How to Shop Online: The Construct and Measurement of Consumer Competency in Online Shopping

Guofang Liu, Xiao Li, & Qingxuan Meng

School of Economics and Management, Shanghai Maritime University, Shanghai, China

Abstract

Lower levels of consumer competency are a major obstacle preventing consumers from benefitting from online shopping. However, the literature provides little information on consumers' competency in online shopping. Based on the consumption decision-making process model, in Study 1, 12 college students with rich experience in online shopping were interviewed. A three-step coding process was conducted, and the results illustrated the key competencies of online shopping, i.e., product identification, self-control, support for decision-making, and consumer protection. Based on the results of Study 1 and the knowledge-attitude-skill model, Study 2 developed three subscales to evaluate college students' knowledge, attitude, and skill regarding online shopping in standardized and systematic ways. The validity of the instrument was examined in a sample of 648 college students. Study 3 further examined and demonstrated the quality of the three subscales in a new sample of 494 residents. Moreover, a latent profile analysis (LPA) divided the participants into three groups based on their consumer competency: low-, median-, and high-competence consumers. The findings contribute to the literature on consumer competency and online shopping and have different implications for consumers, the government, and corporations.

Introduction

In recent years, platform economies such as online shopping have played an increasingly important role in the world's economy and individuals' daily lives. In China, in 2021, more than 842 million consumers shopped online, and online retail sales reached 13.1 trillion yuan (approximately 192 billion US dollars; CNNIC, 2022). Although online shopping contributes both to the world's economic development and consumer welfare, not all consumers have the opportunity and willingness to shop online. Therefore, an increasing number of researchers have investigated the influencing factors and mechanisms of the acceptance of online shopping. It was found that consumers' demographic characteristics (e.g., age, gender, educational level), personal innovativeness and value orientations, concerns about security, self-efficacy, and the features of shopping channels were significant factors of consumers' behaviors in online shopping (e.g., Chiang & Dholakia, 2003; Dabija et al., 2022; Hansen, 2008; Lian & Lin, 2008; X. M. Liu et al., 2017; Pop et al., 2023).

Theoretically, engaging in online shopping can benefit consumers due to the rich variety of products and convenient shopping. However, insufficient competency may prevent consumers from obtaining the benefits of

online shopping. For example, incompetent consumers may suffer from bad decision-making, impulsive consumption, and online fraud (Adkins & Ozanne, 2005; Chopdar & Balakrishman, 2020; CNNIC, 2022). The influences of consumer competency on consumer satisfaction and welfare have been repeatedly investigated in traditional offline consumption (e.g., Fernandes et al., 2020; Mansfield et al., 2020; Mhlanga & Kotzé, 2014; Stewart & Yap, 2020; Viswanathan et al., 2021). However, studies of consumer competency in online shopping are highly inadequate. Moreover, the differences between online and offline shopping inhibit the transfer of information about offline shopping experiences to online shopping. Therefore, it is important to examine the construct and performance patterns of consumer competency in online shopping.

To investigate the construct of consumer competency in online shopping, this study first interviewed 12 college students with rich experience in online shopping. A three-step coding process (Saldaña, 2013) was conducted under the view of the consumption decision-making process model (Panwar et al., 2019). Study 1 illustrated four key elements of consumer competency in online shopping: product identification, self-control, support for decision-making, and consumer protection. To provide a systematic instrument to measure individuals' consumer competency in online shopping, Study 2 developed three subscales under the view of the knowledge-attitude-skill model (G.-f. Liu & Zhang, 2022). Study 3 further examined the quality of the instrument and participants' competency performance patterns. By doing so, this study identifies the construct of consumer competency in online shopping and develops a set of standardized measurements for it. Theoretically, this study provides a conceptual basis and measurement tool for future studies. Practically, this study may facilitate the government and managers of platform enterprises to evaluate and increase consumers' competency and thus improve the sustainability of the platform economy.

Theoretical Background of Consumer Competency

Consumer competency indicates the competence needed by consumers to function effectively and rationally in the marketplace (G.-f. Liu & Zhang, 2022; Park et al., 2011). For example, competent consumers should have the abilities to think, identify their needs, recognize essential products, compare prices according to value, and be vigilant toward salespersons (Lachance & Choquette-Bernier, 2004). Competencies when buying electronic products comprise knowledge of the product, expectations for product use, and skills for information search and consumer protection (Lu & Zhuang, 2021). Researchers have also found that competent consumers are more likely to be sensitized to outcomes, avoid waste, and adopt prevention approaches to avoid deception (Chinedu et al., 2016; Fernandes et al., 2020). In contrast, less competent consumers frequently struggle with biased decision-making and unsatisfactory consumption (Mansfield et al., 2020; Mhlanga & Kotzé, 2014; Stewart & Yap, 2020). To respond to the banding effect of low competency, several researchers trained low-competence consumers (e.g., Donohue et al., 1983; Viswanathan et al., 2021) and found that the training programs improved consumers' knowledge, understanding of consumption information, and ability to make rational decisions. Consumer competency is therefore an important influencing factor of consumer satisfaction and welfare.

To the best of our knowledge, few studies have investigated consumer competency in online shopping (e.g., Andronie et al., 2021; Pop et al., 2023). Parker and Kuo (2022) found that consumers who valued efficiency and time were more likely to engage in online activities; consumers' concerns about the security and the leakage of private information inhibited their willingness to shop online (Parker & Kuo, 2022; Rodríguez-Torrico et al., 2019; J. Sun & Chi, 2018). Several researchers have also investigated participants' financial literacy in cyber-situations. Research has found that consumers frequently had weak financial security awareness and risk identification and control abilities (H.-Y. Liu et al., 2021). Consumers' characters such as their gender, age, health situation, educational level, and social status affect their level of financial competency significantly (Andronie et al., 2021; Z. Q. Xin & Mu, 2020). Education is a valid way to improve consumers' financial competency, especially for college students (CFPB, 2019; H.-Y. Liu et al., 2021; OECD, 2015). This trend is consistent with the reality that online shopping platforms are inclined to launch consumer credit products (e.g., Jingdong IOU and Ant Huabei) to tempt lower-income consumers. Therefore, improving consumers' competency and enhancing their ability to identify risks will help them make rational decisions. However, the current literature has not provided enough evidence to understand consumer competency in online shopping.

Although the literature on consumer competency in online shopping is quite limited, studies in the context of offline shopping provide significant implications. Consumer competency is frequently investigated on the basis of the consumption decision-making process model and the knowledge-attitude-skill model (see the review of G.-f. Liu & Zhang, 2022). From the perspective of the consumption decision-making process model, consumers may

make decisions through several stages, including identifying consumer demand, information search, product comparison, purchase decision-making, and post-purchase behaviors (Panwar et al., 2019). Accordingly, consumer competency has been conceptualized as the necessary knowledge and capacities for decision-making processes, such as understanding the information of products, comparing prices according to value, responding to the influences of marketing, and promoting consumers' rights (Grønhøj, 2007; G.-f. Liu & Zhang, 2022; Mhlanga & Kotzé, 2014). Some researchers have proposed more concise views. For example, Chinedu et al. (2016) proposed that consumer competency consists of preventive and defensive constructs. Preventive competency indicates the cognitive abilities that consumers exhibit before purchasing, such as information search and vigilance toward marketing. Defensive competency indicates consumers' self-protective behaviors after purchasing, such as keeping the receipts of purchases and returning unsatisfactory products. It can be concluded that the decision-making process model provides a visualized and operable approach to illustrate the construct of consumer competency. That is, researchers can observe consumers' decision-making processes and identify the important behaviors in consumption that indicate consumer competency.

In contrast to the decision-making process model, the knowledge-attitude-skill model pays more attention to the multiple origins of consumers' specific behaviors (Bolek, 2020; Fielder et al., 2016). For example, consumers' defensive behaviors are functions of their knowledge (e.g., the declarative and procedural knowledge of defensive approaches), attitude (e.g., the willingness and motivation to maintain self-rights), and defensive skills (e.g., the ability to conduct defensive behaviors; Park et al., 2011). This model has also been used in several domains of consumption. For example, the Organization for Economic Co-operation and Development (i.e., OECD) defined individuals' digital competency based on the dimensions of knowledge, attitude, and skill (Vuorikari et al., 2016). It seems that the knowledge-attitude-skill model helps to discover the underlying causes of specific behaviors and thus provides researchers with the opportunity to achieve a more comprehensive understanding of consumer competency.

According to G.-f. Liu and Zhang (2022), although the logic of the two models of consumer competency varies, they may compensate for and improve each other. Specifically, researchers may first identify important consumer behaviors based on the decision-making process model. Then, researchers may analyze the necessary knowledge, attitude, and skills that support the development of consumers' behaviors.

The Proposal of Consumer Competency in Online Shopping

The impacts of consumer competency in offline shopping have been repeatedly revealed (Mansfield et al., 2020; Mhlanga & Kotzé, 2014; Stewart & Yap, 2020), and it is reasonable to assume that consumer competency is also a significant factor in consumers' decision-making and satisfaction in online shopping. For example, incompetent consumers in online shopping may not access necessary product information, judge the fitness of a specific product, or protect themselves from biased evaluations and internet fraud. Despite the disadvantages of incompetent consumers in online shopping, the literature mainly focuses on influencing factors that may increase the acceptance of online shopping (e.g., Saha et al., 2021; Stojmenovic et al., 2019; Thakur, 2018) instead of the capacities or competencies necessary for online shopping. From our viewpoint, it is possible to estimate the situations faced by consumers in online shopping and improve consumer satisfaction and welfare only on the basis of the construct of consumer competency. Therefore, this study develops the concept of consumer competency in online shopping and attempts to illustrate its construct and evaluation.

In traditional offline consumption, studies of consumer competency are frequently focused on specific products, such as food (Berg, 2007), digital products (Malchenko et al., 2020), financial products (Robson & Peetz, 2020; Ward & Lynch, 2019), and communication instruments (Chinedu et al., 2016). The literature improves the understanding of the construct, origins, and outcomes of consumer competency as well as training programs for consumer competency, providing a solid foundation for the investigation of consumer competency in online shopping. However, several differences between online and offline shopping may impede the direct transfer of consumption experiences and research findings. For example, consumers in online shopping face more complicated and diverse products and find it difficult to evaluate the products before purchase. Therefore, consumers must develop higher skills for information search and processing in online shopping (Lu & Zhuang, 2021). The procedures of online shopping, such as ways to pay and protect consumers' rights, are also different from those of offline shopping. Therefore, consumers in online shopping need not only the knowledge of products and skills to make reasonable consumption decisions but also the capabilities to use the internet and online shopping instruments.

Based on the traditional definitions of consumer competency (Berg, 2007; Park et al., 2011), this study conceptualizes consumer competency in online shopping as the necessary capabilities that support consumers to function effectively and rationally in online shopping. Two forms of capacities are included in the definition. On the one hand, competent consumers in online shopping should have specific knowledge and capacities related to corresponding products such as food and mobile phones. For example, consumers should understand the important characteristics of a mobile phone, identify their expectations, and use the mobile phone properly. On the other hand, consumers who are competent in online shopping should have knowledge and capacities related to the internet and specific approaches to online shopping. For example, consumers should have knowledge of internet use and procedures of online shopping, the importance of personal information prevention, and the protection of consumer rights. In contrast to the first form of competency, the second form of competency in online shopping is more difficult to obtain from experience in offline shopping. Therefore, this study mainly focuses on the second form, i.e., general and product-independent competencies. Indeed, similar conceptualizations of consumer competency can be found in previous literature. For example, Lachance and Choquette-Bernier (2004) defined consumer competency as product-independent cognition, emotion, and behaviors that influence consumers' decision-making processes.

