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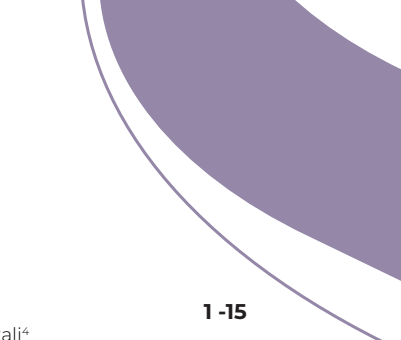


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DESIGNING AND VALIDATING THE STUDY ON THE INFLUENCE OF SOCIAL MEDIA INFLUENCERS SCALE

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ABSTRACT

As the influence of influencers continues to expand, influencer marketing has become one of the mainstream sales methods in China. As a communication bridge between influencers and consumers, social media promotes the development of e-commerce and shortens the distance between audiences and influencers. With the rapid growth of social media in recent years, more and more women are willing to achieve self-transformation by dressing up and making up. They confidently share their cosmetics and dressing-up experiences on social media platforms. Therefore, this preliminary study aims to explore the influence of social media influencers on the cosmetics purchasing decisions of young female consumers in China. This study uses the questionnaire survey method in quantitative research and selects four universities in Shaanxi Province of China through probability sampling. Through the normal distribution analysis and reliability and validity analysis of 292 samples of young female consumers in China, the researchers concluded that the questionnaire has a high reliability and validity. Therefore, the questionnaire can be used to explore the relationship between influencers and consumers' purchasing decisions.

1. Introduction

Internet technology is one of the greatest innovations in the past 30 years, and its rapid development has allowed it to be used in various fields. Since the early 1990s, the Internet has

occupied a place in the economic and socio-political fields for the first time. After decades of reform and development, 5G technology and fibre optic cables have become increasingly popular and convenient, quietly changing people's lifestyles (Roblek et al., 2020). Moreover, the Internet has transformed the local world community into a global world community, which means that people worldwide can be closely connected through the Internet. With the rapid development of the Internet, social media, as a carrier of the Internet, has connected people worldwide, and people can explore knowledge areas they have never touched through social media. Many types of social media are well-known to the public. Nowadays, people often use social media platforms, including YouTube, Twitter, Instagram, Facebook, and TikTok. At present, social media is not only a tool for entertainment needs but also shows excellent use in business activities (Infante & Mardikaningsih, 2022).

With the rapid development of social media in the commercial field, the beauty industry uses various social media channels to sell and display products. In recent decades, the scale of China's cosmetics market has continued to expand significantly with the growth of the national economy and the increase in residents' disposable income (Gilitwala & Nag, 2021). In 2019, the market size of China's cosmetics industry reached 477.7-billion-yuan, accounting for 14% of global cosmetics sales. Regarding market size, China has become the world's second-largest cosmetics consumer after the United States (Yang & Meng, 2021). Nowadays, e-commerce is the primary method of selling cosmetics, and the contribution of e-commerce channels to the overall contribution of cosmetics in China has increased from 10.2% in 2012 to 23.3% in 2017. Over the past five years, the compound annual growth rate of cosmetics sales through social media platforms in China was 27%. In addition, from the analysis of consumer age structure, consumers born after 1980 are the main force of online shopping (Gilitwala & Nag, 2021). The latest market research in 2015 shows that more than 57% of women apply makeup daily, spending an average of 30.1 minutes daily. In addition, according to data from the Baidu Marketing Centre (2020), female cosmetics consumers in China make up 77% of the total, while male consumers make up 23%. According to the data, Chinese women generally pay more attention to cosmetics (Ma, 2023). An Internet celebrity is a person who has gained fame and popularity on the Internet. Internet celebrities are rising not only on global social media platforms like Twitter and YouTube but also in China. Chinese social media influencers use personal accounts to share content about skincare and cosmetics to attract many followers (Guan, 2021). Social media influencers have become a new marketing tool in the Internet age. They use their professional knowledge of cosmetics to sell related products to consumers through live broadcasting, which completely subverts the traditional consumption model of cosmetics.

1.1 Problem statement

With the rapid development of Internet technology, new media forms have emerged in an endless stream. Among them, live streaming, as a real-time interactive communication method, has shown great potential and influence in the new media era. In the era of new media, the way and speed of information dissemination have undergone fundamental changes. With its unique real-time nature, interactivity, and immersion, live streaming has rapidly become an important part of the new media field. From the initial TV live streaming to today's mobile video live streaming, live streaming technology has been constantly upgraded, and application scenarios have been continuously expanded. This technology changes traditional media's communication pattern and profoundly influences users' ways of obtaining information and social behaviours. This study aims to provide the academic community with a qualified and effective questionnaire to collect the attitudes of contemporary young consumers towards purchasing decisions after watching live broadcasts. As there are currently no verified tools to measure the impact of live streaming on consumers' purchasing decisions, researchers have designed and verified an updated

measurement instrument. Since social media usage patterns are changing rapidly, studies on social media emerge in an endless stream every year, but the relevant scales have not been updated. Most of the previous scales were used to measure consumers' purchasing intentions, but there were very few variables related to consumers' purchasing decisions. Therefore, this study comprehensively measures purchasing decisions from five aspects: influencers, advertising, brands, social media, and trust. Previously, many researchers have developed several scales to measure the factors of consumers' purchasing intentions. This systematic review independently examined the development and implementation of these scales. The scales published for consumer purchasing intentions have not been fully validated. Some scales assess content validity, while others assess surface validity. However, to obtain a fully validated tool, researchers must go through structural and standard-related validity steps. None of the published scales has conducted a complete examination of the instruments used. Therefore, developing a completely effective scale to measure consumers' purchasing decisions is very important. A fully verified tool can help identify the factors influencing consumers' purchasing decisions and promote the formulation of effective purchasing plans to support the development of the live-streaming industry.

