Livestream shopping is getting more and more popular as a new shopping form. Also, due to the COVID-19 pandemic, people have shifted to online shopping platforms. However, the broader user adoption comes with a cost — many streamers’ malicious selling incidents have recently been reported. In this study, we aim to explore streamers’ malicious selling strategies and how viewers may perceive these strategies. First, we collected 40 livestream shopping sessions from two popular livestream platforms in China — Taobao and Douyin (TikTok of Chinese version). We identified three categories of malicious selling strategies (i.e., Compulsive, Restrictive, and Designing) and found platform designs mostly enhanced these malicious selling strategies. Second, through an interview study with 13 end users, we provide a rich description of users’ awareness of malicious selling strategies and challenges to counter malicious selling. We conclude the paper by discussing the policy and design implications to counter malicious selling.

CCS Concepts:
• Human-centered computing → Empirical studies in HCI.

Additional Key Words and Phrases: livestream shopping, malicious selling strategy, Taobao, Douyin, TikTok, deception, manipulation, taxonomy, dark pattern

1 INTRODUCTION

Livestream shopping has recently become a popular new form of online shopping [10, 12]. In a typical 30-minute to one-hour livestream session, the streamer (often a shop owner, model, an influencer, or a celebrity) spends a few minutes introducing each product and then encourages their viewers to make the order right away (e.g., food and clothes). The product list is carefully tailored by the streamer and changes everytime. Despite sounding much like QVC and the Home Shopping Network on television (TV), livestream shopping offers a much more interactive and engaging experience to the users [4, 48]. Hundreds of thousands of viewers can watch the livestream session simultaneously, and they can directly interact with the streamer via the built-in chat channel, or even tip money to the streamer as a virtual gift (e.g., a flower). Some of them may finally make the purchase, while others just watch and enjoy the streamer chatting with viewers. The livestream platform often has an integrated “shopping window” feature, thus when the streamer goes over the product one by one, the viewers can see the purchase link for that product popping up on their screen. They can then make the purchase with one simple click without leaving the livestream to enter address or credit card information.

Livestream commerce has taken off in China since 2019 [43]. This new form of online shopping benefits greatly from "the increasing tensions between the cultural politics and economic ambitions of digital China" [26]. The government supports small businesses to sell their products via livestream, through which they can obtain more customers at a low cost. Moreover, the COVID-19 pandemic fuels the livestream shopping frenzy, as homebound customers cannot go to offline stores for shopping, and the retailers have to rely heavily on online shopping platforms. Platforms that support livestream and e-commerce (e.g., Alibaba’s Taobao, DyteDance’s Douyin) have integrated a range of features to promote engagement and purchases, e.g., red pockets, fan groups, and loyalty levels [53]. These integrated features enable e-commerce applications to support more
social activities and facilitate communication and connections between businesses and customers. Compared to China, livestream commerce in the U.S. and other countries is nascent in terms of its platform designs and services. E-commerce platforms (e.g., Amazon) and social media platforms (e.g., Facebook Live) are catching up with the hype [12, 78].

This rapid development of livestream commerce in China comes with a cost. More and more malicious selling incidents have been reported by media press articles [5, 19, 43]. Recent studies have investigated the motivations of livestream viewers’ purchasing behavior and of streamers’ selling behavior [10, 11, 52, 73, 81], but the dark side of livestream shopping — malicious selling strategies of streamers, and platform designs that mediate these strategies — is underexplored.

In this paper, we define *livestream malicious selling* as 'streamers leveraging unbalanced power and information to deceive or manipulate viewers into buying behavior during livestream sessions'\(^1\) We conducted a two-fold research project to understand malicious selling in livestream shopping. The first study was to explore malicious selling strategies in livestream shopping and how platform designs mediate these strategies, through qualitative analysis of 40 sampled livestream shopping sessions from two top platforms in China — Taobao and Douyin. The second study was to provide the viewers’ perspective of malicious selling strategies, through a semi-structured interview study with 13 participants who had shopping experiences on livestream platforms in China.

We identified three types of malicious selling strategies: Compulsive, Restrictive and Designing. They included 16 sub-category strategies, among which nine malicious strategies are amplified by platforms’ designs. The interview study revealed that some participants were not aware of the malicious selling strategies or designs. For other participants, even though they were aware of malicious selling, they were generally tolerant of these strategies and designs. Participants also reported that they were faced with challenges to defend against malicious selling due to the loosely-regulated and very individualized streamer’s stream practices, and some system designs worsen the situation. Based on these findings, we discuss policy and design implications to counter malicious selling in livestream shopping.

The contributions of this work are two-fold: first, we identified three types of malicious selling strategies with 16 specific strategies, some of which were new compared to existing typologies (e.g., Playacting); more than half of the strategies were enhanced by system designs — even though some of these designs were not dark pattern designs but they led to negative effects on viewers when combined with streamer’s malicious selling strategies on the livestream shopping platforms. Second, we provided a rich account of viewers’ perspective on how they perceived and reacted to streamers’ malicious selling, which provides policy and design implications for livestream platforms.

2 RELATED WORK

This work aims to investigate streamers’ malicious selling strategies and (or) the platform designs in livestream shopping. We first review studies about livestream shopping. Then, we review the selling strategies that have been investigated in online shopping forms (e.g., TV shopping). Last, we review literature specifically discussing the system design’s negative effects on users (e.g., dark pattern) in the online shopping and other scenarios.