To investigate the construct, development, and influencing factors of consumer competency in new situations, grounded research is frequently viewed as the predominant approach. Researchers have frequently investigated the content of consumer competency by asking interviewees to report what skills are necessary to be a competent consumer (e.g., Grønhøj, 2007) or to explain what happens in specific consumption situations (e.g., Mhlanga & Kotzé, 2014). For example, Mhlanga and Kotzé (2014) showed their participants several pictures of consumption and asked them to tell a story about what was happening in each picture. Then, the researchers investigated the participants' competencies and coping strategies qualitatively under the framework of the decision-making process model, especially the stages of information search and product comparison. Based on interviews with six focus groups, Longart et al. (2016) investigated participants' behavioral patterns during the processes of decision-making. It was found that consumers highlighted different factors in the stages of decision-making. Therefore, it is reasonable to expect that grounded research based on the framework of the decision-making process model will reveal the construct of participants' consumer competency in online shopping.

Although grounded research can provide a bottom-up understanding of consumer competency, it cannot be conducted in large samples. Therefore, researchers have developed standardized instruments based on the grounded analysis of participants' consumer competency (Berg & Teigen, 2009; Chinedu et al., 2016; Grønhøj, 2007). These standardized instruments provide researchers the opportunity to investigate the levels, performance patterns, and influencing factors of consumer competency conveniently and systematically. Because online shopping varies from offline shopping in several ways (Lu & Zhuang, 2021), it is necessary to construct a bottom-up understanding of consumer competency in online shopping. Then, a standardized instrument may be developed.

The Current Research

Both the previous literature and the development of the cybereconomy call for the study of consumer competency in online shopping. This study has three objectives. First, it identifies the construct of consumer competency in online shopping. Second, it develops a scale to measure participants' consumer competency in online shopping. Finally, it investigates the levels and performance patterns of participants' consumer competency. In Study 1, 12 college students with rich experience in online shopping were interviewed and analyzed. Based on the model of consumption decision-making processes, the key consumer competencies in online shopping were constructed. According to the results of Study 1 and the knowledge-attitude-skill model, three subscales of consumer competency in online shopping were developed in Study 2, i.e., the subscales of consumer knowledge, consumer attitude, and consumer skill. Study 3 reexamined the quality of the instrument and conducted a latent profile analysis (LPA) to investigate the performance patterns of participants' consumer competency in online shopping.

Study 1

To investigate the construct of consumer competency, researchers frequently ask their participants to report the necessary skills or procedures for consumption (Grønhøj, 2007; Mhlanga & Kotzé, 2014). This study adopted the same logic but revised the interview question. Specifically, the participants in this study were asked to answer and

illustrate "how to shop online" step by step in a real online shopping platform. Because the consumption decision-making process model is good at identifying necessary behaviors in consumption, it was used as the theoretical framework of Study 1. This approach of theory elaboration has frequently been used in grounded research (e.g., Ketokivi & Choi, 2014; M. Zhang et al., 2021).

Methods

Participants

Twelve college students (6 females and 6 males) with rich experience in online shopping were interviewed. Their mean age was 23.20 years (SD = 1.23). Two of them were interviewed to examine the coding saturation. Therefore, the following analysis was conducted based on the data of 10 participants. In the month before the date of the interviews, all participants shopped online more than 3 times, and 4 of them shopped online more than 10 times. The participants believed their experience in online shopping were above average. Nine of them scored their familiarity with online shopping higher than 6 (the full mark was 10). The monthly disposable income of the participants ranged from 1,500 yuan (approximately 222 US dollars) to 3,000 yuan (approximately 441 US dollars).

Data Collection

All participants were interviewed face-to-face during the period of November 11 to 26, 2021. Each interview lasted 15 to 30 minutes. Interview data were captured through the researchers' independent notes, video recordings, full transcripts, and additional validation from the interviewees for data reliability and validity. Before each interview, the researcher explained the purpose and procedure of the current study and obtained the consent of the participants. First, the interviewees' personal information and experience in online shopping were obtained. Second, the interviewees were asked to imagine a product they wanted to buy online. Third, the interviewees showed the researcher how to buy the product in Taobao, which is a business of Alibaba and the largest online retail platform in China. In this stage, the participants were asked to illustrate the procedures of online shopping under the belief that they were "illustrating how to buy online for individuals who never shopped online". To ensure consistent and sufficient information across the interviews, the interviewer was instructed to further ask two questions, i.e., *Should any other things be done in online shopping?* and *Why is [the specific behavior] important for online shopping?* Finally, the interviewees were asked to provide additional information and thanked for their participation.

Data Analysis

The data were first transcribed by the second author within 24 hours after each interview. Then, the first author checked the transcripts based on the video recordings. The interview data were analyzed by three researchers using thematic techniques in a three-step coding process (Miles & Huberman, 1994; Saldaña, 2013). First, all three researchers familiarized themselves with the data by reading the transcripts several times. Second, all three researchers undertook an initial round of open coding separately before converging the first set of findings (i.e., triangulation). Third, the coding information from triangulation was further analyzed for pattern identification and data grouping under the framework of the consumption decision-making process model (i.e., axial coding). By reorganizing and comparing the thematic categories, emerging behaviors were grouped into interrelated themes that indicate consumer competencies in different stages of consumption decision-making (see Table 1 for a full list of the coding themes). Finally, the themes were iteratively analyzed and refined to obtain a framework of key consumer competencies and a mode of consumption decision-making in online shopping (i.e., selective coding; see Figure 1). The teamwork approach enhanced the reliability and validity of the results (M. Zhang et al., 2021).

Results

In this part, we first depict and discuss consumer competencies in five stages of consumption decision-making. This provides a skeleton of necessary competencies in online shopping. Then, the competencies are further refined to four key elements, and the decision-making modes are discussed.

Competencies in Five Stages of Consumption Decision-Making

Table 1 depicts the results of the open coding and axial coding. As shown, the participants' responses can be grouped into 12 subthemes that are distributed in five stages of consumption decision-making, which indicate the elementary consumer competencies in online shopping.

Table 1. *The Findings of Open Coding and Axial Coding.*

Axial coding		Open coding	
Stages of decision-making	Subthemes	Description of references	Number of references
Identifying consumer demand	Identify the demand for specific products	Identify the types and characteristics of desired products	9
		Personal preference and product choice	4
		Brand preference and product choice	4
		Characteristic expectations and product choice	16
	Choose a platform for online shopping	Consciousness of platform choice	1
		Stereotypes about the platforms' features	10
		Platform choice based on demand	10
	Judge the rationality of the demand	Choose a suitable product within one's budget	7
Information search	Information search within the platform	Information search based on the characteristics of products	26
		Check pictures and videos in product evaluations	10
		Identify mendacious evaluations of product	9
		Focus on negative evaluations	8
		Additional evaluations after use may provide more reliable information	5
		Judge the suitability based on the evaluations of products	10
		Evaluate products through the information of retail stores	8
		Evaluate products based on post-sales services	16
	Information search outside the platform	Evaluate products based on brand	9
		Evaluate products based on information from other platforms	9
	Seek help during the information search	Ask friends for help	3
		Ask customer service for help	26
		Ask other customers for help	14
Product comparison	Comparison based on the characteristics of products	Consciousness of product comparison	3
		Compare sales volume	1
		Compare the brand	1
		Compare the features and appearance	4
		Compare pride	4
	Comparison based on subjective experiences	Buy first, then compare	2
		Compare based on personal preference	5
		Compare based on the other customers' experiences	3
Purchase decision-making	Choose a specific version of products	Choose a version than can meet one's demand	5
		Ask customer service for suggestions	3
		Choose a product with discounts	7

	Preventive behaviors during the purchase	Ask customer service for preventive information	3
		Know the procedures of buying online	9
		Focus on the freight insurance	7
		Decision-making based on attitude certainty	9
		Decision-making based on the degree of liking	7
		Check and determine one's address and the way to pay	9
		Use freight insurance when returning	6
Post-purchase behaviors	Be aware of and check the delivery information	Know the general delivery time	9
		Check detailed information of delivery	2
		Know influencing factors of delivery	26
		Ask customer service for delivery information	9
		Ask express company for delivery information	2
	Defensive behaviors in use	Return an unsatisfactory product	10
		Know how to use freight insurance	7
		Choose proper defensive approaches	20
		Ask customer service for help with product returns	9
		Give negative evaluations for unsatisfactory products	1

Competencies in the stage of identifying consumer demand. In this stage, 61 references were grouped into 3 subthemes or competencies. First, consumers should have clear consciousness about the product needed and its characteristics (i.e., identify the demand for specific products). Second, the participants reported that consumers should choose a suitable platform for their shopping. Although there are several platforms available for online shopping, consumers have stereotypes about the features and images of different platforms. For example, interviewee 3 reported that "Jingdong [an online shopping platform] mainly sells electronic products and home appliances, Taobao mainly sells products for daily use, such as clothes." The stereotypes were heavily influenced by the initial positions of each platform. Although platforms such as Taobao and Jingdong sell almost everything, a competent consumer would prefer to choose a specific platform based on its stereotypes. Finally, the participants believed in the importance of judging the rationality of demand. Five out of 10 interviewees mentioned self-control in online shopping. For example, interviewee 5 reported, "[I will purchase a product] with a reasonable and inexpensive price. That is, I can handle it on my own." Because most college students cannot support themselves, self-control becomes a salient competency for them.

Competencies in the stage of information search. In this stage, 153 references were grouped into 3 subthemes or competencies: information search within and outside the platform and seeking help during the information search. The platform itself provides abundant product information, such as characteristics, sales volume, and consumer experiences and feedback. Although the participants reported the most references in the information search within the platform, they were suspicious of the trustworthiness of such information. For example, interviewee 9 noted, "A long and very good evaluation of the product with professional and high-quality pictures is absolutely mendacious." Therefore, the participants believed that negative and additional evaluations after use could provide more reliable information. For example, interviewee 1 reported, "You can check the positive and negative evaluations of the product, especially the negative evaluations. If the negative evaluations are large and concentrated, the product may have real problems in some dimensions." Information search outside the platform refers to information search in other online networks, such as Weibo and Xiaohongshu. It seems that the participants believed that third-party platforms would provide more reliable information for specific products. Finally, the participants suggested that the most effective approach for information search was asking customer service for help. There were 26 references on this topic, accounting for the highest proportion of help-seeking behaviors.

Competencies in the stage of product comparison. The participants mentioned 23 references in this stage, which was the lowest of the five stages of decision-making. According to the foundations of product comparison,

2 subthemes emerged. On the one hand, consumers may compare products based on objective information, such as the sales volume, version and appearance of products, price, and so on. On the other hand, consumers may compare products based on subjective emotions and feelings. Consistent with the small proportion of references to product comparison, several interviewees mentioned that they did not make product comparisons frequently. For example, interviewee 6 remarked, "I do not make comparisons between different products. That's what I do in online shopping. If I think the product is okay, I will buy it."

Competencies in the purchase decision-making stage. The participants reported 65 references in this stage that were grouped into two competencies: choosing a specific version of products and preventive behaviors during purchase. To choose a specific version of products, consumers must choose suitable versions based on either the product introductions or suggestions from customer service. In particular, 7 out of 10 interviewees stated that they were inclined to ask customer service for help. Preventive behaviors during purchasing consisted of the descriptive and procedural knowledge of preventive behaviors as well as specific preventive behaviors such as decision-making based on attitude certainty and likeness and seeking help from customer service. The participants also mentioned consciousness of freight insurance, which is unique to online shopping. Freight insurance is a kind of compensatory protection for express expenses in the return and exchange of products. If freight insurance is available, consumers do not need to pay the extra cost of delivery caused by the return and exchange of products. Because the delivery and return of products cost time and money, freight insurance has a great influence on online shopping. For example, interviewee 9 reported, "[If the retail store does not provide freight insurance freely] I will not buy the product—only if I am very certain that I will like it." It seems that the liking of a specific product played both a motivational and a moderating role in online shopping. For example, interviewee 4 stated, "I hope the delivery is free for me only if I like it very much."