2. Literature Review

2.1 The development of social media

"Social media" first appeared in 1994 in the Tokyo online media environment called Matisse (Aichner et al., 2021). There is no universal definition of social media in academia because it has characteristics of both mass media and interpersonal communication, making it difficult to define. According to Carr and Hayes (2105), social media must meet five requirements: Internet-based and offline, which means it supports asynchronous or non-live social interaction. In addition, social media is characterized by interaction and is user-generated, which indicates that its core value comes from the social interaction of other users. Finally, social media is democratic because it requires users to spread interpersonal communication to other audiences. In addition, social media can eliminate the boundaries of time and space, connecting users. As of the end of October 2020, statistics show that mobile device users increased from 5.19 billion to 5.2 billion, Internet users increased from 4.54 billion to 4.66 billion, and social media users increased from 3.8 billion to 4.14 billion. The global population reached 7.81 billion, which shows that the number of people using social media accounts for 53% of the world's total population. According to Boyd and Ellison (2007), founded in 1997, Sixdegrees.com was a site for creating user profiles and sharing friend lists. It was the first SNS to be accepted by the public. In 2000, Sixdegrees.com announced its closure, but the site's functionality and concept survived. After Sixdegrees.com, social media platforms such as MySpace, Facebook, YouTube, and Twitter were created. Twitter, Facebook, Instagram, and TikTok are popular social media platforms allowing users worldwide to communicate and share information. Social media has the characteristics of networking and interaction, and everyone has the right to participate in the virtual Internet community. In these platforms, users are the subject of information and information consumers (Grover et al., 2022). With the rapid development of social media, it is a platform for sharing information and an e-commerce platform. Many brand organizations use social media to reach potential consumers, share and shape product information and efficacy on the platform, and increase product sales and corporate reputation. In addition, the influence of content depends on the communicator, the recipient, and the context. Consumers' consumption experience comes from social media, and other users' purchase reviews will affect customers' consumption decisions. Positive news will increase product sales, while negative information will reduce sales (Grover et al., 2022).

2.2 *The development of social media in China*

Social media is one of the most popular communication tools in contemporary society. It is widely used and spread by users worldwide and has become an inseparable part of people's daily lives. *Social media* is an Internet application based on Web 2.0 that allows users to create and exchange information in the program (Kaplan & Haenlein, 2010). In addition, the rise of social media has closely connected people worldwide regarding communication and entertainment. However, China is different from other countries. China has a strict Internet monitoring and censorship system called the "Great Firewall", which prevents Chinese netizens from quickly accessing foreign social media applications (Fong, 2009). The establishment of this system has promoted the development of China's Internet. According to data from the China Internet Network Information Center, China's Internet penetration rate reached 64% in 2015, and the penetration rate in rural areas exceeded 34%. This data shows that China's Internet is developing rapidly in urban and rural areas. According to the China Internet Report, as of the beginning of 2019, the number of Internet users in China has reached 829 million. China Internet Network Information Centre (2020) reports that the number of mobile Internet users in China has reached 897 million, which accounts for about 69% of the total population of China. China's Internet users reached 1.067 billion in December 2022, in just two years, and the Internet penetration rate reached 75.6% (Jinhui & Tarofder, 2023). Compared with Facebook, Twitter, YouTube, TikTok, and Instagram in other countries, social software such as Weibo, WeChat, TikTok, QQ, and Xiaohongshu dominate China. Under China's "Great Wall" firewall policy, Chinese social software has a fixed audience and is developing steadily.

Weibo and Twitter have similar functions. They are both broadcast network platforms based on user relationship information sharing and dissemination, sharing short real-time information through the following mechanism. WeChat and QQ are cross-platform communication tools that support voice, picture, video, and text. Xiaohongshu and Instagram are the lifestyle platforms of today's young people, and users share wonderful moments in life through these two applications. TikTok is a short video social app for smartphones that allows users to learn a wealth of information and share new things daily. In addition, social media has created a new network marketing model and provided an online operating platform (Y. Chen et al., 2011; Hanna et al., 2011; Sajid, 2016). Taobao is a popular online shopping retail platform in China, where abundant goods and reasonable prices have become its label. Moreover, there is a significant relationship between the use of mobile applications for online shopping and social media, and Chinese people's online shopping is closely related to social media (Hossain et al., 2020). In addition, social media in China has also dabbled in online teaching, politics, healthcare, and mobile payments.

