts who often sought sociability, interactivity, modality, and navigability. In addition, many heavy users engaged in the contribution functions were also narcissists who displayed an attitude of entitlement and vanity. Heavy users of the enhancement functions tended to be younger females and more educated extraverts who generally sought money making, sociability, navigability, interactivity, and modality in TikTok engagement. Furthermore, those who believed themselves to be vain tended to use more enhancement functions. Individuals who created more on TikTok tended to be more educated and extraverted. They were the most likely to be motivated by money making, sociability, interactivity, and modality in their use of TikTok. These heavy users of creation functions also tended to be exhibitionists and those who displayed vanity. Altogether, the predictors included in the regression equations explained 35–48% of the variance.

4. Conclusions and discussions

4.1. Gratifications sought in TikTok use

One of the major aims of this study was to identify the underlying structure of the gratifications sought by people in using TikTok. Exploratory factor analysis successfully yielded six identifiable factors from U&G 1.0 and three identifiable factors from U&G 2.0 that generally confirm previous studies' characterization of the gratifications sought from social media apps. The findings indicate that users are motivated by U&G 1.0 factors including escape, fashion, entertainment, information seeking, money making, and sociability seeking in TikTok use. This is in accordance with similar motivations found for using Facebook (Alhabash & Ma, 2017; Chen & Kim, 2013; Quan-Haase & Young, 2010; Smock et al., 2011), Instagram (Alhabash & Ma, 2017), Twitter (Chen, 2011), and Snapchat (Alhabash & Ma, 2017). It is worth noting that "making money" appears to be a unique type of gratification sought why TikTok users actively contribute to the enhancement and create new content in their engagement with TikTok. Such findings support recent reports that users can earn money from the TikTok app with the content they create (Hayes, 2020; Shaw, 2020). This is an important finding as traditional gratifications of social media use involved mostly only escape, entertainment, social interaction, and information seeking. Money making is a unique motivation driving users to TikTok so that they can earn money by livestreaming and/or promoting products. Moreover, most previous uses and gratifications studies put emphases on U&G 1.0 while this study extended U&G 1.0 to U&G 2.0 examining the technological unique nature of TikTok in navigability, interactivity, and modality. As expected, TikTok users were heavily motivated by these gratifications inherited in the technology which support the notion that medium-specific gratifications are related characteristics of media themselves rather than innate needs of users (Sundar & Limperos, 2013). Such finding confirms the theoretical relevance of U&G 2.0.

4.2. Engagement behaviors on TikTok

As expected, there is strong support for the hypothesis that the more users find TikTok use gratifying, the more they will engage in it. While only sociability in U&G 1.0 was found to be significant in predicting all dimensions of engagement behaviors in TikTok, this study found that navigability, interactivity, and modality from U&G 2.0 were strong predictors of contribution, enhancement, and creation in TikTok use. This reinforces Sundar and Limperos's (2013) study that indicated that measurements designed for older media are no longer suitable for understanding gratifications sought from newer media. Based on the size of the beta weights, engagement behaviors in TikTok were mostly motivated by *interactivity* (β ranged from 0.26 to 0.34, $p < .001$). This makes sense, as TikTok provides many interactive functions such as commenting, sending danmaku, following, receiving likes, and forwarding, allowing users to meet various perceived needs. In particular, people motivated by interactivity tended to *contribute, enhance, and create* more, as they would use creation functions such as making and hosting live videos, interacting with followers, and sending danmaku while viewing the content of others. Similarly, enhancement functions like the beauty camera and filters allow them to make themselves appear more physically attractive, which could help them increase the possibilities for interaction. Additionally, contribution behavior such as commenting and following could help them participate in more interactions with others.

Modality turned out to be a strong predictor (β ranged from .11 to .20, $p < .05$) for all three TikTok engagement behaviors which is reasonable since TikTok could meet people's modality needs by providing innovative technology such as livestreaming, sending danmaku, filters, and convenient editing functions. With these features, TikTok users tended to create more since functions like live broadcasting make people feel like the content is real and live, leading them to engage by sending likes and comments. Furthermore, TikTok has two ways to release videos: one is for public viewing, while the other is only visible to friends who follow each other. TikTok stickers is also an interesting function. With the application of AI technology, facial expression recognition and gesture recognition can be realized. This kind of gameplay is engaging and attracts users' attention and responses. All these applications of new technology could encourage users to contribute, enhance, and create more in TikTok making it truly a virtual playground.