2.1 Livestreaming as an Emerging Online Shopping Platform

Livestream has been widely used as an engaging way to connect community members [41, 57]. Previous studies have explored engagement motivations, participation demographics and engagement

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\(^1\)We would like to remind our readers that MOST of the studied streamers’ selling strategies and tactics are totally normal and legal. We did not report those in our paper analyses as our research questions focus on the malicious selling strategy. But the readers should not be misled or biased by our findings to think negatively of all the platforms or streamers.
levels in various livestream communities, including livestream for entertainment, education [15, 42], skill improvement [56], programming [31], cultural practices [55], creative activities [57], and online communications [74]. Prior research has explored reasons for livestream participation from both streamer perspectives [44, 54, 66] and viewer perspectives [38, 41, 69], how people formed communities between streamers and viewers via livestream [40], and different types of interactions within livestream communities [38, 51, 67, 84]. For example, streamers on livestream platforms such as Twitch broadcasted playing video games to share gameplay skills and common interests with viewers [41, 45, 66, 71, 77]. Prior work has also analyzed viewers' negative behaviors during livestreams and how livestream platforms allowed viewers to report inappropriate content [76]. Livestream user interfaces also integrated communication channels to increase viewer engagement [34, 51]. This high degree of interactivity and engagement make some viewers more willing to purchase products created by streamers during the stream [55] or the merch designed by the streamers [71]. This indicates a great potential of livestream as a new form of e-commerce.

Livestream e-commerce or livestream shopping has attracted researchers' attention in recent years. Some works have focused on viewers' (buyers) motivations: why they watch livestreams and buy products in it [10, 11, 52, 73, 81]. By analyzing self-reported data, scholars found that utilitarian and hedonic values were two main values that motivated customers to shop in livestream. Utilitarian value was related to purchase needs, and hedonic value was related to affective commitment to streamers [11, 52]. Scholars also found that trust was an intermediate variable that transferred affective commitment to engagement and buying in livestream shopping [14].

A few researchers focused on the streamers' (sellers) perspective. Researchers from business and marketing reported a range of selling strategies that streamers used to increase buying and sales revenues [13, 78]. It indicates a dearth of works about streamers' selling strategies, especially from an HCI perspective to explore how these streamer practices may impact viewer's buying experiences, and how platform designs may mediate streamers' behaviors.

### 2.2 Seller Behaviors in Online Shopping

Although livestream shopping is emerging and little is known about seller behaviors and selling strategies in livestream shopping, it shares similarities with TV shopping and social shopping, which have been well studied regarding seller behaviors and selling strategies.

TV shopping is a shopping method dated back to the 1980s and is still popular in many countries. In a pre-recorded TV shopping program, the TV host presents the products in detail, and viewers can order the items by calling the telephone number [35]. Both livestream shopping and TV shopping show the products in a lively way. But livestream shopping is more interactive than TV shopping [53]. Studies have been done to investigate selling strategies in TV shopping. For example, Fritchie and colleagues found that social proof, scarcity, authority, commitment and consistency, liking, and reciprocation were used as selling strategies to simulate selling. These selling strategies were based on persuasion theory [21]. The hosts also built personal and emotional connections with viewers and further fostered trust with viewers [47, 72]. For example, the hosts asked questions to establish similarities with viewers [72].

Social shopping is another form of online shopping, by which product promotion is disseminated through personal social networks on online platforms (e.g., Facebook, Instagram) without switching to another e-commerce channel [17]. The salesmen, called “market intermediaries,” are individuals who are actively sharing product information with their social connections on social shopping platforms. Some work has studied the behaviors of market intermediaries in social shopping platforms [17]. Market intermediaries helped customers detect trending products, evaluated products and provided a good price and discount to customers [16, 17, 46]. Other than providing product-related support, they built trust with potential customers by generating and sharing content (e.g.,
short video) [39] and providing emotional support [70]. Customers reported that other than trust, culture and social presence are two other factors that impact market intermediaries’ sales [63].

Among these selling strategies, scholars also examined their malicious side. Existing literature has extensively discussed the dark side of TV selling strategies. For example, consumers believed TV shopping was extremely risky [8] as the product quality might be poor and the price was uncertain [9]. TV shopping hosts used their knowledge of human behaviors and viewers’ desire to implement deceptive strategies that incited purchasing. For example, TV shopping used compliance-gaining techniques to urge viewers. These techniques included using countdown timers and “sold out” signs [3]. The host of TV shopping introduced a product with emphasis on financial prudence such as bargain price and versatility and upward mobility such as items looking expensive [23].

Livestream shopping combines salesmanship and parasocial interaction characteristics. In a livestream, a streamer serves as the salesman to display products and also builds social connections with viewers. For example, a streamer who sell books in her channel also teaches history courses relevant to the promoted books while sharing her personal stories during the livestream.

In livestream shopping, streamers can use various strategies to attract attention, increase sales, and build customer engagement. For example, Wongkitrungrueng et al. [78] found four sales approaches in livestream commerce. The four sales approaches were “transaction-based,” “persuasion-based,” “content-based,” and “relationship-based.” Through the transaction-based approach, streamers used simple selling, limit quantity/time/offer, and demonstration to facilitate their selling. Through the persuasion-based approach, streamers relied on game-prize, show, and personal characters to persuade viewers. Through the content-based approach, sellers provided product related or non-product related information to enrich their livestream’s content. They also provided service to customers to incite their buying behaviors. Through the relationship-based approach, streamers shared their personal life, feelings/experiences and organized community activities to strengthen their relationship with viewers.

These characteristics make livestream shopping differ from TV shopping and social shopping. To our best knowledge, the only work that studied impulsive buying behavior in livestream is [80]. It suggested that a viewer’s impulsive buying behavior might be related to “emotional energy,” which referred to customers’ affection engagement towards streamers. In this work, we aim to ask what are streamers’ malicious selling strategies, and how livestream platform designs mediate malicious selling strategies.