2.3 *The development history of social media influencer*

As social media permeates People's Daily lives, more and more social media influencers have emerged. The researchers define social media influencers as a new type of online performance of people who use social media platforms to promote interaction and generate personal value (Leung et al., 2022). The rapid development of the Internet today has provided many employment opportunities for ordinary people, and more and more people have stepped out from behind the scenes to the front of the screen through social media. In addition, the two-way and synchronous communication influencers provided through social media have also established a bridge between fans and followers for the public (Baker & Rojek, 2020). Due to the broad reach of social media, there are representative influencers in every industry (Dhanesh & Duthler, 2019). Influencers' influence is becoming more widespread, so influencer marketing has become today's mainstream marketing method. Influencer marketing uses popular users on the Internet to endorse or sell products and brands and share ideas and services on their accounts in

exchange for commercial value and compensation (Campbell & Farrell, 2020). The types of influencers can be divided by the number of followers: 5000-20,000 followers are micro influencers, 100,000-1,000,000 followers are macro influencers, and more than 1,000,000 followers are super influencers (Syrdal et al., 2023). Currently, social media influencers are ranked as high earners in the United States, and the larger the number of followers, the higher the influencer's income. Influencers with over 1,000 followers and over 270 million views on TikTok can earn up to \$100,000 annually. Instagram is also one of the leading development platforms for influencers. Influencers with more than a million followers can earn over \$250,000 by promoting their brand (Scipioni, 2021).

Unlike traditional celebrities, social media influencers are innovators and communicators (Wu et al., 2022). The role of an influencer is to create opportunities for ordinary people to become famous so that celebrity is no longer an unreachable career. With the rapid development of the marketing industry, influencers and brand marketing have made remarkable achievements. In recent years, live streaming has become a widespread form of communication in which users and influencers can interact in real-time and two-way. Live streaming is used as a direct sales channel for enterprises, and the global live-streaming industry will be worth about \$988 million in 2021, and experts predict it will reach \$534.37 billion in 2030 (Future, 2021; CISION, 2021). Influencers need to establish a close relationship with their followers, which is an interactive, reciprocal, and co-creative relationship. Influencers on social media attract followers to browse and comment on their lives by sharing and showing their lives. Compared with celebrities, influencers are closer to their fans. Therefore, followers are often strongly willing to buy influencers' endorsements and trust them to share sponsored content (Lou, 2022). Brand owners value the characteristics of influencers and sell products to consumers through the detailed introduction and display of products by influencers in live broadcasts or daily posts. The audience's active participation in live broadcasts or posts, whether liking comments or sharing, is a kind of traffic and return (Lin et al., 2018). In the Internet age, social media influencers have become the third voice of brands, and many advertisers use influencers' influence to recommend their products. As influencers gain a high online presence, endorsements for influencers soar, ranging from hundreds of thousands to millions of dollars (Hopper HQ, 2023). The global pandemic in previous years has shifted brand marketing from traditional advertising to influencer marketing. During the pandemic, social media engagement increased by 61% over normal usage, and the influencer marketing industry grew by approximately \$9.7 billion (Wang et al., 2021). The influencer marketing industry is growing, and although brands have requirements for the content released by influencers, platforms should also exercise specific control over the environment to make the industry's development healthier (Rees-Roberts, 2020).

2.4 The history of influencers in China

The rapid development of interactive digital technology has made social media popular worldwide, and the number of users has gradually increased. According to statistics, there will be more than 930 million social media users in China in 2021, which has increased by 110 million users compared to 2020 (Kemp, 2021). Influencers spread and share content through social media and attract many followers through personal charm and characteristics (Lou et al., 2019; Ye et al., 2021). Moreover, "influencer" has frequently appeared in the public eye in recent years. A social media influencer participates in specific topics on a social account and updates information promptly (Hermenda, 2019). There is a term for influencers in China called "Wanghong," which means "red on the Internet," and red represents an active user base and widespread attention (Sun, 2022). China's influencer market is the world's largest social media market, and Chinese teenagers are the primary social media users. People born after 1995 are called Generation Z, accounting for 17% of China's total population. As natives of the digital age, they are also potential consumers (Statista, 2022b). As the primary social media users, young Chinese often pay attention to influencers and current trends. Bilibili is a comprehensive video community that belongs to the diversified

entertainment needs of the young generation in China, and 80% of the users who follow Chinese head influencers on Bilibili as of April 2021 are young people aged 24 and below (Statista, 2022a). TikTok is a short video social app for smartphones that has grown in recent years to become one of the world's most popular social media platforms. According to the data, TikTok has over 800 million users worldwide, including over 400 million in China (Yang & Ha, 2021).

Since the 1990s, with the advancement of technology, digital marketing and online sales have surpassed traditional methods and become mainstream. Social media platforms play an important role in the retail industry. China's social media platforms have 900 million active users daily, and millions of users spend 70 minutes daily on WeChat (Statista, 2018). Many young people look up to online influencers and follow their fashion tastes, lifestyles, and intellectual talents. 70% of young people in China buy goods on social media platforms (Sun et al., 2022). Consumers follow influencers on social media and follow, like, comment, and share the influencer's posts. Brands collaborate with influencers to implicitly put their products into their posts and promote the brand's products by having consumers imitate the influencer and follow in their footsteps. The scale of influencers in China is on the rise, and the scope of influencers is gradually expanding to the fields of beauty, games, movies, and food.