TikTok also has multiple functions gratifying users' desires for *navigability*. The gratification of navigability can be easily fulfilled through three main navigational functions: a decentralized recommendation mechanism, intra-city video streaming, and a hot list. A decentralized recommendation mechanism relies on users' preferences to create the platform, which is effective for both content producers and content consumers. Also, a page called "Local" can recommend videos released by producers from the same city as the user. In this way, people can learn about the latest news or most popular events in their neighborhood through short-form videos in real

time, which is an attractive method to connect people extending the virtual playground in TikTok from online to offline.

It is also interesting to note that among the six U&G 1.0 factors, only sociability seeking and money making were significantly linked to TikTok engagement behaviors. This is reasonable as heavy users of TikTok creation, enhancement, and contribution functions can use the technology as a means to meet new friends, keep in contact with people they have no or little time to meet in person, and feel involved with what's going on with their friends. It is also logical that contribution behaviors such as liking, commenting, and following would increase the possibility of making friends and contacting them on TikTok.

Money making was only a significant predictor of TikTok engagement behavior in enhancement and creation. In fact, video content creators for TikTok are often driven by money making, but they do not know exactly how to make money because TikTok has not developed a mature profit-making business model, unlike YouTube. The general view is that the most common way to make money on TikTok is by making promotional videos and having a large number of followers, which can be difficult for most people to attain. This makes perfect sense, as people who want to make money on TikTok tend to use more enhancement and creation functions since uploaders who promote products in live broadcast would use enhancement functions (such as the beauty camera and filters) to make themselves look more attractive and creation functions (e.g., making videos and hosting livestreams, interacting with followers, and sending danmaku while viewing) to attract more people to watch their live broadcasts and buy advertised products. Similarly, this study also found that heavy TikTok users who often make and stream TikTok content, enhance their TikTok videos before posting, and engage or contribute TikTok content with others (e.g., liking, commenting, forwarding, and adding videos to favorites) were motivated by social reasons, such as wanting to meet new people and keeping in touch with friends.

It is also worth noting that the younger users tend to use more enhancement functions in TikTok. There are two potential explanations of this phenomenon. First, young people are more technological savvy and are more proficient at using new enhancement technology like beauty cameras, filters, and editing functions. Second, the finding could reflect that young people are easily influenced by their peers and like to perfect their appearance using various TikTok tools before revealing themselves.

Exhibitionism and vanity were the only two narcissistic predictors of creation. This is understandable as people who have a narcissistic obsession are also good at social interaction and self-presentation to promote their personal qualities. In fact, people who pay much attention to their appearance, especially those who have the quality of being vain, might contribute, enhance, and create more in the belief that they have enough charm to attract other users to watch their live videos, interact with them, and send danmaku while viewing. Similarly, the results also show that extraverts contribute, enhance, and create more in TikTok use. This can be explained as extroverted people are generally talkative, cheerful, and tending to use media as a tool to communicate. These findings suggest that narcissists and extroverts are the most vulnerable to be addicted to the TikTok virtual playground. In fact, the combined predictive power as illustrated in R^2 changes for the narcissism and the Big Five personality blocks for TikTok engagement behaviors (ranged from 18 to 23%) are comparable to those in the U&G 1.0 and 2.0 blocks with 8–24% additional variance explained (as shown in Table 4).

Another important contribution of the study is the validation that there are three major types of engagement behaviors in TikTok. Most past studies in social media focused on intensity or frequency of use in terms of "how often they use in a typical day." This study established that there are three types of behaviors when we use TikTok in addition to being passive viewers or lurkers. TikTok users can be producers as well as active consumers of the mobile short video by *contributing* different aspects of engagement (such as liking, commenting, forwarding, and following), enhancing the quality with different sophisticated visual effects, and *creating* by being the creators of TikTok contents with "creation" being the most involved or immersed in the virtual playground and "contribution" being the casual users. These TikTok engagement behaviors were confirmed with high reliability.