Competencies in the post-purchase stage. In this stage, 95 references were grouped into two dimensions: being aware of and checking the delivery information and defensive behaviors in use. Consumers who shop online cannot "get it when you buy it", which is different from offline shopping. Therefore, the participants noted the importance of being aware of and checking the delivery information. Consumers may access this information either by checking the delivery information on the platform or by asking for help from the customer service of online shopping platforms or express companies. A competent consumer should also have the knowledge and capabilities to protect their rights. For example, consumers may use freight insurance and appropriately choose specific defensive approaches. The importance of asking customer service for help was mentioned again. For example, interviewee 8 reported:

> "If you do not know which defensive approach should be chosen, you can ask customer service for help. For example, you may tell customer service, 'I am not satisfied with the clothing, what should I do?' They will instruct you how to exchange a version or return it."

Key Competencies in Online Shopping

According to the results shown in Table 1, several elements were mentioned in multiple stages in online shopping. For example, the participants noted that asking customer service for help worked in each stage of decision-making. Therefore, we further refined the results depicted in Table 1. Based on the consistency of the subthemes, four key competencies were summarized, i.e., product identification, self-control, support for decision-making, and consumer protection (see Figure 1).
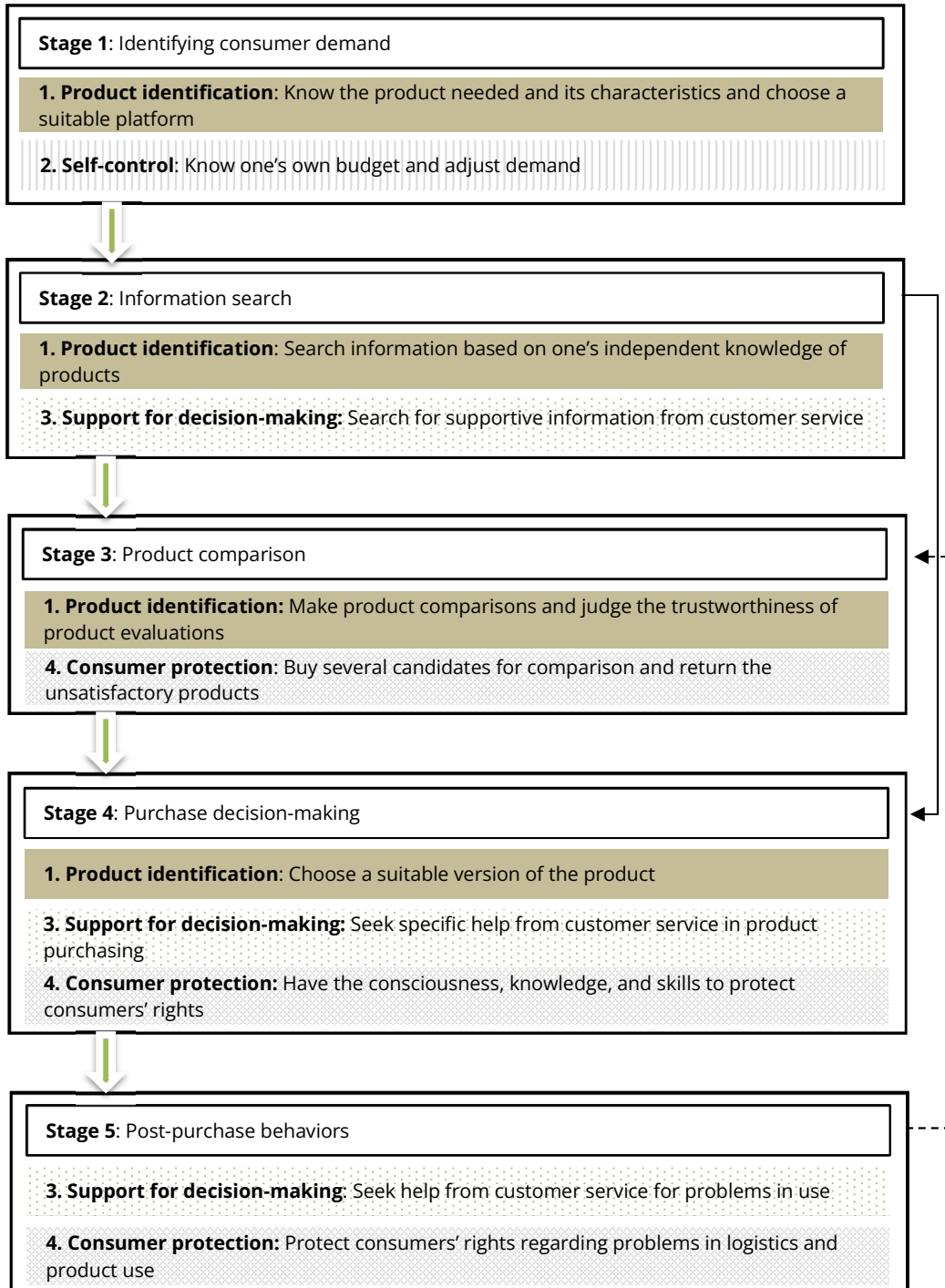
Product identification indicates that consumers have a clear understanding of the necessary characteristics and types of products; thus, they can search important information, make justified comparisons between products, and choose a proper platform for their online shopping. The competency of product identification was mentioned in the stages of identifying consumer demand, information search, and purchase decision-making. Although the capabilities of product identification function in several stages, as depicted in Figure 1, their specific contents vary depending on the product. Therefore, our original conceptualization of consumer competency in online shopping was not challenged (i.e., general and product-independent competencies in online shopping).

Self-control indicates that consumers can judge the reasonability of their demand based on their budget. Although self-control was only mentioned in the stage of identifying consumer demand, it is not dispensable. Consumer competency, which was defined in a purpose-oriented way, indicates the capabilities that support consumers to function effectively and rationally in the marketplace (G.-f. Liu & Zhang, 2022; Park et al., 2011). Self-control particularly reflects the motivational element of consumer competency. Because college students frequently face

an imbalance between exuberant expenditures and limited budgets, self-control is especially important for college students' online shopping (Antonides et al., 2011; Z. Q. Xin et al., 2022).

Support for decision-making refers to a series of behaviors that seek informative support to make a reasonable decision, such as searching for information within and outside the platform and asking customer service and friends for help. Support for decision-making was illustrated in the stages of purchase decision-making and post-purchase behaviors. To make reasonable decisions in online shopping, consumers may independently search for information within and outside the platform. However, the most frequently mentioned approach was asking customer service for help. There is evidence that low-competence consumers are reluctant to seek others' help (Mhlanga & Kotzé, 2014). The results thus indicate important topics for consumer education and improvement.

Figure 1. *The Key Competencies and Decision-Making Modes in Online Shopping.*

Stage 1: Identifying consumer demand

1. Product identification: Know the product needed and its characteristics and choose a suitable platform

2. Self-control: Know one's own budget and adjust demand

Stage 2: Information search

1. Product identification: Search information based on one's independent knowledge of products

3. Support for decision-making: Search for supportive information from customer service

Stage 3: Product comparison

1. Product identification: Make product comparisons and judge the trustworthiness of product evaluations

4. Consumer protection: Buy several candidates for comparison and return the unsatisfactory products

Stage 4: Purchase decision-making

1. Product identification: Choose a suitable version of the product

3. Support for decision-making: Seek specific help from customer service in product purchasing

4. Consumer protection: Have the consciousness, knowledge, and skills to protect consumers' rights

Stage 5: Post-purchase behaviors

3. Support for decision-making: Seek help from customer service for problems in use

4. Consumer protection: Protect consumers' rights regarding problems in logistics and product use

Consumer protection refers to the preventive and defensive behaviors that contribute to consumer protection. In the stages of purchase decision-making and post-purchase behaviors, the competency of consumer protection is mainly apparent in the form of preventive and defensive behaviors, respectively. Two points may be noted specifically. On the one hand, asking customer service for help plays an important role in consumer protection.

Specifically, consumers can obtain information and support for delivery, product use, and post-purchase help from customer service. On the other hand, the competency of consumer protection was mentioned in the stage of product comparison. That is, the quality of post-purchase services is a significant reason for product comparison and purchase. For example, interviewee 7 reported:

> "If you are not sure which one is more suitable, you can check the information on post-purchase services, especially the information on freight insurance. If the products have freight insurance, you can buy both, then return the one you feel is unsatisfactory."

Although most of the participants made decisions through the 5 stages in an orderly manner, there were two exceptions. First, some participants did not make comparisons between different products. That is, they wanted to purchase a specific product after an information search instead of a product comparison (as indicated by the solid arrow on the right of Figure 1). For example, interviewee 6 reported, "In general, I will check and evaluate a specific product. If I feel okay, I will buy it." It should be noted that the absence of a specific stage of decision-making does not necessarily indicate a lower level of consumer competency; in contrast, it suggests a higher level of consumers' confidence in their decision-making and consumer protection abilities. For example, interviewee 8 reported:

> "I may check the information I just mentioned, and then I will buy it and have a try. If I do not feel good or it [the product] cannot fulfill my expectation, I can return it. If it meets my expectation, I can keep it."

Second, some participants exchanged the orders of product comparison and purchase decision-making (as indicated by the dashed arrow on the right of Figure 1). That is, they wanted to purchase several products first and then make a comparison. For example, interviewee 2 reported, "If it is difficult to compare two products, you can buy both and make a comparison. After that, you can return the unsatisfactory one." Therefore, consumers not only follow the general processes of decision-making but also adjust the processes flexibly based on the specific situation. However, this adjustment should be based on higher levels of consumer competency in online shopping.

Discussion

Based on the decision-making process model, this study illustrated the capacities and behaviors in 5 stages of online shopping. Considering the correlations among the references and subthemes, four key competencies were distinguished: product identification, self-control, support for decision-making, and consumer protection. It can be concluded that, first, some consumer competencies or capabilities are cross-functional between online and offline shopping, such as identifying the desired product, asking customer service for help, and defensive behaviors. However, it should be noted that such behaviors in online shopping had a different essence than in offline shopping. For example, defensive behaviors in online shopping, such as returning an unsatisfactory product, require consumers to have not only consciousness of consumer protection but also knowledge of freight insurance and the skills to return the product through express delivery. Second, several new elements and competencies emerged in online shopping, such as the platform choice and the judgment of the trustworthiness of product evaluations. In contrast to offline shopping, consumers who shop online find it more difficult to perceive and evaluate products based on direct experience, which is a new challenge for their cognitive abilities. Third, product comparison seems to be less important than the other stages. For example, interviewees 5 and 10 did not mention product comparison at all. The rationality of omitting specific stages of decision-making is also suggested in previous literature (G.-f. Liu & Zhang, 2022; Panwar et al., 2019). Two explanations for this finding may be examined further. On the one hand, the results may indicate the real role of product comparison in online shopping. On the other hand, the results may originate from college students' higher levels of consumer competency and confidence.

Although Study 1 constructed a framework for consumer competency in online shopping, it cannot be used to evaluate consumers' competencies efficiently and economically. To develop a standardized instrument for the measurement of consumer competency in online shopping, Study 2 decomposed the competencies based on the knowledge-attitude-skill model (Bolek, 2020; Park et al., 2011; Vuorikari et al., 2016), which believes that consumers' competencies have multiple origins, such as descriptive and procedural knowledge, corresponding motivation, attitude, and skills. Accordingly, three subscales of consumers' knowledge, attitude, and skill are developed in Study 2.