2.4.1 Li Jiaqi

There is enormous potential for online shopping in China. In the first half of 2023, China's online retail sales reached 7.16 trillion-yuan, accounting for 26.6% of social consumer retail sales (Jinhui & Tarofder, 2023). The granddaddy of social media influencers, Li Jiaqi, was once an ordinary L'Oreal employee who gained many fans online for his outstanding looks and professional communication skills (Qiu, 2020). The outbreak of the epidemic has changed consumers' lifestyles. People forced to stay at home have begun to consider how to buy goods, which has also prompted the development of e-commerce. In 2018, Li Jiaqi generated 3.53 million yuan of GMV in 5.5 hours of live streaming on Taobao (Global Times, 2018). As one of China's most well-known influencers, Li Jiaqi conducted over 240 live broadcasts in 2020, covering multiple categories such as beauty, daily necessities, home appliances, food, and clothing. During the 2021 Double 11 Shopping Festival, Li Jiaqi sold 439 products in his live broadcast room, with final sales of up to US\$1.9 billion (Li et al., 2023). Li Jiaqi's straightforward personality is an important reason for his fans. In the live broadcast room, he gets along with fans as friends, introduces product information to consumers from a professional perspective, and answers their questions to sell products. In addition, Li Jiaqi has also devoted himself to poverty alleviation and public welfare, promoting products and stimulating consumption in various provinces in China (Li et al., 2023).

2.4.2 East Buy

With the rapid development of the live broadcasting industry, the model of "live + e-commerce" has become an important means of e-commerce sales. As a branch of Internet live broadcast, live delivery has opened a new track in the e-commerce model. Merchants do not need to pay high rents offline but sell goods directly to buyers through online platforms, expanding the sales model of merchants and increasing the scope of market operations. According to CNNIC, as of June 2023, the number of Internet users in China reached 1.079 billion, an increase of 11.09 million people in half a year from December 2022, and the Internet penetration rate reached 76.4% (X. Guo, 2024). East Buy is an e-commerce platform under the New Oriental Education Group. The platform has attracted many fans with its "bilingual" and "cultural" live broadcasting. East Buy has its supply chain, distribution channels, and after-sales service. The platform is mainly positioned to help agricultural development, but East Buy has also developed many sub-platforms, including beauty, clothing, books, and home appliances (Y. Guo, 2024). East Buy was formerly an education

and training institution, but it gradually transformed into an e-commerce platform under the double reduction policy. On October 30, 2021, New Oriental announced the suspension of compulsory education subject training. On December 28, 2021, it announced the establishment of East Buy and officially entered TikTok to start live-streaming sales (Song & Mo, 2024). The anchors of East Buy are all former English teachers of New Oriental, so they pioneered knowledge-based live streaming. The teacher-transformed livestream uses bilingual sales while spreading knowledge of Chinese culture, history, and geography. In the week from June 10 to June 16, 2022, East Buy's followers soared from 2.3 million to 12.88 million, with a single-day peak of 4.3 million followers. Since then, East Buy's influence has grown. As of July 15, East Buy's fans have reached 22.3136 million, its live broadcast sales in the past 30 days have reached 780 million yuan, and the single live broadcast sales have exceeded 50 million yuan (WU et al., 2024). Based on TikTok's many users, East Buy significantly increased communication by building emotions with consumers and resonating and conveying emotions. As a result, East Buy's knowledge-based live-streaming products have become a leader in the live-streaming industry and have helped the development of China's agriculture.

2.5 The Chinese cosmetics industry

The cosmetics industry is one of the most booming industries today and belongs to China's five major consumer goods industries. In the past 30 years, China's cosmetics industry has gradually gone from unknown to the world's second-largest market (Rungruangjit, 2022). As the demand for cosmetics continues to grow, more and more Chinese consumers are willing to spend time and money dressing themselves up. China's per capita consumption of cosmetics is US\$50, which is lower than the global level, but China is the most promising cosmetics market and has room for growth. Foreign brands have long occupied a place in the Chinese cosmetics industry. In recent years, local Chinese brands have proliferated and become indispensable in the cosmetics industry (Yang & Meng, 2021). According to statistics, the daily sales of Taobao live streaming are as high as \$3 billion, and the live streaming generated \$65 billion in GMV between 2019 and 2021 (Bu et al., 2019). Cosmetics sales accounted for 16% of the share. In 2019, the market share of local Chinese cosmetics brands reached 56%, and it took only four years for Chinese domestic brands to dominate the cosmetics sector (Yang & Meng, 2021). In recent years, Florasis, Winona, and Perfect Diary have played an important role in domestic cosmetics brands, especially Winona and Perfect Diary, which have also completed the listing. Therefore, under the substantial publicity of influencers, domestic brands have occupied a place.

2.6 Cosmetics purchasing decisions of young Chinese female consumers

About a decade ago, women became the main force of consumption in China, and the "She economy" concept was popularized in China. In recent years, the popularity of online shopping has further expanded the influence of the "She economy" (Li, 2020). Live streaming e-commerce is a new online marketing model that presents product information to consumers three-dimensionally through the host's demonstration and sharing (Xie et al., 2019). With the rapid rise of e-commerce, the two-way interaction between live broadcasts and the audience is one of the characteristics of live broadcast sales. Because of this extraordinary sense of participation, more and more audiences are attracted to join. As of December 2022, the ratio of male to female netizens in China is 51.4:48.6, of which 507 million are female. In addition, the target audience of TikTok and Kuaishou platforms is young Chinese women, accounting for 56.4%, and users aged 18-40 are as high as 63.6% (Jinhui & Tarofder, 2023). The online shopping potential of young female consumers continues to grow and gradually becomes the leading force in shopping consumption. With young Chinese women taking an increasingly heavy share of the consumer market, major online retailers have set up "Queen's Day" and "Goddess Day" specifically for women, during which

all products enjoy deep discounts. According to Ali, data show that the size and number of Chinese females in the market have shown explosive growth compared with 2015 and 2017, when female online consumption increased by 64% (Li, 2020). In e-commerce, women have shown absolute purchasing power, and young female consumers have gradually become the backbone of China's retail consumer market.