2.3 Online Shopping Platform Design and “Dark Pattern” Design

Livestream shopping is a new and special type of online shopping experiences thus streamers’ and viewers’ experience are empowered or bounded by the platform’s UI designs. We are also interested in how platform designs may mediate streamer’s malicious selling strategies.

In the CSCW and HCI community, one stream that focuses on the negative effects of interface designs on users is “dark patterns.” A dark pattern is defined as “a user interface that has been carefully crafted to trick users into doing things” [7]. Studies have reported dark pattern designs in various scenarios: e-shopping websites [60, 62], mobile applications [30], gaming [29, 83], robot [50], etc.

Initially, Brignull proposed a dark pattern taxonomy to categorize the various designs [6, 7]. The taxonomy consists of 12 categories, e.g., “Bait and Switch,” “Disguised Ad” [6]. Gray and colleagues criticized that the taxonomy mixed up context, strategy, and outcome”. Thus they simplified the taxonomy into five categories: “nagging,” “obstruction,” “sneaking,” “interface interference,” and “forced action” [37]. Mathur and colleagues built upon these works and developed a dark pattern taxonomy specifically for online shopping websites [60]. The taxonomy includes seven dark pattern categories. Compared to Bringnull’s and Gray’s taxonomies [37], Mathur’s version added “Urgency,”
“Social Proof,” and “Scarcity” for online shopping context. And they combined multiple categories such as “Confirmshaming” and “Trick Questions” into a single “Misdirection” category. Further, Mathur and colleagues summarized five characteristics of dark patterns, “Asymmetric,” “Covert,” “Deceptive,” “Hides Information,” and “Restrictive” [60]. These characteristics help to differentiate dark patterns from normal persuasive strategies in designs.

Other prior studies that were not particularly looking at dark patterns also reported “bad” design practices that could potentially harm users, such as malicious interface techniques [22], asshole designers [36], privacy paradox [75], and impulsive buying [62]. Conti and Sobiesk defined malicious interface techniques as the intention that “deliberately sacrifice the user experience” to achieve designers’ goals [22]. Gray et al. found that even without the presence of dark patterns, asshole designs could still deceive users, such as restricting users’ tasks, setting traps that were hard to avoid, and misrepresenting information, which highlighted designers’ unethical intents and motivations [36]. Moser and colleagues [62] studied impulse buying in e-shopping websites. Some impulsive buying features are different from dark patterns. For example, an impulse buying feature “Offering Returns” is not a dark pattern because it does not directly benefit e-shopping websites [7, 60].

Studies have started to understand users’ perceptions about dark patterns — whether users can be aware of dark patterns [30, 59, 75] and how dark patterns influence user behaviors [58]. Studies indicated that users tended to be insensitive to dark pattern designs even with hints [30, 59]. For example, Di Geronimo and colleagues explored user’s perception of UI dark patterns in mobile applications. Their online user experiment illustrated that the presence of malicious designs was not easy to notice by users [30]. If users were informed of the existence of dark patterns, they were better aware of them [75]. Maier and Harr [59] found that deceptive techniques were perceived as less malicious by users and some of them were regarded as just sneaky and dishonest. Luguri and Strahilevitz found that well-educated users were less susceptible to dark patterns than the less-educated group; the dark patterns “hidden information,” “trick questions,” and “obstruction” were more likely to be manipulative than others such as “nagging,” “sneaking,” “forced action” [58]. These findings indicate a need to better understand users’ perceptions of and reactions to dark patterns with the purpose of mitigating harms.

However, in our work, there may be some “not-so-dark” designs that also impair customers’ decision making and purchase behaviors due to the ways that streamers use these designs in their malicious selling strategies. Thus, we are eager to investigate how these “normal” designs may fluidly turn to “dark pattern designs” in the livestream shopping scenario.

2.4 Research Questions

In summary, base on these reviewed literature, we ask the following three research questions:

RQ1: What malicious selling strategies are used by streamers in livestream shopping?

RQ2: How do platform designs mediate these malicious selling strategies?

RQ3: How do viewers perceive (both awareness and attitude) and react to these malicious selling strategies?

3 RESEARCH METHODS

We conducted a two-fold study to address the RQs: a qualitative content analysis to identify malicious selling strategies and platform designs in recorded livestream sessions (RQ1 & RQ2) and an interview study to triangulate the findings from the viewers’ perspective (RQ3).
3.1 Qualitative Analysis of Livestream Shopping Video Recordings

To investigate streamer’s selling strategies, we sampled a group of 40 publicly available livestream sessions and archived them as video recordings. These 40 sessions were from two predominant livestream shopping platforms in China: Alibaba’s Taobao and ByteDance’s Douyin. To identify malicious selling strategies, we conducted inductive coding with the recorded videos. In what follows, we describe how we selected the research sites, processes the data, and performed the qualitative coding method.

3.1.1 Two Livestream Platforms as Research Sites. We selected two top livestream commerce platforms, Alibaba’s Taobao and ByteDance’s Douyin as they are the top two livestream shopping platforms in China [18]. Taobao is originally an online shopping platform, thus its add-on livestream feature is an extension to its online shopping website. Douyin is a short video sharing and livestream platform, thus the add-on shopping feature is an extension to its livestream service [48].

Due to their different origins, the livestream style and the streamer’s background are slightly different on these two platforms. The streamers on the Taobao livestream platform are usually small business owners or temporary streamers (e.g., salesmen) hired by business owners, and they sell products from their own business. In contrast, the streamers on Douyin livestream shopping are often celebrities, influencers, or professional streamers, and they collaborate with various brands and business owners. Functionality-wise, Taobao livestream can redirect viewers to the online stores on the Taobao website; while Douyin provides a “shopping window” feature within the stream session, enabling users to browse a list of products and complete purchases with one click without leaving the livestream session [27].