Study 2

Study 1 constructed a framework for the key consumer competencies in online shopping. To evaluate the levels and performance patterns of consumer competency, it is necessary to develop a standardized instrument. According to the suggestions of G.-f. Liu and Zhang (2022), the corresponding knowledge, attitude, and skill for each key competency were first analyzed. Then, items for the measurement were developed, and the qualities of the measurement were examined.

Methods

Participants

The data was collected in May, 2022. Six hundred forty-eight college students (446 females and 202 males) participated in this study. Their mean age was 21.73 years (SD = 1.89). Among them, 172 participants had monthly disposable income of less than 1,500 yuan (approximately 215 US dollars), 270 participants had monthly disposable income ranging from 1,501 to 2,000 yuan, 112 participants had monthly disposable income ranging from 2,001 to 2,500 yuan, and 94 participants had monthly disposable income of more than 2,500 yuan. There were 28 participants who spent less than 100 yuan (approximately 15 US dollars) on online shopping per month, 247 participants who had a monthly expenditure that ranged from 101 to 300 yuan, 240 participants with a monthly expenditure ranging from 301 to 500 yuan, and 133 participants who had a monthly expenditure of more than 500 yuan. In the month before the investigation, only 6 participants reported they had never shopped online, while the remaining participants reported they had shopped online more than 3 times. Among them, 598 participants believed they were very familiar with online shopping.

Instrument

Analysis of the dimensions of consumer competency. According to the knowledge-attitude-skill model (Bolek, 2020; G.-f. Liu & Zhang, 2022; Park et al., 2011; Vuorikari et al., 2016), a specific consumer competency is a function of the declarative and procedural knowledge, motivations and attitudes to behave, and the skills to perform specific behaviors. As depicted in Table 2, the key consumer competencies obtained in Study 1 can also be disassembled.

Table 2. *Knowledge, Attitude, and Skill for Each Consumer Competency.*

Key competencies	Essences of the competencies	Dimensions		
		Knowledge	Attitude	Skill
Product identification	Understand the products needed, choose a proper platform and make justified decisions.	✓	✓	✓
Self-control	Be aware of one's own budget, judge the reasonability and adjust the demand.	—	✓	✓
Support for decision-making	Seek informative support independently and from others to make a reasonable decision.	✓	✓	✓
Consumer protection	Conduct preventive and defensive behaviors.	✓	✓	✓

The dimension of knowledge indicates the declarative and procedural knowledge needed in the processes of consumption decision-making. For example, it includes the declarative knowledge of specific products, product evaluations, characteristics of platforms, and consumer rights as well as the procedural knowledge of how to search for supportive information, ask customer service for help, judge the trustworthiness of product evaluations, and protect consumers' rights. During the interviews for Study 1, self-control seemed to be a main motivation to judge the reasonability of demand based on an individual's own budget.

The dimension of attitude refers to consumers' motivation and willingness to make efforts to perform specific behaviors such as information search, self-control, and consumer protection. For example, attitude in product identification indicates that consumers have the motivation to understand the characteristics of products, judge the quality and fitness of products, make product comparisons, and choose a suitable platform for online

shopping. Attitude in self-control reflects consumers' consciousness of budgeting and the motivation to control their desire and impulsive consumption.

According to previous literature (e.g., Park et al., 2011; Robson & Peetz, 2020), the dimension of skill indicates consumers' goal-directed behaviors that are performed in real online shopping. For example, how did consumers judge the trustworthiness of product evaluations in their past online shopping, did consumers expand their budget and consume impulsively, and did consumers select proper approaches to protect their rights based on specific situations?

Although participants' consumer competency is a function of their corresponding knowledge, attitude, and skill, this study aims to develop three subscales to measure their competency instead of one scale with three dimensions. First, participants' knowledge, attitude, and skill with regard to online shopping covered their responses in the stages of demand identification, information search and so on, making it is difficult to develop a clear separation between the dimensions of knowledge, attitude, and skill. Moreover, the separation among the subscales of knowledge, attitude, and skill is consistent with our primary aims, i.e., illustrating the different profiles and origins of consumer competency. Finally, the development of three independent subscales is supported by the previous literature. For example, researchers investigated the construct of financial literacy and developed three subscales to measure it: the subscales of financial knowledge, financial capacities, and financial values (L. Sun & Xin, 2020; Z. Y. Xin et al., 2020; H. C. Zhang et al., 2020). To conclude, we think that the current procedure for the development of the instrument is reasonable.

Development of items. According to the aforementioned analysis, three subscales of knowledge, attitude, and skill were developed. First, the raw transcripts of Study 1 were reexamined to develop items to measure the corresponding competency. Moreover, items were selected and revised from the previous literature on consumer competency (e.g., Chinedu et al., 2016; Lachance & Choquette-Bernier, 2004; Mhlanga & Kotzé, 2014; Park et al., 2011). A total of 60 items were obtained. Second, the researchers discussed and revised the items. Finally, 45 items remained for the subscales of knowledge, attitude, and skill. Each subscale had 15 items. The items of the subscales of knowledge and skill were objective questions, and the items of the subscale of attitude were Likert evaluations. For objective items, participants had to choose one of two answers and scored one point for a correct answer. For example, participants were asked to answer the question, *If you do not know the information on freight insurance, how do you access this information?* with either *Check the product evaluation* or *Ask customer service for help*. The latter answer was correct. The aggregate score indicated their level of knowledge and skill for consumer competency in online shopping. The theoretical score of the subscales of knowledge and skill ranged from 0 to 15. For Likert items, participants had to evaluate their agreement with each item from 1 (*strongly disagree*) to 7 (*strongly agree*); for example, *In online shopping, I usually know exactly what kind of product I want*. The average score of items indicated the level of attitude toward consumer competency in online shopping.

Data Analysis

Because the subscales of knowledge and skill consisted of objective items, their difficulty and discrimination were analyzed. The reliability and validity of the attitude subscale were examined.

Results

The Difficulty and Discrimination of the Subscale of Knowledge

First, the correlations between each item and the aggregate score of the subscale were calculated. Although the results showed that the correlations ranged from .14 to .59 and that all were significant ($ps < .001$), some correlations were relatively low. Therefore, 2 items with the lowest correlations were deleted. The correlations of the other 13 items and the aggregate score of the subscale ranged from .22 to .61 ($ps < .001$). The results suggest that the 13 items of the subscale of knowledge consistently examined the participants' knowledge of online shopping.

Then, the difficulty of the subscale of knowledge was examined. According to previous literature (L. Sun & Xin, 2020), the passing rate of each item was calculated to indicate the difficulty. A higher passing rate indicates a lower level of difficulty. It was found that the passing rates of the items ranged from 24% to 98%, with an average of 80%. It seems that the subscale of knowledge was relatively easy for college students. In our opinion, the results

may be due to college students' rich experiences with online shopping. Considering the applicability of the scale in wider samples, especially samples with fewer experience in online shopping, all 13 items remained.

Finally, the participants were ordered by their aggregate score on the subscale. They were then grouped by the upper and lower 27% rule grouping method, which is commonly used in item analysis based on Kelley's (1939) derivation. In this paper, the top 27% of participants were defined as the higher group, while the bottom 27% were defined as the lower group; each group had 175 participants. The discrimination was determined by the difference between the passing rates of the two groups; a larger difference indicated a greater discrimination. The results showed that 4 items had discriminations lower than .20. The average discrimination of the subscale was .36, indicating good discrimination. The Cronbach's α of the scale was .69.

The Reliability and Validity of the Attitude Subscale

According to college students' consumer competency in online shopping, 15 items were developed. However, during the development of the items, the researchers found that it is difficult to strictly discriminate the dimensions of product identification and support for decision-making. For example, the willingness to make an effort to examine the features of online shopping platforms not only refers to the concept of product identification but also provides supportive information for decision-making. That is, the dimensions of product identification and support for decision-making were theoretically interrelated. Therefore, product identification was integrated into the support for decision-making. The 15 items were assigned to 3 dimensions theoretically. The dimension of support for decision-making contained 7 items, and the dimensions of self-control and consumer protection contained 4 items, respectively.

To examine the construct validity of the subscale of attitude, the correlations between each item and its average score were calculated. The results showed that the correlations ranged from .25 to .54 (ps < .001). Then, the participants were ordered and assigned into higher and lower groups by their mean scores on the scale. The t tests showed that the two groups had significant differences in each item (ps < .001). Therefore, all items were included in the following analysis. An exploratory factor analysis (EFA; principal component analysis with varimax rotation) suggested 3 factors that accounted for 46.65% of the entire variance. All items were consistent with the theoretical conjecture except item 8. Item 8 was originally believed to belong to the dimension of self-control; however, the results suggested that it is in the dimension of support for decision-making. Because the confusing meaning of this item, it was deleted from the scale. Meanwhile, item 6, which had the lowest communality (.34), was also deleted. A further EFA (principal component analysis with varimax rotation) suggested 3 factors that accounted for 49.12% of the total variance. All items were consistent with the theoretical conjecture (See Table A1 in the Appendix). The Cronbach's $α$ of the scale was .60. A higher mean score indicates a greater willingness to make rational decisions in online shopping.

The Difficulty and Discrimination of the Subscale of Skill

The same procedure used in the analysis of the difficulty and discrimination of the subscale of knowledge was conducted for the subscale of skill. First, the correlations between each item and the aggregate score of the subscale of skill ranged from .20 to .52, and all were significant (ps < .001). As the procedure used in the analysis of the subscale of knowledge, 2 items with the lowest correlations were deleted. The correlations of the other 13 items and the aggregate score of the subscale ranged from .29 to .53 (ps < .001). Second, the passing rates of the items ranged from 59% to 94%, with an average of 85%. The subscale of skill was also relatively easy for college students. Finally, the discriminations ranged from .20 to .55, and the average discrimination of the subscale was .34, indicating good discrimination. The difficulty and discrimination of the subscale of skill were similar to those of the subscale of knowledge. The Cronbach's α of the scale was .60.

The items of the subscale of skill and the subscale of knowledge can be found in the Appendix.

Discussion

This study investigated the quality of the subscales of knowledge, attitude, and skill instead of the quality of the entire item pool. We would like to give several further explanations. As mentioned above, the separation of the subscales was made on the basis of the knowledge-attitude-skill model (Bolek, 2020; Fielder et al., 2016). Under the view of this model, knowledge, attitude, and skill are different profiles of participants' consumer competency.

Because participants' knowledge, attitude, and skill regarding online shopping covered their responses in the stages of the decision-making processes, a factor analysis of the entire item pool would prevent meaningful constructs from being found.

Second, the subscales of knowledge, attitude, and skill have different evaluation modes. That is, the subscales of knowledge and skill consist of objective items that can be judged as correct or wrong. However, the subscale of attitude consists of Likert evaluation items that do not have correct responses. Therefore, it is not suitable to conduct a factor analysis on the entire item pool. This procedure was also adopted in the previous literature. For example, researchers developed three subscales to measure participants' financial literacy. Their subscales of knowledge and capacities were objective, while the subscale of values consisted of Likert evaluations. They also conducted separate factor analyses for the three subscales (L. Sun & Xin, 2020; Z. Y. Xin et al., 2020; H. C. Zhang et al., 2020). Therefore, the current procedure for the development of the instrument is reasonable.

Based on the knowledge-attitude-skill model, Study 2 developed three subscales to evaluate participants' knowledge, attitude, and skill regarding online shopping in standardized and systematic ways. The results showed that the reliability and validity of the three subscales were acceptable. To provide more convincing evidence for the instrument, Study 3 examines its applicability in the general population. On the one hand, the reliability and validity of the three subscales are reexamined; on the other hand, the individual differences in and performance patterns of consumer competency in online shopping are explored.

Study 3

Study 2 developed three subscales to measure participants' knowledge, attitude, and skill in online shopping. Study 3 reexamines its reliability and validity in the general population. Moreover, this study will also explore possible individual differences, as well as the performance patterns of participants' consumer competency in online shopping.