3. Methodology

This study adopts quantitative research, which is used to study the influence of social media influencers on young female Chinese consumers' decisions to purchase cosmetics. In this study, Baoji College of Arts and Sciences, Chang'an University, Xi'an Sport University, and the Shaanxi University of Technology were selected by a probability sampling method in Shaanxi Province, and the research objects also included young females aged 18-35 who were born or studied in Shaanxi Province. The researchers conducted a pre-test before collecting actual data.

A pre-test was conducted to ensure that the data used in this study were complementary to its purpose, which included the following:

1. To determine the reliability and validity of the questionnaire.
2. Ensure the questionnaire is clear, well-designed, and in a reasonable order.
3. Determine whether all questions answer the research objectives.
4. Determine the time required to answer the questionnaire.

The questionnaires were checked after the pre-test and adjusted according to the results. The results obtained from the pre-test were used in the actual questionnaire.

Then, the questionnaire was spread among friends with the help of social media software such as WeChat and Weibo, and the survey results were summarized on the survey website.

All questionnaires were coded and manually entered SPSS version 26; the variables analyzed were divided into two main areas:

Consumer's background and live shopping information.

1. Consumer's socio-demographic information, i.e., gender, age, ethnicity, education level, and income.
2. A Platform for watching live broadcasts.
3. The number of following influencers.
4. Live broadcast of purchasing cosmetics.

Meanwhile, the second area to be analyzed is the factors that influence purchasing decisions, including:

5. Social media influencers' expertise
6. Informative Advertising
7. Brand admiration
8. Social media interactivity.
9. Trust

The pre-test took about a month to complete, during which the researchers collected 292 questionnaires (such as age incompatibility, income of 0, outliers, and IP addresses from other provinces). The actual situation of the questionnaire in this study is that 292 young female consumers have purchased cosmetics through live online broadcasts; there are 292 valid

questionnaires. This study will explore the impact of social media influencers on the cosmetics purchasing decisions of young female consumers in China.

3.1 Operationalization of the Variables

3.1.1 Social media influencers' expertise

The degree of understanding, skill, and knowledge the endorser perceives is expertise (Exp). Influencers often rely on their expertise and reliable sources of information to convince most people that their information is authentic and valid (Masuda et al., 2022). Brands will use social media influencers' popularity and expertise to market their products and brands. Most consumers believe that online celebrities are more credible than advertisements. Moreover, Masuda et al. (2022) believe that expertise directly influences the decision to persuade consumers to buy products. Thus, more expertise is needed to maintain the credibility of influencers. A four-item questionnaire on a five-point Likert scale. They are adapted from (Masuda et al., 2022).

Table 1
Social media influencers' expertise

Construct	Item	Measure
Social media influencers' expertise (Exp) (Masuda et al., 2022)	Exp1	I feel SMI knows a lot
	Exp2	I feel this SMI is competent to make assertions about things that this SMI is good at
	Exp3	I consider this SMI an expert on his/her area
	Exp4	I consider this SMI sufficiently experienced to make assertions about his/her area

3.1.2 Informative Advertising

The ability to inform users about product choices to make choices that produce the highest value is defined as informative (Lee & Hong, 2016). The main reason for the success of Internet advertising is content. The informational nature of social media advertising means that consumers' cognition and understanding of content information. The content includes brands, prices, discounts, links, sizes, and functions that consumers often pay attention to (Tan et al., 2021). When an advertisement provides an accurate description of a product, consumers will find the value, so informative advertising encourages consumers to make an informed purchase decision (Lee & Hong, 2016). A three-item questionnaire on a five-point Likert scale. They are adapted from (Lee & Hong, 2016).

Table 2
Informative Advertising

Construct	Item	Measure
Informative Advertising (Inf) (Lee and Hong, 2016)	Inf1	Information obtained from the ad would be useful
	Inf2	I would learn a lot from using the ad
	Inf3	I think the information obtained from the ad would be helpful

3.1.3 Brand admiration

In a competitive market, established brands are one of the advantages that attract consumers. When consumers buy a branded product, the reason is its functional benefits and the symbolic meaning of the brand. Furthermore, brands support and reinforce consumers' self-expression through their unique image (Aw et al., 2021). Customers appreciate a brand that meets their needs and preferences. Moreover, consumers choose respected brands among similar products (Modyop et al., 2022). Consumers' favourable emotions towards a product or brand will increase their purchase intention (Gupta et al., 2021). A three-item questionnaire on a five-point Likert scale. They are adapted from (Modyop et al., 2022).

Table 3
Brand admiration

Construct	Item	Measure
Brand admiration (Ba) (Modyop et al., 2022)	Ba1	I prefer this brand rather than any other brand
	Ba2	I would consume this brand more than any other brand
	Ba3	I would be inclined to buy products from the brand instead of those from other brands.