3.1.2 Data Collection of Livestream Shopping Sessions. We sampled representative streamers based on the number of subscriptions. Some streamers have a huge viewer population (e.g., two streamers Viya and Jiaqi Li on Taobao have millions of viewers) whereas some others have a relatively small viewer population (e.g., a farmer streamer had only a few dozen viewers). Besides, we also sampled accounts to cover diverse product types. On Taobao livestream platform, stream channels are categorized by the type of products. There are seven primary categories: Food, Apparel, Beauty, Jewelry, Mother&Kid, Home, Electric. On Douyin, there are no specific categories in livestream shopping. Thus, we sampled accounts based on Taobao’s product categories. We also observed that most livestream sessions were happening in the evening to gain higher customer volume. But there were still livestream sessions happening in the morning and afternoon. Thus, we selected three time segments for data collection: the morning segment (10 AM-12 PM China Standard Time), the afternoon segment (1 PM-3 PM), and the evening segment (8 PM-11 PM). The evening segment is longer than the other two segments to accommodate more livestream sessions happening during the evening. The first author conducted the recording task to make sure the sampling strategy was consistent. The researcher used a screen recording software to save livestream sessions as video recordings. The researcher used an incognito browser to log on to Taobao and Douyin to avoid any recommendation algorithm bias. All livestream sessions were publicly available.

Normally, one livestream session runs for a few hours each day. During the session, a streamer displays multiple products in turn. To conduct a comprehensive investigation for malicious selling strategies in livestream shopping, we needed to cover diverse selling behaviors. Therefore, there was a trade-off between data diversity and data size. To decide the length of livestream sessions to record, we first recorded five livestream sessions from each platform. Each recording lasted for 15 to 25 minutes. We found that streamers usually spent about five minutes on a single product, and streamers’ selling behaviors did not change much from product to product. Thus, we decided to shorten the length of recordings, about seven minutes for each one. We collected another 15
Malicious Selling Strategies in Livestream Shopping

(a) A Douyin Livestream Channel. (b) The Shopping Cart on Douyin. The main features are: 1) the chat channel where both viewers and the streamer’s assistant can post comments; 2) from the top down, viewers’ action messages, including a sending gifts (to the streamer) message (“User A (王°) is sending beer”), a sending likes message (“User B (任°) is sending likes”), a joining the livestream channel message (“User C (美°) is joining the channel”); 3) the link of the streamed product; 4) other function buttons: from left to right, more function button, checking shopping cart button, sending likes button, sending gifts button, and checking the streamer’s profile button; 5) the subscribing reminder tag, named “Join my fans group”; 6) the shopping cart on Douyin with the numbered products, one “Streaming” mark on the 1st product, and two “Sold out” marks on the 3rd and 4th products.

Fig. 1. The interface of (a) a Douyin livestream channel and (b) the shopping cart on Douyin. The main features are: 1) the chat channel where both viewers and the streamer’s assistant can post comments; 2) from the top down, viewers’ action messages, including a sending gifts (to the streamer) message (“User A (王°) is sending beer”), a sending likes message (“User B (任°) is sending likes”), a joining the livestream channel message (“User C (美°) is joining the channel”); 3) the link of the streamed product; 4) other function buttons: from left to right, more function button, checking shopping cart button, sending likes button, sending gifts button, and checking the streamer’s profile button; 5) the subscribing reminder tag, named “Join my fans group”; 6) the shopping cart on Douyin with the numbered products, one “Streaming” mark on the 1st product, and two “Sold out” marks on the 3rd and 4th products.

Table 1 lists the 40 livestream recordings data in detail, including the channel name, platform, the number of subscriptions, the number of real-time viewers, and the category of products.

3.1.3 Qualitative Coding Procedure. We noticed overlap between our coding and the existing typologies [6, 7, 37, 60]. Thus, we first conducted a deductive analysis method with the first 10 recordings (five from Taobao and five from Douyin) using the codes in the existing typologies. All researchers had prior shopping experiences on China livestream platforms. The coding was primarily focusing on streamers’ malicious selling strategies and designs used by streamers together with such strategies. We independently watched the first 10 recordings, wrote down the codes along with the timestamps, and took notes. We coded multiple video elements, including streamers’ speeches and actions, the features or functions used by streamers, the content of comments in the chat channel, and the products sold, etc.
Table 1. The summary of 40 sampled livesteam sessions from Taobao and Douyin, including the video ID, the livestream channel’s name in Chinese, the number of subscriptions, the number of real-time viewers, the category of streamed shopping products. The product category “All” means the livestream channel sold multiple types of products.