Methods

Participants

The data was collected in January, 2023. Four hundred ninety-four residents of China (355 females and 139 males) participated in this study. Their mean age was 32.20 years (SD = 6.50). Among them, 71 participants had a monthly disposable income of less than 5,000 yuan (approximately 734 US dollars), 207 participants had a monthly disposable income ranging from 5,001 to 10,000 yuan, and 216 participants had a monthly disposable income of more than 10,000 yuan. There were 43 participants who spent less than 300 yuan (approximately 44 dollars) on online shopping per month, 112 participants who had a monthly expenditure that ranged from 301 to 500 yuan, and 339 participants who had a monthly expenditure of more than 500 yuan. In the month before the investigation, all participants reported that they had shopped online more than 3 times. Among them, 488 participants believed that they were familiar or very familiar with online shopping.

Instruments

Subscale of Knowledge of Online Shopping. The corresponding 13 items developed in Study 2 were used to measure participants' knowledge of online shopping. In this study, the subscale of knowledge had a mean difficulty of .79 and a mean discrimination of .32. The Cronbach's α of the scale was .63. A higher aggregate score (ranging from 0 to 13) indicates a higher level of knowledge of online shopping.

Subscale of Attitude of Online Shopping. The corresponding 13 items developed in Study 2 were used to measure participants' attitude toward online shopping. A confirmatory factor analysis (CFA) based on Mplus 8.1 was conducted to examine the construct validity of this scale. The results showed that the 3 dimensions of the construct fit the data well, $\chi^2(62)$ = 161.46, p < .001; AIC = 17807.22, BIC = 17983.72, CFI = .92, TLI = .90, RMSEA = .06, SRMR = .05, supporting its validity. The Cronbach's α of the scale was .61. A higher mean score (ranging from 1 to 7) indicates a higher level of a rational attitude toward online shopping.

Subscale of Skill of Online Shopping. The corresponding 13 items developed in Study 2 were used to measure participants' skill in online shopping. In this study, the subscale of skill had a mean difficulty of .84 and a mean

discrimination of .32. The Cronbach's α of the scale was .60. A higher aggregate score (ranging from 0 to 13) indicates a higher level of skill in online shopping.

Results

Individual Differences in Participants' Consumer Competency

Among all participants, their average scores in the subscales of knowledge, attitude, and skill were 10.21 (SD = 1.80), 5.57 (SD = 0.50), and 10.87 (SD = 1.86), respectively. We further investigated the individual differences caused by gender and monthly budgets. As depicted in Table 3, the participants' online shopping knowledge, attitude, and skill did not vary with their gender or monthly budgets.

Table 3. *Individual Differences in Participants' Consumer Competency in Online Shopping.*

		Knowledge	Attitude	Skill
Gender	Male	10.39 ± 1.58	5.63 ± 0.59	10.69 ± 1.99
	Female	10.14 ± 1.88	5.54 ± 0.46	10.94 ± 1.80
F		1.98	2.65	1.81
Monthly budgets	Less than 5,000 yuan	10.44 ± 1.77	5.68 ± 0.45	11.07 ± 1.61
	5,001–10,000 yuan	10.24 ± 1.90	5.54 ± 0.57	10.72 ± 1.99
	More than 10,000 yuan	10.10 ± 1.72	5.56 ± 0.44	10.95 ± 1.81
F		1.01	2.17	1.35

The performance patterns of consumer competency in online shopping

Correlational analysis showed that the participants' knowledge of online shopping was positively correlated with their attitude (r = .27, p <.001) and skill (r = .48, p <.001) and that the participants' attitude was positively correlated with their skill (r = .51, p <.001). Although the participants' online shopping knowledge, attitude, and skill were positively correlated with each other, we further conducted an LPA to examine whether they had varied performance patterns in online shopping.

Because of the varied scoring methods of the subscales of knowledge, attitude, and skill, the participants' scores on the subscales were first transformed into standardized scores. Then, an LPA was conducted. As depicted in Table 4, the four-class and five-class models were first rejected by the LMR indicator. According to the results, the three-class model had a significant LMR indicator and a lower aBIC than the two-class model. Therefore, the three-class model was selected as the final solution.

Table 4. *The LPA Results of Participants' Consumer Competency.*

Model tested	Entropy	BIC	aBIC	LMR	BLRT	Properties in each category
2-class	0.617	3965.16	3933.42	0.0008	<0.0001	.40/.60
3-class	0.777	3893.25	3848.82	0.0000	<0.0001	.52/.40/.07
4-class	0.922	3884.36	3827.22	0.1920	<0.0001	.07/.43/.20/.30
5-class	0.944	3857.33	3787.50	0.0752	<0.0001	.13/.04/.42/.22/.20

As depicted in Figure 2, three classes of participants exhibited salient differences in their knowledge, attitude, and skill regarding online shopping. The first latent class (C1) had the highest scores on each subscale (knowledge: M = 0.33, SE = 0.07; attitude: M = 0.61, SE = 0.07; skill: M = 0.82, SE = 0.06). This class was thus named high-competence consumers (N = 199). The second latent class (C2) had median levels on each subscale (knowledge: M = −0.04, SE = 0.06; attitude: M = −0.32, SE = 0.07; skill: M = −0.43, SE = 0.06). This class was thus named median-competence consumers (N = 259). The third latent class (C3) had the lowest levels on each subscale (knowledge: M = −1.53, SE = 0.20; attitude: M = −1.11, SE = 0.15; skill: M = −1.72, SE = 0.12) and was thus named low-competence consumers (N = 36). According to the results, the subscales were good at discriminating participants based on their levels of consumer competency in online shopping.

Figure 2. *The Latent Classes of Participants' Consumer Competency (N = 494).*
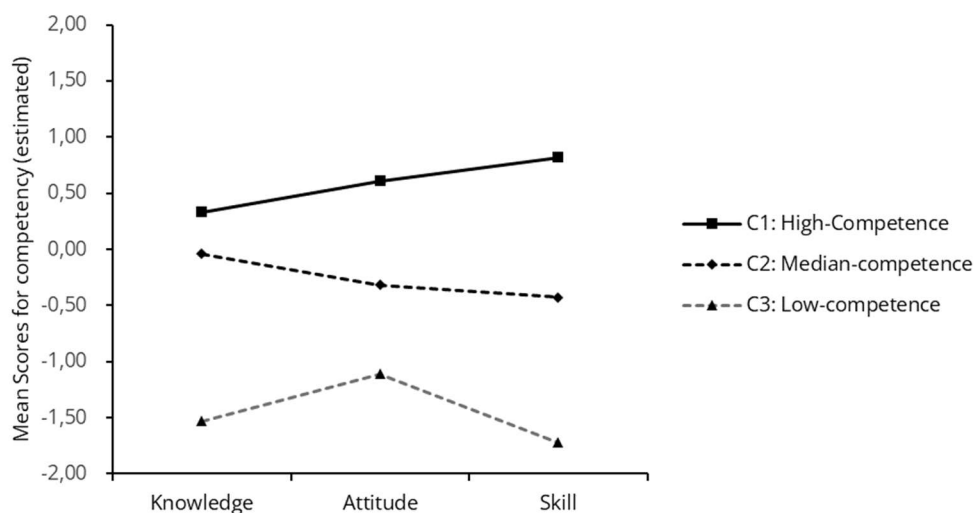
Discussion

On the basis of Study 2, Study 3 examined the quality of the instrument in a new sample. The results supported the reliability and validity of the three subscales. Because our participants had rich experience in online shopping, the difficulty and discrimination of the instrument may not impede its applicability in wider samples, especially samples with limited experience in online shopping. The reliability and validity of the subscale of attitude were also acceptable. Overall, this study provides a useful standardized instrument for evaluating the levels, structures, and origins of consumer competency in online shopping.

The results also showed that the subscales were positively correlated with each other. It is thus reasonable to assume that the three subscales can evaluate participants' competency in online shopping consistently. This assumption was also supported by the LPA results, which revealed three subgroups according to the participants' levels of consumer competency. As shown in Figure 2, participants who had higher levels on one subscale were also likely to have higher levels on another subscale. Therefore, the instrument is valid for measuring and discriminating participants based on their levels of consumer competency in online shopping.

General Discussion

Based on the consumption decision-making process model, Study 1 developed the construct of consumer competency in online shopping and identified four key competencies, i.e., product identification, self-control, support for decision-making, and consumer protection. Based on the results of Study 1 and the knowledge-attitude-skill model, Study 2 developed three subscales of knowledge, attitude, and skill that can be used to measure consumers' competency in online shopping. Using a sample of the general population, Study 3 reexamined the quality of the scales that were developed in Study 2. In addition, Study 3 explored possible individual differences and elaborated 3 performance patterns of participants' consumer competency.

Consumer competency refers to the ability that consumers need to help them play their role effectively and rationally in the market (G.-f. Liu & Zhang, 2022; Park et al., 2011). The previous literature mainly focused on consumers' performance in the context of offline shopping and demonstrated the construct and influences of consumer competency (Chinedu et al., 2016; Robson & Peetz, 2020; Ward & Lynch, 2019). However, the differences between online and offline shopping prevent the transfer of consumers' experiences and competencies. Although a few studies have investigated consumers' performance in online shopping and revealed the importance of risk awareness and motivation (Andronie et al., 2021; Parker & Kuo, 2022; Pop et al., 2023; Rodríguez-Torrico et al., 2019; J. Sun & Chi, 2018), they did not conduct a systematic analysis of the capacities that support consumers' rational decision-making in online shopping. This study developed the construct and measurement of consumer competency in online shopping, and in doing so, it expands our understanding of consumer competency in online shopping.

Using grounded research, we investigated how consumers perform in online shopping. It was found that product identification, self-control, support for decision-making, and consumer protection were key capacities in online

shopping. According to the results, consumer competency in online shopping has several features and elements in common with offline shopping, i.e., product identification, support for decision-making, and consumer protection. For example, Chinedu et al. (2016) demonstrated that consumers should have the capability to compare products with regard to important characteristics, search for information and respond to the influences of marketing. Park et al. (2011) found that consumers' knowledge and skills to protect themselves are key elements in consumption. Asking others for help was also viewed as an indicator of competent consumers (Mhlanga & Kotzé, 2014; Stewart & Yap, 2020). To conclude, although there are various differences between offline and online shopping, many of the capabilities that are developed in offline shopping may be applied in online shopping.

However, as illustrated, consumers in online shopping should have several other abilities, such as understanding the features of platforms, judging the trustworthiness of online product evaluations, and protecting consumer rights online, as well as self-control ability. That is, consumers who shop online may face more cognitive challenges than those who shop offline (Wu et al., 2019). Therefore, a consumer who is competent in offline shopping does not necessarily perform well in online shopping. Moreover, online shopping platforms have launched various consumption loans that tempt consumers to overspend and consume impulsively, which will amplify the influences of consumers' disadvantages in terms of their weak self-control ability and impulsive consumption (Antonides et al., 2011; Z. Q. Xin et al., 2022). At the same time, consumers have less opportunities to pay by cash in online shopping than in offline shopping, which may decrease their affective pain caused by the decrease in money and thus increase their willingness to buy (Mazar et al., 2017). Therefore, the participants' highlighted competency in self-control does indeed reflect the unique characteristics of online shopping.

In addition to the differences between the necessary capacities in offline and online shopping, we would again like to note that the concept of consumer competency in this study is different from that in offline shopping in some ways. Consumer competency has frequently been investigated based on specific products such as digital and financial products (Malchenko et al., 2020; Robson & Peetz, 2020). In contrast, this study focused more on product-independent competencies. As a result, on the one hand, the findings of this study may be more adaptive to different consumption situations and fields. On the other hand, the construct and measurement that this study found may be modified when researchers aim to investigate consumers' behaviors and performance in regard to the consumption of specific products.