4.3. Theoretical and practical implications

With the amount of total variance explained ranging from 38 to 48%, this study robustly demonstrates the significant effects of personality traits, narcissism, and gratifications in explaining the TikTok engagement behaviors. This is an important theoretical contribution reinforcing that the constructs employed are effective in predicting TikTok engagement. Specifically, gratifications from U&G 2.0 alone contributed significantly to the overall explanatory power. As indicated in Step 5 of the hierarchical regression, the amount of variance explained ranged from 6 to 11%. Unlike previous research in social media use, making money was found to be a unique motivation in this study. However, while the beta weights for making money predicting creation ($\beta = 0.27$, $p < .001$) and contribution ($\beta = 0.20$, $p < .001$) were relatively high, the factor mean (in Table 3a) were comparatively low ($M = 2.25$, $sd = 0.98$). This may reflect that TikTok still does not have a mature business model like other video platforms such as YouTube. One practical implication of this finding is that a more sophisticated and mature business model should be developed so that TikTok users can fully understand the challenges and opportunities of how to make money on TikTok.

To our surprise, the means for the measurement items for sociability were fairly low. This suggests that as a relatively young social media short-form video platform, TikTok doesn't yet have a mature social ecosystem, as it only provides superficial social functions such as commenting, liking, and following. Users cannot conduct genuine social interactions in TikTok. For example, TikTok's function of forwarding is highly dependent on WeChat, Weibo, QQ, and other social media. In March 2018, when WeChat and Weibo blocked TikTok's sharing links, WeChat users could not directly open TikTok videos shared by others and needed to copy the link and paste it into the browser by themselves, which has a bad influence on users' experience. Users were not satisfied with these basic social activities, and TikTok could lose users if they do not resolve this problem. Therefore, another practical implication of this weakness is that measures should be taken to improve user stickiness. The operators of TikTok should learn from WeChat, QQ, and other social platforms in building its social ecology and reducing its dependence on other social media platforms (Guo & Guo, 2018).

4.4. Policy implications

Since TikTok exists within a private mobile device (e.g., a smartphone or tablet) rather than a public space, teachers and parents are not present to guard off unwelcome voyeurs. TikTok teenage users are at risks of cyber-predators and cyberpornography. The virtual playground in TikTok promotes its users to "play" through short-video creation but it lacks a boundary and supervision which may lead to parental "moral panic" resulting from a fear of unregulated and free exchanged of diverse TikTok video content. This absence of teacher and/or parental guidance may intensify the moral panic which should serve as a wake-up call for strict age requirements for the operators to register every user and to develop a robust automated artificial intelligence (AI)-driven software to detect user comments with adult language. However, in the short term, it is ultimately educators' and parents' responsibility to exert control and policy intervention in school and at home over what occurs in this virtual playground.

4.5. Limitations and suggestions for future research

This study has several limitations. First, a convenience sample instead of a probability sample was used, which makes the results less generalizable. Thus, the use of a larger random sample in future studies would improve the robustness of the research. Second, contrary to our expectations, passing time and recognition gratifications in the use of TikTok were not confirmed. This may be due to the imprecise wording of the items used. Similarly, items for assessing agency in U&G 2.0 failed to emerge, which may also be due to ineffective wording. Future studies should re-examine the measurement rigor of these gratification dimensions. Third, the present study is a 'snapshot' of TikTok using a cross-sectional survey. Future studies should investigate how people's uses of and gratifications sought in TikTok develop and change over time by employing a longitudinal design.

Appendix 1. The Big Five Personality

How do the following statements describe you?	Mean	SD	Cronbach's alpha
Extraversion			
1. I am outgoing and sociable.	3.24	.78	.84
2. I generate a lot of enthusiasm.	3.52	.75	
3. I have an assertive personality.	3.58	.79	
Agreeableness			
4. I am helpful and unselfish with others.	3.74	.73	.85
5. I have a forgiving nature.	3.76	.78	
6. I am considerate and kind to almost everyone.	3.74	.74	
Conscientiousness			
7. I do a thorough job.	3.58	.79	.79
8. I am a reliable worker.	4.04	.76	
9. I make plans and follows through with them.	3.67	.77	
Neuroticism			
10. I worry a lot.	3.40	.87	.81
11. I can be moody.	2.98	.94	
12. I get nervous easily.	3.18	.84	
Openness			
13. I always come up with original ideas.	3.50	.79	.73
14. I feel curious about many different things.	3.57	.84	
15. I am sophisticated in art, music or literature.	2.89	.82	

Scale used: 1 = strongly disagree and 5 = strongly agree. N = 526.

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