| Video ID | Plateform | Channel Name | # of Subscriptions | # of Viewers | Product Category |
|----------|-----------|--------------|--------------------|--------------|------------------|
| VT1      | Taobao   | 薇娅viya     | 39m                | 1.9m         | All              |
| VT2      | Taobao   | 李佳琦       | 38m                | 1.3m         | All              |
| VT3      | Taobao   | veromod      | 14m                | 11k          | Apparel          |
| VT4      | Taobao   | CT彩妆师     | 898k               | 13k          | Beauty           |
| VT5      | Taobao   | 小田Tia      | 776k               | 657k         | Apparel          |
| VT6      | Taobao   | 李响         | 537k               | 613k         | All              |
| VT7      | Taobao   | 美的厨房电器 | 348k               | 461          | Electronics      |
| VT8      | Taobao   | 老兵蜜蜡琥珀 | 178k               | 39k          | Jewelry          |
| VT9      | Taobao   | 淘气妈妈孕妇装 | 146k              | 334          | Mother&Kid       |
| VT10     | Taobao   | 混血美整颜顾问Dr赵 | 83k       | 869          | Beauty           |
| VT11     | Taobao   | 林子严选童装精品 | 51k       | 5.0k         | Mother&Kid       |
| VT12     | Taobao   | 南鹿船老大 | 27k                | 6.0k         | Food             |
| VT13     | Taobao   | 葡萄皮黄昏潮玩 | 27k       | 1.7k         | Mother&Kid       |
| VT14     | Taobao   | 奇小喵奢侈品A | 21k       | 741          | Apparel          |
| VT15     | Taobao   | 新疆和田玉随听 | 18k       | 4.7k         | Jewelry          |
| VT16     | Taobao   | 冰冰Fancy     | 9.5k               | 33k          | Beauty           |
| VT17     | Taobao   | 小鑫欧洲轻奢直 | 7.5k       | 5.8k         | Apparel          |
| VT18     | Taobao   | 石之道       | 3.5k               | 1.5k         | Jewelry          |
| VT19     | Taobao   | 罗莱精选折扣点 | 2.3k       | 23k          | Home             |
| VT20     | Taobao   | 李小七折扣店 | 976                | 21k          | Food             |
| VD1      | Douyin   | 主持人王芳   | 7.7m               | 2.4k         | Education        |
| VD2      | Douyin   | 恩克         | 4.7m               | 2.6k         | Food             |
| VD3      | Douyin   | 龙峰人阿明   | 4.7m               | 2.4k         | Food             |
| VD4      | Douyin   | 晨泉创始人何胜强 | 4.0m     | 7.0k         | Beauty           |
| VD5      | Douyin   | 三只松鼠     | 3.3m               | 4.0k         | Food             |
| VD6      | Douyin   | 彩虹夫妇     | 2.9m               | 4.6k         | All              |
| VD7      | Douyin   | 贾不假鞋坊   | 1.9m               | 2.9k         | Apparel          |
| VD8      | Douyin   | 圆圆价到      | 1.6m               | 3.4k         | Home             |
| VD9      | Douyin   | 新郑市白马服装厂 | 1.4m   | 3.9k         | Apparel          |
| VD10     | Douyin   | 新百伦旗舰店 | 1.2m               | 1.6k         | Apparel          |
| VD11     | Douyin   | 棉花糖果早上9:00直播 | 795k  | 730         | Apparel          |
| VD12     | Douyin   | 丹儿家海鲜   | 777k               | 1.7k         | Food             |
| VD13     | Douyin   | 美希（香港周六福） | 532k  | 3.4k         | Jewelry          |
| VD14     | Douyin   | 阿离玉炸    | 412k               | 1.7k         | All              |
| VD15     | Douyin   | 每日家居     | 387k               | 1.7k         | Home             |
| VD16     | Douyin   | 易辰官方女鞋号 | 374k    | 2.9k         | Apparel          |
| VD17     | Douyin   | 自然堂       | 368k               | 50           | Beauty           |
| VD18     | Douyin   | UR定制       | 70k                | 1.4k         | Apparel          |
| VD19     | Douyin   | 祥哥潮汕牛肉丸 | 45k    | 5.7k         | Food             |
| VD20     | Douyin   | 湘西田嫂农家菜 | 26k     | 211          | Food             |

Notably, we define malicious selling as streamers leverage unbalanced power and information to deceive or manipulate viewers into buying. We carefully checked if the selling strategies were deceptive, or manipulative in an immoral way. We did not count normally exaggerated or persuasive strategies as malicious. For example, if a streamer applied an “urgency” strategy, we checked whether the product selling or discount expired as the streamer said. We realized that livestream might not allow post check. Thus, part of the cross-check work was done during the data collection process.
That is, if the first author noticed there might be a potential malicious selling strategy, the author would record the cross-check process in the video recording for post analysis.

During the deductive coding process, we generated new code from the data. We added the new codes to the codebook. Then, we coded another ten recordings independently with the updated codebook. The codebook reached saturation during the process. We calculated the inter-coder reliability [49]. Cohen’s kappa was 0.91. Using the codebook, we coded the rest 20 recordings.

In total, we identified 15 malicious selling strategies from the 40 recording sessions. We borrowed or referred to codes such as “urgency,” “scarcity,” “social proof,” “forced action,” and “nagging” from the existing typologies [24, 37, 60]. We added new codes such as “playacting” (engaging in pretense to induce viewers to buy or to gain affection and sympathy) to our taxonomy. We further grouped the malicious selling strategies into three categories. They are Compulsive, Deceptive and Designing selling strategy categories. We define them in Results. Table 3 lists the malicious selling strategies and descriptions.

We also identified 15 interface designs that mediated the malicious selling strategies. Figure 1 demonstrates the primary features on the Douyin livestream platform. Features on the Taobao livestream platform are similar to those on Douyin thus we do not illustrate them. Table 4 illustrates how the 15 designs mediated malicious selling strategies. We explain more details in Results.

3.2 Interview Study

To understand how viewers think of these malicious selling strategies, we designed and conducted a semi-structured interview study to gather viewers’ perception (awareness and attitude) and reactions to these selling strategies.

3.2.1 Participant Recruitment. We recruited participants who had purchase history on livestream platforms in China. We used the snowball sampling method to recruit participants. We disseminated the recruitment flyers through researchers’ social networks and also asked the participants to spread the recruitment to their acquaintances. Once one agreed to participate in the interview, we asked the person to fill out a survey. This survey includes questions such as “Have you ever watched livestream for shopping?” “How frequently do you watch livestream?” “Have you ever bought products on livestream?” “What platform(s) do you watch livestream?”