There are also differences between the current study and previous studies that revealed influencing factors of online shopping. For example, the previous literature has shown that consumers' risk perceptions and concerns over the leakage of private information inhibit their willingness to shop online (Parker & Kuo, 2022; Rodríguez-Torrico et al., 2019; Soopramanien, 2010; J. Sun & Chi, 2018). Surprisingly, no interviewees in this study mentioned related concerns. In our opinion, there are two explanations. On the one hand, the participants in our Study 1 had strong confidence in their ability to cope with risks in online shopping. On the other hand, the participants lacked the consciousness to prevent the leakage of their security and private information during online shopping. Because of the negativity bias in human life (Baumeister et al., 2001), we would like to adopt a more cautious attitude toward consumers' awareness and ability to protect themselves, especially among consumers with lower levels of competency such as elderly people (Soh et al., 2020). Because online shopping and the platform economy have been an increasingly prominent part of the world's economy and individuals' daily life, it is salient to investigate consumers' ability and performance in online shopping and thus provide evidence for consumer education, consumer protection, and the marketing of related corporations.

To further illustrate the contributions of the findings, we would like to discuss the influence of asking customer service for help. Low-competence consumers are more likely to avoid new products and marketplaces and to avoid seeking help from others (Mhlanga & Kotzé, 2014; Stewart & Yap, 2020). However, seeking others' help is an important strategy to respond to risks in consumption. As reported by the participants in Study 1, product information and evaluations on online shopping platforms are complex and confusing, and judging the trustworthiness of product evaluations and the fitness of product versions thus becomes a significant challenge for consumers (Hu et al., 2011; Luca & Zervas, 2016). Therefore, seeking others' help is a particularly necessary and valid way to engage in online shopping. As depicted in Table 1, seeking help from customer service was mentioned in several stages of consumption decision-making. Therefore, consumers must not only improve their ability to search for and evaluate product information online but also acknowledge that seeking others' help indicates a higher level of competency rather than a lower level of capability. For example, Adkins and Ozanne (2005) found that challenging the stigma of incompetence is the foundation of decreasing social pressure and developing coping skills during buying. This study also raises abundant questions that need to be investigated in future studies. For example, how does seeking help online affect consumers' psychology and behavior? How can

consumers' pressure and cognitive load be reduced in online shopping? How do retailers and platforms provide unbiased and moderate information for their consumers?

After understanding the construct of and key competencies in online shopping, we need to conduct further research on online shopping. Based on the knowledge-attitude-skill model (Bolek, 2020; Park et al., 2011), consumers' consumption behaviors may originate from varied sources. Accordingly, Study 2 analyzed the underlying elements of each competency in online shopping and developed three subscales to evaluate the participants' corresponding knowledge, attitudes, and skills. The results suggested that the subscales of knowledge and skill were relatively easy for consumers with rich experience in online shopping and that the subscale of attitude had acceptable reliability and validity. To provide more convincing evidence for this tool, Study 3 expanded the measurement sample from college students to the general population. The results showed that the subscales of knowledge, attitude, and skill were applicable to the general population. They also showed that participants' online shopping knowledge, attitude, and skill did not change with their gender or monthly budgets. It seems that even though male and female consumers had different views of and habits in offline shopping (Ameen et al., 2021; Haj-Salem et al., 2016; Katrodia et al., 2018), they did not exhibit varied levels of consumer competency in online shopping. However, this study is based only on cross-sectional data and a single-point observation. More evidence is needed in future studies. Overall, this study provides a valid way to understand and measure consumers' competency in online shopping.

We also note that although the subscales were developed on the basis of the construct of consumer competency in online shopping that was revealed in Study 1, we do not recommend differentiating the dimensions or elements in the subscales of knowledge, attitude, and skill. On the one hand, such differentiation would make the instrument too complex to use. On the other hand, specific behaviors (e.g., asking customer service for help) are cross-functional in multiple competencies, and several elements, such as product identification and support for decision-making, are difficult to differentiate from each other. Therefore, we believe that the discrimination of knowledge, attitude, and skill is reasonable and is able to provide rich information for understanding consumers' competency in online shopping.

Although this study developed three independent subscales to evaluate participants' corresponding online shopping knowledge, attitude, and skill, we also wanted to explore the relationships between consumers' knowledge, attitude, and skill. The results of Study 3 showed that the participants' scores on the three subscales were positively correlated with each other, supporting their consistency. Furthermore, the LPA results three groups of participants, i.e., low-, median-, and high-competence consumers. The results also suggested that the subscales can inform consumers' levels of competency in online shopping consistently. It is thus reasonable to assume that if consumers have lower levels of knowledge of or skill in online shopping, they are also likely to have a weaker attitude toward rational shop online. This would be a positive signal to consumer education and protection. As suggested by the previous literature, consumers frequently face the disadvantages in terms of their weak self-control and impulsive consumption (Antonides et al., 2011; Z. Q. Xin et al., 2022), and online shopping platforms have launched various consumption loans that tempt consumers to overspend. Although consumption is a considerable impetus for economic development, the impacts of excessive consumption on consumers' welfare should be discussed further. In fact, the China Banking and Insurance Regulatory Commission (2021) demanded that small loan corporations not mislead, induce, or divert young consumers. From the consumer perspective, the government may conduct structured and formal education to improve consumers' declarative and procedural knowledge about online shopping, which may also facilitate their rational attitude.

This study makes substantial theoretical and practical contributions. From a theoretical perspective, this study investigated the construct, measurement, and performance patterns of consumer competency in online shopping, contributing to understanding the platform economy and providing a foundation for future studies. On the basis of this study, more questions may be further investigated. For example, can consumers evaluate their competency in online shopping objectively and in an unbiased manner? According to the previous literature, consumer may have too much confidence in their capabilities (Hansen & Thomsen, 2022; Jain et al., 2018). The results of Study 1 also indicated this possibility. For example, no interviewees mentioned the problems of security and private information, which has been revealed to be an important factor in online activities (Parker & Kuo, 2022; Rodríguez-Torrico et al., 2019). Moreover, this study demonstrated the application of the consumption decision-making process model and the knowledge-attitude-skill model in new consumption contexts. G.-f. Liu and Zhang (2022) proposed that integrating these two models may help researchers obtain a more thorough view of consumer competency. In this regard, this study provides initial evidence and an initial example.

From a practical perspective, the current findings may have different practical implications for consumers, the government, and corporations. For consumers, the construct and measurement of consumer competency in online shopping provide consumers with the opportunity to estimate their levels of competency and understand competent behaviors in online shopping. Then, they may increase the quality of their consumption decision-making and consumer protection as well as their level of consumer satisfaction. For the government, this study may help in evaluating consumers' situations in online shopping and in improving consumer education programs. Moreover, because of the digital divide (Lythreatis et al., 2022), the government may supervise and evaluate the influences of the expansion of online shopping on incompetent consumers. Corporations engaged in online shopping should provide consumers with more convenient and effective services with regard to product information and evaluations, support for decision-making, and consumer protection. For example, advertisements should match consumers' competency and cognitive features (Jae et al., 2011). Corporations may also take responsibility for consumer improvement. These measures may not only improve consumer satisfaction but also decrease risk perceptions of online shopping and attract new consumers to shop online. Both corporations and consumers can benefit from online shopping and achieve a win–win result.

This study is also of significance in that it contributes to solving several specific problems, for example, the dilemma between consumers' trust in Internet enterprises and risks. With the development of the Internet, online shopping and mobile payment make human life more convenient. However, several risks such as fake news (Kopalle & Lehmann, 2006, 2015; Wang & Dong, 2021) and Internet fraud (West & Bhattacharya, 2016) occur frequently. To safeguard individuals' rights and interests, it is necessary to improve consumers' competency in online shopping, such as their knowledge about consumer protection and rational consumption attitude. The creation of a good online shopping environment requires the government and enterprises to take corresponding actions. In addition, researchers and the government may pay special attention to several groups of consumers such as elderly people. In contrast to young consumers, elderly people are less involved in online shopping. On the one hand, they face barriers to Internet use. Studies have shown that elderly people's willingness to accept online shopping is negatively correlated with their use barriers (Soh et al., 2020). On the other hand, higher levels of risk perception decrease their willingness to shop online (Kwon & Noh, 2010). Therefore, enterprises should not only extend their market to incompetent consumers in an orderly manner but also evaluate and improve consumers' competency preventively.

Despite the aforementioned contributions and implications, several limitations of this study may be examined and addressed in future studies. First, although Studies 2 and 3 examined the quality of the subscales of consumers' online shopping knowledge, attitude, and skill, the instruments exhibited low reliability. Although Studies 2 and 3 found consistent results regarding the reliability and construct validity of the subscales, they might still undermine the reliability of our findings. On the one hand, future studies may examine the quality of the instruments in new samples under different cultures and levels of experience in online shopping. On the other hand, the instruments may be used with caution and modified based on specific research problems. Second, when conducting grounded research, this study interviewed 12 college students with rich experience in online shopping. More interviewees with diverse characteristics may provide more convincing evidence for the findings. Third, this study was mainly conducted based on participants' experience in online shopping in Taobao, which is the most popular online shopping platform in China. Future studies may compare and extract the commonalities of competencies from different platforms. Finally, this study provides initial evidence for the construct and performance patterns of consumer competency in online shopping. Future studies may investigate the modes, factors, and mechanisms of individual differences, as well as the influences of consumer competency in online shopping on consumer satisfaction, efficacy, and corporate performance.

Conclusion

To conclude, this study aims to contribute to the field of consumer behavior in the context of online shopping. Theoretically, this study first illustrates the construct of consumer competency in online shopping, i.e., product identification, self-control, support for decision-making, and consumer protection, which helps in understanding how consumers make decisions in online shopping and what factors may affect their behaviors. Second, this study develops a set of instruments to measure participants' consumer competency in online shopping, providing future researchers and other stakeholders a valid instrument to evaluate consumers' performance and, thus, an opportunity to cultivate and improve consumers' competency. Finally, this study extends the scope of the application of the consumption decision-making process model and knowledge-attitude-skill model by

demonstrating their validity in context of online shopping. This study also has practical implications for consumer protection and the sustainability of the platform economy, suggesting a constructive relationship between enterprises and consumers. Despite these contributions, future studies may reexamine the construct of consumer competency and the quality of the three subscales that this study developed with varied samples and under varied conditions.

Conflict of Interest

The authors have no conflicts of interest to declare.

Authors' Contribution

Guofang Liu: conceptualization, methodology, formal analysis, writing—review & editing, supervision. **Xiao Li:** data curation, investigation, formal analysis, writing—original draft. **Qingxuan Meng:** data curation, investigation, formal analysis.

Acknowledgement

The data and analysis procedure can be obtained from the corresponding author.

All procedures performed in studies were in accordance with the ethical standards of the institutional research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards. Participation consents were obtained from each participants.