3.1.4 Social media interactivity

Interactivity is one of the most critical aspects of the online space related to social media platforms. Interactivity is the degree to which participants in the communication process have control over the communication and can switch roles in their mutual discourse. *Interactive communication* is defined as communication in which individuals provide active control and allow them to synchronize with each other (Huang, 2012). According to Kiousis (2002), interaction is the ability of media platforms to provide synchronous communication. In e-commerce, websites serve as communication tools that enable consumers to interact with sales representatives online. A three-item questionnaire on a five-point Likert scale. They are adapted from (Huang, 2012).

Table 4
Social media interactivity

Construct	Item	Measure
Social media interactivity (Int) (Huang, 2012)	Int1	Social media facilitates two-way communication
	Int2	Social media makes me feel like it wants to listen to its members
	Int3	Social media enables conversation among members

3.1.5 Trust

Trust is a willingness to be vulnerable to positive expectations of another person's future behavior. (Dwidienawati et al., 2020). During the live broadcast, social media influencers introduce and recommend all products, and the influencers' consumers trust the quality of the brand's products. When consumers develop Trust in social media influencers, they trust these online celebrities' reviews and the authentic quality of products (Lu & Chen, 2021). Trust plays an important role in online transactions because of the willingness of the parties to exchange money and products without face-to-face interaction. A company's timely announcement of its affairs will enhance customers' Trust in the company, which makes information transparent to customers (Halim & Karsen, 2020). An eight-item questionnaire on a five-point Likert scale. They are adapted from (Halim & Karsen, 2020).

Table 5
Trust

Construct	Item	Measure
Trust (T) (Halim and Karsen, 2020)	T1	I trust to purchase because of the platform is reliable
	T2	I trust to purchase because of social media influencer of the business
	T3	I trust to purchase because of business organization
	T4	I trust to purchase because of the brand
	T5	I trust to purchase because of clear information
	T6	I trust to purchase because of comfortable using the platform

3.1.6 Purchase decision

Social media has revolutionized the way people communicate and share information and interests. With the emergence of more and more online shopping software, people's shopping habits have also changed from offline to online. Examining how social media affects customers' purchasing decision-making process in this environment is important. The purchasing decision

describes a customer's process when purchasing a product. It consists of five stages: problem identification, information search, alternative evaluation, purchase decision, and post-purchase behavior (Yogesh & Yesha, 2014). A three-item questionnaire on a five-point Likert scale. They are adapted from (Yogesh & Yesha, 2014).

Table 6
Purchase decision

Construct	Item	Measure
Purchase intention (Pc) (Yogesh and Yesha, 2014)	Pc1	I trust friends review
	Pc2	I trust review from strangers
	Pc3	Social media plays role in decision making

3.2 Instrument design

A questionnaire was constructed in English. The questionnaire was then translated into Chinese, as the study was conducted in a Chinese context. To ensure similar meaning in the translation process, one translator first translates the original English questionnaire into Chinese, and another translates it into English (Brislin, 1970). Forward translation: The original English scale will be translated into Chinese by two Chinese professors of communication, and the Chinese version will be repeatedly refined in terms of items, scoring principles, content, and language. As for the back translation, two Chinese American communication experts were invited to translate the Chinese version of the scale back to the English version, which was carefully compared, reviewed, calibrated with the original English scale, and fine-tuned according to the situation of Chinese influencers. The researchers conducted a pretest before the data collection and developed a set of questionnaires after the test. After the first pretest, researchers refined and clarified the survey. Moreover, to ensure that respondents could easily understand the meaning of the questions, the researcher proposed changing the questions' language to everyday language and discarding some of the more technical terms. The survey includes appropriate instructions, and the purpose of the study is to ensure that the respondents are aware of the situation.

After further adjustments to the items, the researchers agreed on the final version of the questionnaire. The researchers used a recall method to obtain respondents' perceptions in the survey. Respondents were asked to recall their live viewing experience and respond to the items based on the experience. The recall method was used to collect perceptual data through personal memory, and the recall process helps people shape perceptions through long-term memory. Therefore, the recall method was applied to this study. This study used a five-point Likert scale to measure respondents' perceptions and feelings: 1=strongly disagree, 2=disagree, 3=basically agree, 4=agree, and 5=strongly agree.

The respondents were selected based on their involvement with the content; therefore, the questionnaire was divided into three parts. The first part is a valid sample screening to determine whether the respondents watched a live broadcast and made a purchasing decision during the live broadcast. The researchers targeted consumers who were tied to the live-stream platform. By doing this, only respondents who positively confirmed the screening were considered sample. In this part, two questions are initially set to screen effective samples. The second part is the basic information of the interviewees, including age, gender, and disposable income. The researchers initially set up 4-5 questions in this part. The last part is the attitude and behavior of the youth group watching the live broadcast. The last part of the questionnaire divided questions into sections

based on the objectives. Therefore, it projected the independent, mediator, and dependent variables. Each variable section is initially set with 10-15 questions.