We received 23 responses in total. We filtered out the respondents who did not have purchase history on livestream platforms or did not provide contact information. In total, we interviewed 13 participants. Out of the 13 participants, 11 participants are female. All participants had a high school degree or higher, and they were from both cities and towns in China. All had online shopping experiences either from Taobao or Douyin or both before the interview study. The participants’ information is summarized in Table 2. According to a China livestream e-commerce user report in 2020, the ratio of male users to female users on Taobao and Douyin livestream commerce platforms was about 3:7, and users aged between 18 and 40 was about 85% [65]. In general, our interview participant sample represents the user population on the two platforms with a slight skew to female.

3.2.2 Interview Procedure. The interviews were conducted from December 2020 to January 2021. We used video or audio conferencing tools (i.e., WeChat, Zoom) to interview participants based on their preferences. All interviews were conducted in Mandarin Chinese. The first author led the interviews, asked questions, and recorded the audios. The second author took notes. Both researchers are fluent in Mandarin Chinese. Before conducting the interviews, we ran two pilot studies to test the interview procedure. All researchers participated in the pilot studies and provided feedback, and the pilot results were excluded from this work.
Table 2. The summary of participants’ demographic information (i.e., age and gender) and general experiences of watching livestream for shopping (i.e., how often they watched livestream, how long they had watched livestream, and on what platforms they watched livestream).

| Participant | Age     | Gender | Frequency of Viewing | History of Viewing | Platform(s)       |
|-------------|---------|--------|----------------------|--------------------|------------------|
| P01         | 26-35   | Female | Once a week          | 1-3 months         | Taobao, Douyin   |
| P02         | 26-35   | Male   | Once a week          | 4-6 months         | Taobao, Douyin   |
| P03         | 18-25   | Female | Several times a week | 7-12 months        | Taobao, Douyin   |
| P04         | 18-25   | Female | Once a week          | 7-12 months        | Taobao           |
| P05         | 26-35   | Female | Several times a week | 1-2 years          | Taobao, Douyin   |
| P06         | 26-35   | Female | Every day            | 4-6 months         | Taobao, Douyin, WeChat |
| P07         | 18-25   | Female | Several times a week | 7-12 months        | Taobao           |
| P08         | 36-45   | Male   | Once a week          | 1-2 years          | Taobao           |
| P09         | 26-35   | Female | Several times a week | 1-2 years          | Taobao           |
| P10         | 36-45   | Female | Once a week          | 4-6 months         | Taobao, Douyin   |
| P11         | 36-45   | Female | Several times a week | >2 years           | Taobao, Douyin   |
| P12         | 36-45   | Female | Several times a week | 7-12 months        | Taobao           |
| P13         | 18-25   | Female | Once a week          | 1-2 years          | Taobao, Douyin   |

The interview contained two primary parts: the first part was to let participants validate the malicious selling strategies that the researchers identified from the recordings, and the second part was to let participants share their experiences about how they reacted to malicious selling.

At the beginning of the interview, we started with some icebreaker questions, such as “How often do you watch livestream?” “How long have you watched livestream for shopping?” Then, we dived into participants’ shopping experiences on livestream. We asked “Have you bought something on any livestream platforms?” Then, we asked participants to talk about the most recent/impressive shopping experience in detail. We also asked the participants about their perceptions of streamers and other viewers in the livestream channel(s).

The questions were designed to help participants recall as many of their shopping experiences in livestream channels as they could. If the participants had difficulty in recalling an experience, we asked the participants to show us the livestream platform and describe the interface designs to us. It proved very helpful for participants to recall behaviors of themselves and streamers.

To avoid leading questions that could bias participants’ perceived malicious selling strategies, we did not remind participants of any specific malicious strategy. Instead, when they mentioned experiences related to the strategies in our taxonomy, we asked follow-up questions regarding participants’ attitudes, such as “Do you trust the streamer?” “Are you satisfied with the product?” Then, we asked the participants to further explain why they think so or not, and how they reacted to that. If participants never mentioned any malicious selling strategy, we asked a general question, “Have you noticed anything inappropriate or wrong, or that you feel uncomfortable with, including the streamer, the assistant, viewers, and the interface designs?” If participants answered no, we did not ask any probing questions. In the end, we asked participants for suggestions to improve the livestream shopping experience.

Each interview lasted approximately 40-50 minutes. Participation in the interview was voluntary. All interviews were audio-recorded with participants’ approval.

3.2.3 Data Analysis. The first and second authors conducted an inductive coding process derived from grounded theory [33]. They followed a similar coding process to the video recording analysis aforementioned. All researchers discussed the coding results together and grouped the codes into six themes. They are general experiences, motivation of watching livestream for shopping,
purchase procedure, awareness of malicious selling strategies, ways of coping with malicious selling strategies, challenges of defending dark strategies. Then, the researchers applied an axial coding [25] and generated the final coding schema with three primary categories: awareness and attitudes towards malicious selling strategies, ways of coping with malicious selling, challenges of coping with malicious selling.

4 RESULTS

In this section, we present the results for RQ1 and RQ2 drawn from both the analysis of video recordings and the interview study. Then, we present the interview findings regarding how the participants fought against malicious selling and what were the challenges.

4.1 Malicious Selling Strategies in Livestream Shopping (RQ1)

Our content analysis for the livestream shopping video recordings revealed three categories of malicious selling strategies with 15 specific strategies.

Then, we interviewed 13 participants to see whether they were aware of these malicious strategies. The participants were aware of most malicious strategies. Only the strategy Pressured Selling was not perceived by any participant. Moreover, three participants mentioned a new malicious selling strategy, Forced Wholesale. Notably, if a participant mentioned a livestream shopping experience related to a malicious selling strategy but did not perceive it as malicious, we did not count the participant for the malicious strategy.