References

Adkins, N. R., & Ozanne, J. L. (2005). The low literate consumer. *Journal of Consumer Research*, *32*(1), 93–105. https://doi.org/10.1086/429603

Ameen, N., Tarhini, A., Shah, M. H., & Nusair, K. (2021). A cross cultural study of gender differences in omnichannel retailing contexts. *Journal of Retailing and Consumer Services*, *58*, Article 102265. https://doi.org/10.1016/j.jretconser.2020.102265

Andronie, M., Lăzăroiu, G., Ştefănescu, R., Ionescu, L., & Cocoşatu, M. (2021). Neuromanagement decision-making and cognitive algorithmic processes in the technological adoption of mobile commerce apps. *Oeconomia Copernicana*, *12*(4), 1033–1062. https://doi.org/10.24136/oc.2021.034

Antonides, G., de Groot, I. M., & van Raaij, W. F. (2011). Mental budgeting and the management of household finance. *Journal of Economic Psychology*, *32*(4), 546–555. https://doi.org/10.1016/j.joep.2011.04.001

Baumeister, R. F., Bratslavsky, E., Finkenauer, C., & Vohs, K. D. (2001). Bad is stronger than good. *Review of General Psychology*, *5*(4), 323–370. https://doi.org/10.1037/1089-2680.5.4.323

Berg, L. (2007). Competent consumers? Consumer competence profiles in Norway. *International Journal of Consumer Studies*, *31*(4), 418–427. https://doi.org/10.1111/j.1470−6431.2007.00588.x

Berg, L., & Teigen, M. (2009). Gendered consumer competences in households with one vs. two adults. *International Journal of Consumer Studies*, *33*(1), 31–41. https://doi.org/10.1111/j.1470-6431.2008.00720.x

Bolek, S. (2020). Consumer knowledge, attitudes, and judgments about food safety: A consumer analysis. *Trends in Food Science & Technology*, *102*, 242–248. https://doi.org/10.1016/j.tifs.2020.03.009

CFPB. (2019). *Youth financial education research priorities*. Consumer Financial Protection Bureau. https://files.consumerfinance.gov/f/documents/cfpb_yrp_report.pdf

Chiang, K.-P., & Dholakia, R. R. (2003). Factors driving consumer intention to shop online: An empirical investigation. *Journal of Consumer Psychology*, *13*(1–2), 177–183. https://www.sciencedirect.com/science/article/pii/S1057740803701879

China Banking and Insurance Regulatory Commission. (2021). 关于进一步规范大学生互联网消费贷款监督管理工作的通知 *[Notice on further regulating the supervision and administration of internet consumer loans for college students]*. http://www.cbirc.gov.cn/cn/view/pages/govermentDetail.html?docId=971269&itemId=4215&generaltype=1

Chinedu, A. H., Haron, S. A., & Osman, S. (2016). Competencies of Mobile Telecommunication Network (MTN) consumers in Nigeria. *IOSR Journal of Humanities and Social Science*, *21*(11), 61–69. https://www.academia.edu/73446454/Competencies_of_Mobile_Telecommunication_Network_MTN_Consumers_in_Nigeria

Chopdar, P. K., & Balakrishman, J. (2020). Consumers response towards mobile commerce applications: S-O-R approach. *International Journal of Information Management*, *53*, Article 102106. https://doi.org/10.1016/j.ijinfomgt.2020.102106

CNNIC. (2022). *The 49th statistical report on China's internet development.* https://www.cnnic.net.cn/n4/2022/0401/c88-1131.html

Dabija, D.-C., Csorba, L. M., Isac, F.-L., & Rusu, S. (2022). Building trust toward sharing economy platforms beyond the COVID-19 pandemic. *Electronics*, *11*(18), Article 2916. https://doi.org/10.1016/j.techfore.2022.122111

Donohue, T. R., Henke, L. L., & Meyer, T. P. (1983). Learning about television commercials: The impact of instructional units on children's perceptions of motive and intent. *Journal of Broadcasting*, *27*(3), 251–261. https://doi.org/10.1080/08838158309386490

Fernandes, J., Segev, S., & Leopold, J. K. (2020). When consumers learn to spot deception in advertising: Testing a literacy intervention to combat greenwashing. *International Journal of Advertising*, *39*(7), 1115–1149. https://doi.org/10.1080/02650487.2020.1765656

Fielder, A., Riina, V., Rodríguez-Priego, N., & Punie, Y. (2016). *Background review for developing the digital competence framework for consumers: A snapshot of hot-button issues and recent literature*. Joint Research Centre Research Reports. https://doi.org/10.2791/780656

Grønhøj, A. (2007). The consumer competence of young adults: A study of newly formed households. *Qualitative Market Research*, *10*(3), 243–264. https://doi.org/10.1108/13522750710754290

Haj-Salem, N., Chebat, J. C., Michon, R., & Oliveira, S. (2016). Why male and female shoppers do not see mall loyalty through the same lens? The mediating role of self congruity. *Journal of Business Research*, *69*(3), 1219–1227. https://doi.org/10.1016/j.jbusres.2015.09.011

Hansen, T. (2008). Consumer values, the theory of planned behaviour and online grocery shopping. *International Journal of Consumer Studies*, *32*(2), 128–137. https://doi.org/10.1111/j.1470-6431.2007.00655.x

Hansen, T., & Thomsen, T. U. (2022). How individual differences in knowledge over-/underconfidence impede dietary consumer decision making under time pressure. *Personality and Individual Differences*, *195*, Article 111701. https://doi.org/10.1016/j.paid.2022.111701

Hu, N., Liu, L., & Sambamurthy, V. (2011). Fraud detection in online consumer reviews. *Decision Support Systems*, *50*(3), 614–626. https://doi.org/10.1016/j.dss.2010.08.012

Jae, H., DelVecchio, D. S., & Childers, T. L. (2011). Are low-literate and high-literate consumers different? Applying resource-matching theory to ad processing across literacy levels. *Journal of Consumer Psychology*, *21*(3), 312–323. https://doi.org/10.1016/j.jcps.2010.11.001

Jain, T., Hazra, J., & Cheng, T. C. E. (2018). Sourcing under overconfident buyer and suppliers. *International Journal of Production Economics*, *206*, 93–109. https://doi.org/10.1016/j.ijpe.2018.09.028

Katrodia, A., Naude, M. J., Soni, S., (2018). Consumer buying behavior in shopping malls: Does gender matter? *Journal of Economics and Behavioral Studies*, *10*(1), 125–134. https://doi.org/10.22610/jebs.v10i1(J).2095

Kelley, T. L. (1939). The selection of upper and lower groups for the validation of test items. *Journal of Educational Psychology*, *30*(1), 17–24. https://doi.org/10.1037/h0057123

Ketokivi, M., & Choi, T. (2014). Renaissance of case research as a scientific method. *Journal of Operations Management*, *32*(5), 232–240. https://doi.org/10.1016/j.jom.2014.03.004

Kopalle, P. K., & Lehmann, D. R. (2006). Setting quality expectations when entering a market: What should the promise be? *Marketing Science*, *25*(1), 8–24. https://doi.org/10.1287/mksc.1050.0122

Kopalle, P. K., & Lehmann, D. R. (2015). The truth hurts: How customers may lose from honest advertising. *International Journal of Research in Marketing*, *32*(3), 251–262. https://doi.org/10.1016/j.ijresmar.2014.12.003

Kwon, W.-S., & Noh, M. (2010). The influence of prior experience and age on mature consumers' perceptions and intentions of Internet apparel shopping. *Journal of Fashion Marketing and Management*, *14*(3), 335–349. https://dx.doi.org/10.1108/13612021011061825

Lachance, M. J., & Choquette-Bernier, N. (2004). College students' consumer competence: A qualitative exploration. *International Journal of Consumer Studies*, *28*(5), 433–442. https://doi.org/10.1111/j.1470-6431.2004.00390.x

Lian, J.-W., & Lin, T.-M. (2008). Effects of consumer characteristics on their acceptance of online shopping: Comparisons among different product types. *Computers in Human Behavior*, *24*(1), 48–65. https://doi.org/10.1016/j.chb.2007.01.002

Liu, G.-f., & Zhang, M. (2022). A review and prospect of consumer competency. *Chinese Journal of Applied Psychology*, *28*(2), 147–156. http://www.appliedpsy.cn/CN/Y2022/V28/I2/147

Liu, H.-Y., Wu, P., & Li, X.-P. (2021). Research on general education mode of college students under the background of stable finance: A survey based on college students' use of Internet consumer credit products. *Journal of Sichuan University (Natural Science Edition)*, *58*(5), 165–172. https://doi.org/10.19907/j.0490-6756.2021.057001

Liu, X. M., Li, F., & Wang, S. (2017). A study on the influence mechanism of self-efficacy, persuasion and boycott on consumers' willingness to accept socialized business models. *Management Review*, *29*(6), 202–213. https://doi.org/10.14120/j.cnki.cn11-5057/f.2017.06.029

Longart, P., Wickens, E., & Bakir, A. (2016). Consumer decision process in restaurant selection: An application of the stylized EKB model. *Market-Tržište*, *28*(2), 173–190. https://doi.org/10.22598/mt/2016.28.2.173

Lu, T., & Zhuang, G. (2021). A grounded-theory-based study of customer offline experience in the context of e-retailing. *Management Review*, *33*(7), 190–202. https://doi.org/10.14120/j.cnki.cn11-5057/f.2021.07.015

Luca, M., & Zervas, G. (2016). Fake it till you make it: Reputation, competition, and Yelp review fraud. *Management Science*, *62*(12), 3412–3427. https://doi.org/10.1287/mnsc.2015.2304

Lythreatis, S., Singh, S. K., & El-Kassar, A.-N. (2022). The digital divide: A review and future research agenda. *Technological Forecasting and Social Change*, *175*, Article 121359. https://doi.org/10.1016/j.techfore.2021.121359

Malchenko, Y., Gogua, M., Golovacheva, K., Smirnova, M., & Alkanova, O. (2020). A critical review of digital capability frameworks: A consumer perspective. *Digital Policy, Regulation and Governance*, *22*(4), 269–288. https://doi.org/10.1108/DPRG-02-2020-0028

Mansfield, E., Wahba, R., & De Grandpré, E. (2020). Integrating a health literacy lens into nutrition labelling policy in Canada. *International Journal of Environmental Research and Public Health*, *17*(11), Article 4130. https://doi.org/10.3390/ijerph17114130

Mazar, N., Plassmann, H., Robitaille, N., & Lindner, A. (2017). *Pain of paying? — A metaphor gone literal: Evidence from neural and behavioral science* (Working Paper No. 2901808). Rotman School of Management. https://doi.org/10.2139/ssrn.2901808

Mhlanga, S., & Kotzé, T. (2014). Information search, alternatives evaluation, and coping mechanisms of functionally illiterate consumers in retail settings: A developing economy context. *Journal of African Business*, *15*(2), 136–149. https://doi.org/10.1080/15228916.2014.925363

Miles, M. B., & Huberman, A. M. (1994). Qualitative data analysis: An expanded source book. *Journal of Environmental Psychology*, 14(4), 336–337. https://doi.org/10.1016/S0272-4944(05)80231-2

OECD. (2015). *PISA 2012 results: Students and money, financial literacy skills for the 21st century*. https://read.oecd-ilibrary.org/education/pisa-2012-results-students-and-money-volume-vi_9789264208094-en

Panwar, D., Anand, S., Ali, F., & Singal, K. (2019). Consumer decision making process models and their applications to market strategy. *International Management Review*, *15*(1), 36–44. https://www.proquest.com/openview/cc0322207156e02b9464e99b52d23e74/1?pq-origsite=gscholar&cbl=28202

Park, H.-Y., Rha, J.-Y., & Widdows, R. (2011). Toward a digital goods consumer competence index: An exploratory study. *Family and Consumer Sciences Research Journal*, *40*(2), 184–199. https://doi.org/10.1111/j.1552-3934.2011.02103.x

Parker, C. J., & Kuo, H.-Y., (2022). What drives generation-y women to buy fashion items online? *Journal of Marketing Theory and Practice*, *30*(3), 279–294. https://doi.org/10.1080/10696679.2021.1934877

Pop, R.-A., Hlédik, E., & Dabija, D.-C. (2023). Predicting consumers' purchase intention through fast fashion mobile apps: The mediating role of attitude and the moderating role of COVID-19. *Technological Forecasting and Social Change*, *186*, Article 122111. https://doi.org/10.1016/j.techfore.2022.122111

Robson, J., & Peetz, J. (2020). Gender differences in financial knowledge, attitudes, and behaviors: Accounting for socioeconomic disparities and psychological traits. *The Journal of Consumer Affairs*, *54*(3), 813–835. https://doi.org/10.1111/joca.12304