Researchers need to reduce the length of the questionnaire by removing unnecessary questions. However, the questionnaire length should contain enough items to measure the relevant variables without respondents getting tired and impatient while filling out the questionnaire. After completing the first version of the questionnaire, the researchers need to conduct a regular distribution analysis of the data because the normal distribution test is the premise of all data analysis. A normal distribution is considered when the skewness of the data is between -1 and 1 or when the median and mode of the items are approximately equal. Secondly, the validity test of the questionnaire is the process of analyzing the reliability of the survey questions. The validity of the questionnaire depends on its measurement purpose, and the validity explains the extent to which the collected data covers the actual survey field. This study used the Kaiser-Meyer-Olkin test to detect the variable adequacy. When the KMO value is more significant than 0.6, it proves sufficient correlation between items, so factor analysis is suitable for this study. In addition, the consistency of the survey results was verified by checking the reliability of the questionnaire. Reliability is necessary for the instrument and determines the study results' stability, internal consistency, and equivalence. When Cronbach's alpha is ≥ 0.7 , all projects will be accepted. When Cronbach's alpha is lower than 0.7, relevant projects must be modified.

4. Results and discussion

4.1 Normality test

Before using statistics on the collected data, the researchers cleaned and integrated the data to ensure that the data used in the analysis was valid. After that, the researchers conducted preliminary data analysis and processing, using normal tests to determine whether the data had a normal distribution. The normal test is mainly used to judge whether the data obeys or approximate the normal distribution, an essential statistical probability distribution type. The Kolmogorov-Smirnov and Shapiro-Wilk tests are among the most effective methods for normality tests. Kolmogorov-Smirnov test (K-S test) is suitable for large samples (SPSS recommends the use of $n \geq 50$). The Shapiro-Wilk test (S-W test) is suitable for small samples. The P-value is compared to the significance level to determine whether the data does not follow a normal distribution. The usual significance level (expressed as alpha or α) is 0.05. $P \leq 0.05$: data does not follow a normal distribution; $P > 0.05$: data is normally distributed. The researchers tested the normal distribution of 292 data sets. Since the sample size of this data is greater than 50, the Kolmogorov-Smirnov coefficient shall prevail. It can be seen from Table 7 that the coefficient of SMI's expertise is 0.059. The coefficient of Informative Advertising is 0.08, the coefficient of Brand admiration is 0.115, and the coefficient of social media interactivity is 0.160. The coefficient of Trust is 0.091, and the coefficient of Purchasing decision is 0.156. The P-value of the K-S coefficient is more significant than 0.05 on average, so the data does not conform to a normal distribution.

Table 7
Tests of Normality

Kolmogorov-Smirnov			
Variable	Statistic	df	Sig.
SMI' expertise	.059	292	.017
Informative Advertising	.080	292	.000
Brand admiration	.115	292	.000
Social media interactivity	.160	292	.000
Trust	.091	292	.000
Purchasing decision	.156	292	.000

The normal distribution skewness should be between -1 and 1, or the mean, median, and mode values should be roughly equal. As seen from Table 8, SMI's expertise, Brand admiration, and Trust present a substantially negative skewed state. Informative advertising, social media interactivity, and purchasing decisions show a moderately and negatively skewed state. Therefore, some data do not have a normal distribution.

Table 8
Skewness and Kurtosis of Data

Variable	Mean	Median	Mode	Skewness	Kurtosis
SMI' expertise	3.8001	3.8182	4	-0.172	0.066
Informative Advertising	4.0348	4.0769	4	-0.331	-0.378
Brand admiration	3.7329	3.6667	3	-0.240	-0.236
Social media interactivity	3.9733	4	4	-0.363	0.165
Trust	3.6295	3.6	3	0.088	-0.374
Purchasing decision	3.7543	4	4	-0.342	0.449

In the process of testing, the data showed a negative skew. Before any analysis, the researchers identified states where some projects exhibited substantially negative and moderately negative skewing. Researchers need to convert the negative skewness data into positive skewness first and then apply the Lg10 and SQRT transformations to SPSS for data transformation. Based on the state of the data presented, SMI's expertise, Brand admiration and Trust, Lg10's conversion method, Informative Advertising, Social media interactivity, and Purchasing decisions use SQRT's transformation method. Data transformation is important at this stage to ensure the data is valid for higher statistical analysis. Tables 9 and 10 show that most data present a normal distribution after the data conversion.

Table 9
Lg10 transformation

Variable	Mean	Median	Mode	Skewness	Kurtosis
SMI' expertise	0.3197	0.3388	0.30	-0.617	-0.148
Brand admiration	0.3243	0.3680	0.48	-0.515	-0.588
Trust	0.3557	0.3802	0.48	-0.811	0.312

Table 10
SQRT transformation

Variable	Mean	Median	Mode	Skewness	Kurtosis
Informative Advertising	1.3887	1.3868	1.41	0.023	-0.504
Social media interactivity	1.4049	1.4142	1.41	-0.46	-0.405
Purchasing decision	1.4803	1.4142	1.41	-0.125	-0.085

4.2 Reliability and validity

Validity analysis usually refers to the validity and correctness of the questionnaire scale, that is, to analyze whether the design of questionnaire questions is reasonable. The validity analysis of the questionnaire is based on the principal component factor analysis, which is realized by comparing whether the factor load coefficient of the item is optimal in the same principal component. The Kaiser-Meyer-Olkin (KMO) test is used to check the adequacy of the data, while the Barlett test is used to measure the correlation matrix. KMO and Bartlett's Test evaluate whether the data is suitable for factor analysis. When Bartlett's probability P value is less than 0.05, and the KMO value is more significant than 0.6, the criteria of factor analysis are met. Kaiser-Meyer-Olkin (KMO) measure: The KMO statistic ranges from 0 to 1 and is used to verify the degree to which the sample data is suitable for factor analysis. Generally, the value of the KMO statistic above 0.7 (0.6) is considered good, and the closer the value is to 1, the higher the degree of data suitability for factor analysis. (See Table 11). According to Table 12, the KMO value of each variable is more significant than 0.7, and the P-value is less than 0.05.