Table 3 lists the three categories with 16 sub-category malicious selling strategies, the explanations, and the participants who were aware of the malicious strategies.

4.1.1 Compulsive Strategies. Compulsive strategies refer to streamers asked viewers to take forced actions for obtaining special rewards or prices. The Compulsive category contains three malicious selling strategies: Forced Subscription, Forced Subscription, and Forced Wholesale.

Forced Subscription refers to when the streamer requires viewers to subscribe to the streamer’s channel or the streamer’s fans group for rewards (e.g., a discount, cashback). The subscription task is forced. In several channels, if viewers did not subscribe, they could not buy products on discount.

Forced Endorsement refers to when the streamer asks viewers to send gifts, which needs to be paid by viewers, or sharing the streamer’s channel with others to get rewards (e.g., a discount). The endorsement task is also forced. Based on streamers’ claims in our data, they could check whether viewers conducted subscription and endorsement tasks at the backend and decided whether they could get the discount.

Forced Wholesale means that the streamer coerces viewers into buying multiple packs of a product. Viewers had no choice to buy a single pack of a product. For example, P4 described a forced wholesale experience and commented that it was a usual malicious strategy in livestream shopping: “I’ll regret (to buy too many things). Streamers won’t sell a single pack. It’s kind of like wholesale. For example, if you want to buy toothpaste, you can only buy a set of four. It’s a family package. If I buy it, I must regret since I can’t use them out in a long time.” (P4)

4.1.2 Deceptive Strategies. The Deceptive strategies refer to that streamers applied fake selling information or product information to trick viewers to purchase products. The Deceptive category contains four specific selling strategies: Fake Scarcity, Fake Urgency, Fake Social Proof, and Fake Exclusive Pricing.

Fake Scarcity refers to the malicious strategy that the streamer deceives viewers about the high demand and limited availability of a product. It helps incite viewers’ desirability of a product and increase the perceived value of a product [61, 64]. Streamers used fake numbers to indicate the low stock of a certain product. They made viewers believe that a limited number of items were available.
Table 3. The taxonomy of malicious selling strategies in livestream shopping: three categories, 16 strategies, the descriptions, and whether they were perceived by the participants.

| Category     | Strategy           | Description                                                                 | Perceived By |
|--------------|--------------------|----------------------------------------------------------------------------|--------------|
| Compulsive   | Forced Subscription| Forcing viewers to subscribe to the streamer and the streamer’s fans group for rewards | P1, P2, P4   |
|              | Forced Endorsement | Forcing viewers to send gifts to the streamer or sharing the streamer with others for rewards | P1, P7       |
|              | Forced Wholesale* | Forcing viewers to buy multiple packs of a product                         | P4, P7, P13  |
| Deceptive    | Fake Scarcity      | Deceiving viewers about the high demand and limited availability of a product | P1, P3, P6, P11 |
|              | Fake Urgency       | Deceiving viewers that the product selling or discount will expire soon      | P2, P7, P9, P11 |
|              | Fake Social Proof  | Highlighting fake positive comments, gifts and likes sent by astroturfs, or providing fake testimonials | P1, P2, P7, P8, P13 |
|              | Fake Exclusive Pricing| Providing a fake, exclusive price or discount, or raising the original price before discount | P2, P9, P10, P13 |
| Designing    | Visual Misrepresentation | Mispresenting a product through visually beautifying or hiding | P8, P10      |
|              | Playacting         | Engaging in acting to induce viewers to buy or to gain affection and sympathy | P3, P7, P8, P11, P12 |
|              | Sophistry          | Defending self against negative comments using implausible language         | P5           |
|              | Retaining Customers| Keeping viewers staying in the channel by holding unpredictable activities  | P7           |
|              | Egoistic Norms     | Asking viewers to follow self-interested norms, and belittling or abusing viewers for anti-norm behaviors | P8           |
|              | Fuzzy Targeting    | Describing a product is applicable to all customer groups                    | P7, P8, P13  |
|              | Disgracing Others  | Depreciating the quality of competitive products or the reputation of competitive streamers | P5, P13      |
|              | Pressured Selling  | Steering viewers into purchasing a more expensive version of a product or additional related products | /            |
|              | Nagging            | Repeatedly asking viewers to purchase without providing useful product related information | P10          |

*: Forced Wholesale is a malicious strategy that was identified only by the interview study.

It created an impression that viewers needed to make the purchase immediately. For example, the streamer in VT19 warned that she had the last three blankets for viewers who would purchase in her channel. She said: “You have to buy the bedclothes quickly to get the blanket, first come, first served.” However, it turned out the blanket was a defaulted gift, and everyone who purchased the bedclothes got a blanket for free. “Three” was a fake number to indicate the scarcity.

Streamers also claimed that their products were easy to be sold out in their livestream channels. The fast sold-out reminder induced viewers to buy. But no evidence showed that their products were sold out fast after a while.

**Fake Urgency** is when a streamer tricks viewers that a sale or discount on a product will end soon or at a certain point in time in an attempt to speed up the viewer’s decision and purchase. However, based on our analysis, the product selling or discount did not end as the streamer claimed. The Fake Urgency strategy was usually used with Fake Scarcity, taking advantage of viewers’ scarcity bias and suggesting inaction would result in losing potential savings [1].
Malicious Selling Strategies in Livestream Shopping

**Fake Social Proof** refers to when the streamer verbally highlights fake positive information (e.g., positive comments, gifts, likes) sent by astroturbers, or provides fake testimonials for the product. Astroturbers (called “water army” in Chinese) were usually paid by streamers and pretended to send positive information in livestream channels. It created an impression that the product was very popular and in high quality.