Rodríguez-Torrico, P., San-Martín, S., & San José-Cabezudo, R. (2019). What drives m-shoppers to continue using mobile devices to buy? *The Journal of Marketing Theory and Practice*, 27(1), 83–102. https://doi.org/10.1080/10696679.2018.1534211

Saha, S. K., Duarte, P., Silva, S. C., & Zhuang, G. (2021). Supporting sustainability by promoting online purchase through enhancement of online convenience. *Environment, Development and Sustainability*, *23*(5), 7251–7272. https://doi.org/10.1007/s10668-020-00915-7

Saldaña, J. (2013). *The coding manual for qualitative researchers*. Sage. http://digital.casalini.it/9781529755992

Soh, P. Y., Heng, H. B., Selvachandran, G., Anh, L. Q., Chau, H. T. M., Son, L. H., Baset-Abdel, M., Manogaran, G., & Varatharajan, R. (2020). Perception, acceptance and willingness of older adults in Malaysia towards online shopping: A study using the UTAUT and IRT models. *Journal of Ambient Intelligence and Humanized Computing*, *145*(1), 1–13. https://doi.org/10.1007/s12652-020-01718-4

Soopramanien, D. (2010). Conflicting attitudes and scepticism towards online shopping: The role of experience. *International Journal of Consumer Studies*, *35*(3), 338–347. https://doi.org/10.1111/j.1470-6431.2010.00945.x

Stewart, C. R., & Yap, S.-F. (2020). Low literacy, policy and consumer vulnerability: Are we really doing enough? *International Journal of Consumer Studies*, *44*(4), 343–352. https://doi.org/10.1111/ijcs.12569

Stojmenovic, M., Biddle, R., Grundy, J., & Farrell, V. (2019). The influence of textual and verbal word-of-mouth on website usability and visual appeal. *The Journal of Supercomputing*, *75*(4), 1783–1830. https://doi.org/10.1007/s11227-018-2313-x

Sun, J., & Chi, T., (2018). Key factors influencing the adoption of apparel mobile commerce: An empirical study of Chinese consumers. *The Journal of the Textile Institute, 109*(6), 785–797. https://doi.org/10.1080/00405000.2017.1371828

Sun, L., & Xin, Z. (2020). The development of the financial knowledge test for Chinese citizens. *Psychology: Techniques and Applications*, *8*(12), 718–725. https://doi.org/10.16842/j.cnki.issn2095-5588.2020.12.002

Thakur, R. (2018). The role of self-efficacy and customer satisfaction in driving loyalty to the mobile shopping application. *International Journal of Retail and Distribution Management*, *46*(3), 283–303. https://doi.org/10.1108/IJRDM-11-2016-0214

Viswanathan, M., Umashankar, N., Sreekumar, A., & Goreczny, A. (2021). Marketplace literacy as a pathway to a better world: Evidence from field experiments in low-access subsistence marketplaces. *Journal of Marketing*, *85*(3), 113–129. https://doi.org/10.1177/0022242921998385

Vuorikari, R., Punie, Y., Carretero, S., & Brande, L. V. den. (2016). *DigComp 2.0: The digital competence framework for citizens. Update Phase 1*. Joint Research Centre, European Commission. http://dx.publications.europa.eu/10.2791/11517

Wang, T., & Dong, L. (2021). Research on the government supervision strategy for the false advertising of enterprises. *Chinese Journal of Management Science*, *29*(4), 179–191. https://doi.org/10.16381/j.cnki.issn1003-207x.2019.1732

Ward, A. F., & Lynch, J. G. (2019). On a need-to-know basis: How the distribution of responsibility between couples shapes financial literacy and financial outcomes. *Journal of Consumer Research*, *45*(5), 1013–1036. https://doi.org/10.1093/jcr/ucy037

West, J., & Bhattacharya, M. (2016). Intelligent financial fraud detection: A comprehensive review. *Computers & Security*, *57*(9), 47–66. https://doi.org/10.1016/j.cose.2015.09.005

Wu, Y., Chen, H., & Wang, H. (2019). The influence of product diversity on consumers' impulsive purchase in online shopping environment. *American Journal of Industrial and Business Management*, *9*(3), 680–698. https://doi.org/10.4236/ajibm.2019.93046

Xin, Z. Q., Liu, G., & Zong, Z. (2022). Feeling and calculation: The impact of lay rationalism thinking mode on mental budgeting. *Current Psychology*. https://doi.org/10.1007/s12144-022-03689-5

Xin, Z. Q., & Mu, H. Y. (2020). Identification and service of the disadvantaged people with financial competency: Know address will reach. *Social Construction*, *7*(4), 37–44. http://www.cqvip.com/QK/72016X/20204/7102544494.html

Xin, Z. Y., Yu, Y. H., & Xin, Z. Q. (2020). The development of financial values tests for Chinese citizens. *Psychology: Techniques and Applications*, *8*(12), 736–746. https://doi.org/10.16842/j.cnki.issn2095-5588.2020.12.004

Zhang, H. C., Xin, Z. Q., & Wu, X. Y. (2020). The development of financial capacity test for Chinese citizens. *Psychology: Techniques and Applications*, *8*(12), 726–735. https://doi.org/10.16842/j.cnki.issn2095-5588.2020.12.003

Zhang, M., Geng, R., Huang, Y., & Ren, S. (2021). Terminator or accelerator? Lessons from the peer-to-peer accommodation hosts in China in responses to COVID-19. *International Journal of Hospitality Management*, *92*, Article 102760. https://doi.org/10.1016/j.ijhm.2020.102760

Appendix

The Subscale of Knowledge (The Correct Answer Is in *Italics*)

1. Taobao is a website that specializes in selling everyday items such as clothes and food. (Yes, *No*)
2. When buying clothes online, there is no difference between Jingdong, Taobao, Dewu, and other platforms. (Yes*, No*)
3. For online product evaluations provided after use, which one is more authentic?
   A. Provided several days after use
   B. Provided on the first day of use
4. As long as consumers know product evaluations on online shopping platforms, they can make the right decisions. (Yes, *No*)
5. On online shopping platforms, product evaluations with rich descriptions and high-quality pictures are more likely to be authentic. (Yes, *No*)
6. "Ask the others" in Taobao refers to who to ask questions.
   A. Ask other consumers who bought the same product
   B. Ask the customer service of Taobao
7. If you do not know information on freight insurance, how do you obtain related information?
   A. Check the product evaluations
   B. Ask customer service for help
8. In online shopping, if you encounter problems related to products, you can only rely on customer service to figure it out. (Yes, *No*)
9. What is the role of customer service in online shopping?
   A. You can ask customer service any question about the product
   B. You can ask customer service for help only when confirming your consumption decisions
10. Which problem do you usually use freight insurance to solve?
    A. Problems about the speed of delivery
    B. Problems about the return and exchange of products
11. If the product you bought online is faulty during use, there is nothing you can do but admit you are unlucky. (Yes, *No*)
12. If the logistics information of the product you bought online has not been updated, you can ask the customer service of the online shopping platform for help. (*Yes*, No)
13. Unlike offline shopping, there is no way to obtain invoices and receipts for online shopping. (Yes, *No*)

The Attitude Subscale

Table A1. *The Construct Analysis of the Subscale of Attitude (Study 2.*

Items	Dimensions			Communality
	Support for decision-making	Self-control	Consumer protection	
1. I usually know exactly what kind of product I want in online shopping.	0.66			0.44
2. I know which online platform is the best place to buy the product I want.	0.65			0.43
3. To get the right product, I am willing to spend time making product comparisons.	0.54			0.42
4. To get the right product, I am willing to spend time understanding the features of different online platforms.	0.68			0.47
5. In online shopping, individuals must first clearly know what they need.	0.61			0.40
6. When choosing products online, I will ask customer service for the information I need.	0.44			0.35
7. In online shopping, I will not borrow money from online platforms or others to buy a product that exceeds my budget.		0.81		0.65
8. In online shopping, it is more important to consume within your budget than to buy a favorite product.		0.67		0.46
9. In online shopping, I will not overspend to satisfy my needs.		0.84		0.72
10. In online shopping, I pay attention to postsales services, such as freight insurance.			0.57	0.44
11. If you buy an unsatisfactory product online, you should take various measures to safeguard your rights.			0.72	0.57
12. In online shopping, it is worth spending time and effort to protect your legal rights.			0.71	0.55
13. In online shopping, if the product cannot be returned without a reason, it should not be purchased.			0.68	0.48

The Subscale of Skill (The correct answer is in *Italics*)

1. What do you usually do when you buy a product online that you're not familiar with?
   A. Learn about the product through the internet and other approaches
   B. Check the product introduction in the online shopping platform or make a guess according to your previous experiences
2. Of the two forms of product evaluations in the online shopping platform, which one do you usually trust more?
   A. Evaluations with rich descriptions and high-quality pictures
   B. Evaluations with simple descriptions and low-quality pictures
3. If you fancy a dress on the internet but you do not know whether it fits you, what would you do?
   A. Look at the "model picture" in the product introduction and imagine whether the product is suitable
   B. Look at the "buyer show" in the product evaluations and imagine whether the product is suitable
4. When you want to know if a new toothpaste truly has the efficacy advertised, which of the following do you usually do?
   A. Find or ask questions you want to know in "ask the others"
   B. Check the introduction to product efficacy in the product evaluations
5. Both the product introduction and "ask the others" provide the product information; when the two are different, what do you usually do?
   A. Consider both types of information but prefer the product introduction

B. Consider both types of information but prefer "ask the others"

6. When you receive a monthly living income, how do you usually arrange for your subsequent online shopping?

   A. Buy what you like without thinking about the total budget

   B. Set a budget for your online shopping and stick to it

7. What do you usually do when you come across a favorite product that is beyond your budget?

   A. Give it up for now and buy it when you have saved up enough money

   B. Buy it now using a credit card or borrowed money from online platforms

8. When buying clothes online, what do you usually do when you do not know what size fits you?

   A. Ask customer service for help

   B. Choose according to your experiences

9. If the logistics information of a product you bought online is not updated several days after the product is shipped, what do you usually do?

   A. Wait patiently; the logistics information will be updated sooner or later

   B. Contact customer service and ask for a push

10. If you do not know how to return an inappropriate product that you just bought online, what would you do?

    A. Think for yourself and look for useful information on the platform

    B. Contact customer service and return the product under their guidance

11. If you bought a product online that you did not like or that was inappropriate, what would you usually do?

    A. Return or exchange the product

    B. Accept and use it reluctantly

12. You buy a product online and find it is slightly damaged. Although the damage does not affect its use, you still feel uncomfortable. What would you do?

    A. Since the damage does not affect the use, I will settle for it.

    B. Contact customer service for partial compensation

13. You have been looking forward to a product for a long time but the online retailer sends you a product in a color you do not like. What would you do?

    A. Accept and use the product that you received

    B. Contact customer service to return or exchange the product you receive

About Authors

Guofang Liu is an associate professor at School of Economics and Management, Shanghai Maritime University. His research interests include consumer psychology and behaviors and organizational behaviors. Recent research focuses on consumer competency in online shopping and human-robot trust in organizations.

https://orcid.org/0000-0002-2502-2244

Xiao Li is a graduate student of business administration at School of Economics and Management, Shanghai Maritime University. Her research interest is marketing psychology such as consumer competency.

Qingxuan Meng is a graduate student of business administration at School of Economics and Management, Shanghai Maritime University. Her research interest is marketing and organizational behaviors such as consumer competency and psychological ownership.

✉ **Correspondence to**
Guofang Liu, School of Economics and Management, Shanghai Maritime University, 1550 Haigang Road, Pudong District, Shanghai 201603, China, liuguofang99@126.com