Table 11
Standard judgement for Kaiser-Meyer-Olkin (KMO)

KMO value	Measurement of sampling adequacy
0.90 above	Marvelous
0.80 above	Meritorious
0.70 above	Middling
0.60 above	Mediocre
0.50 above	Miserable
0.50 below	Unacceptable

*Adopted from Qiu (2012)

Table 12
KMO of Variables According to Each Question. (n=292)

Variable	KMO	N of Items
SMI' expertise	.935	11
Informative Advertising	.878	13
Brand admiration	.730	3
Social media interactivity	.864	5
Trust	.796	5
Purchasing decision	.836	4
Total	.936	41

The reliability of the questionnaire was tested by Cronbach's alpha, which provided an easy way to measure whether the scores were reliable. Cronbach's alpha is a measure of internal consistency and is also considered a measure of scale reliability. Cronbach's alpha ranges from 0 to 1. In general, Cronbach's alpha values greater than 0.7 are considered acceptable. A high alpha level indicates that the items under test are highly correlated (Lavrakas, 2008). According to Rong (2012), Cronbach's alpha ≥ 0.7 is highly reliable. $0.35 \leq$ Cronbach's alpha < 0.7 is considered to have medium confidence, while Cronbach's alpha < 0.35 is not reliable. As a result, items below 0.35 are removed from the analysis. Conversely, factors with eigenvalues of 1 or greater are considered significant. The eigenvalue is the ratio between the ordinary and specific variance, interpreted by the specific factor extraction (Ho, 2006). It can be seen from Table 13 that Cronbach's alpha coefficient of each variable is more significant than 0.8 on average, which indicates that the questionnaire has high reliability and validity.

Table 13
Cronbach's Alpha Analysis of Variables According to Each Question. (n=292)

Variable	Cronbach's Alpha	N of Items
SMI' expertise	.932	11
Informative Advertising	.883	13
Brand admiration	.861	3
Social media interactivity	.893	5
Trust	.824	5
Purchasing decision	.880	4
Total	.955	41

5. Conclusion

The scale reviewed in this study can be used to develop new scales. Using valid and reliable instruments, the newly developed research tool follows detailed validation steps to measure social media influencers' influence on Chinese female consumers' purchasing decisions. The final version of the questionnaire consists of six factors and covers 41 items. These 41 projects can collect information about social media influencers' expertise, informative advertising, brand admiration, social media interactivity, trust, and purchasing decisions. The questionnaire measures the factors that influence consumer purchasing decisions from multiple dimensions, thus ensuring that the questions in the questionnaire can be correctly understood and interpreted by the respondents during the survey.

The questionnaire designed by the author meets the need to obtain information about the influence of influencers on the cosmetics purchasing decisions of young female consumers in China. This work provides a new measurement tool that can be used to understand the reality of consumer purchasing decisions, which is an important step before putting this questionnaire into practice. In this study, 292 Chinese female consumers were collected through WeChat, Weibo, and link sharing through online collection methods. At first, the researchers conducted a normal distribution analysis on the data and found that the data presented a negative skew distribution. After that, the researcher converted the negative skewness data into positive skewness data by transforming the data and then converted the data into a normal distribution by the Lg10 and SQRT methods. The content validity assessed by a panel of expert reviewers showed a highly consistent level of relevance and accuracy in the project. The total KMO value of 0.936 indicates that the data is more suitable for factor analysis. In addition, the reliability analysis of the final questionnaire showed that Cronbach's alpha coefficient was 0.955, which is a high reliability.

This study also has limitations: First, the research was conducted using the method of probability sampling, which, to some extent, limits the extensibility of the research conclusion; Secondly, the research data is based on a specific range of surveys. There will be certain deviations if the research conclusions are extended to any media form and group of people. Thirdly, 90% of the respondents are 25 years old or younger, which means they may use social media more than the public. Therefore, whether the hypothetical relationship reported in the current study applies to other groups requires further testing. Despite certain limitations, this study fills the gap in consumer purchasing decisions and develops a brand-new measurement scale.

Given the above, the questionnaire developed by the researchers is valid and reliable for assessing the influence of influencers on the cosmetics purchasing decisions of young Chinese female consumers. Thus, the tool's accuracy and reliability in measuring and investigating phenomena are proven. Researchers can use the tool to measure the influence of influencers on consumers' purchasing decisions, which can help further explore the relationship between influencers and consumers.

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The study was carried out by WJY, NMMM and, AA. WJY is the first author to conduct the research, analyze the data, and write the paper. NMMM was responsible for developing the research direction and revising the questionnaire. AA was responsible for reviewing, editing, and revising the manuscript.

Conflict of Interest

No conflict of interest associated with this publication.

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