Streamers also claimed that their goods had testimonials. However, some testimonials were just verbal claims and the testimonial origins were forged or not clear. For example, the streamer in VT12 claimed that her jeans were produced by a famous designer’s factory. However, there was no label on the jeans to prove her claim.

**Fake Exclusive Pricing** refers to that the streamer provides a fake, exclusive price or discount, or raises the original price before making the discount. Streamers claimed that they had the lowest price or the best discount in their channels compared to anywhere else, which lacked evidence or was lie.

Besides pretending to have the best discount, some streamers raised the original prices. For example, one streamer raised the price of a pajama to 189 RMB before the livestream started. During the livestream, the streamer announced that he would sell the pajama at 29.9 RMB, which was claimed as an exclusive discount for viewers.

4.1.3 **Designing Strategies.** The Designing strategies refer to streamers took crafty actions to steer viewers’ perception or purchase behavior for more sale. Designing strategies are malicious and immoral because they were manipulating viewers’ perception of products and willingness to purchase. But they are different from Deceptive strategies because the information provided by streamers are not fake (or hard to affirm being fake). The Designing selling strategies are Visual Misrepresentation, Playacting, Sophistry, Retaining Customers, Egoistic Norms, Fuzzy Targeting, Disgracing Others, Pressured Selling, and Nagging.

**Visual Misrepresentation** refers to when the streamer misrepresents a product through visually beatifying the product or hiding the defects. For example, P8 mentioned that one streamer used a type of special light in a livestream channel. The special light was different from natural light but made the goods look better than they were: “So the color of the stone in the livestream channel will look very good and very bright. But when you get it, the color of the stone is not quite the same as in the livestream channel. It is not very satisfactory, not the ideal effect.” (P8)

**Playacting** is an acting behavior used by the streamer to induce viewers to buy or to gain affection and sympathy from viewers. For example, in VT5, when one product was sold out, the streamer begged her product manager to restock another 50 items. The product manager pretended that he tried so hard to find another 50 items for customers. However, it was not hard to restock another 50 items since the product was sold more than 50 at that day. Streamers also used playacting to make up a touching story or a usage experience to emotionally stimulate users to place orders.

**Sophistry** refers to that the streamer uses implausible language to defend for self when encountering an unfavorable situation during the livestream. For example, in VT15, one viewer sent a message in the chat, saying that he was blocked after he contacted customer service for a wrong item shipment. The streamer was extremely angry when noticing this message in the public chat. To defend for herself, she said that “You already got two bracelets from me, I bear the loss myself, why are you still mentioning the customer service in the chat?”

**Retaining Customers** refers to when the streamer keeps viewers staying in the channel for a longer time, viewers are more likely to buy or buy more products. To keep viewers staying in their channel, streamers offer lotteries or make the sequence of promoted products unpredictable to viewers. For example, the streamer in VD1 promised to deliver a lecture at the beginning of the livestream. However, she kept selling her books throughout the livestream and did not start...
the lecture until the end of the livestream. The viewers could not predict when exactly the lecture started so they needed to watch the book selling and wait.

**Egoistic Norms** refers to when the streamer asks viewers to follow norms that are beneficial to the streamer. If viewers do not follow the norms, they will be belittled or abused by the streamer for anti-norm behaviors. For example, in VD3, the streamer kept emphasizing that in his livestream channel, most viewers bought honey quickly without asking any questions. He said, “If you (viewers) have any question about a product, you don’t take me as your bro.”

**Fuzzy Targeting** means that the streamer presents a product in a way by which it applies to all types of customers, regardless of their age, gender and other characteristics. This approach expands the consumer pool by obscuring whom the product is best fit for. For example, the streamer in VD20 recommended that her rice cake was a good snack for old people. Later she expanded the customer types to kids and adults. However, the researchers thought that it was suspicious rice cakes were good for kids because rice cakes were very sticky and could easily get stuck in kids’ throats.

**Disgracing Others** is a strategy where the streamer depreciates the quality of competitive products or the reputation of competitive streamers. For example, the streamer in VD12 argued that some other competitors’ (streamers’) products were of low quality so that their prices were lower than hers. Through disgracing others, the streamer indicated a better quality of products than others and made an excuse for her higher price.

**Pressured Selling** means that the streamer steers viewers into purchasing more expensive products or additional products. For example, in VD7, the streamer tricked viewers to buy the newer version of the shoes by listing the advantages of the newer version. However, the new version of the shoes was much more expensive than the older version, which attracted many viewers into the session at the first place.

**Nagging** refers to when the streamer repeatedly asks viewers to purchase products but at the same time, does not provide any useful information for viewers to make the decision. Non-malicious nagging existed in all video recordings. We only coded malicious nagging strategy for streamers who pushed viewers to make orders without providing any useful production information.

Based on the recording coding and the interview results, Compulsive and Deceptive selling strategies were more malicious and immoral. They were easier to be perceived by participants. Designing strategies were more difficulty to be perceived or verified. They were usually concealing and viewers were not aware that they were manipulated during the process. Malicious selling strategies might be enhanced or hindered by design. In the next session, we present how the three types of malicious selling strategies were mediated by platform designs.

### 4.2 Platform Designs Mediating Malicious Selling Strategies (RQ2)

**Figure 1** demonstrates the interfaces of a Douyin livestream channel. **Table 4** shows 15 platform designs that could mediate the malicious selling strategies. We found that Compulsive selling strategies (e.g., Forced Endorsement, Forced Subscription) and Deceptive selling strategies (e.g., Fake Scarcity, Fake Social Proof, Fake Exclusive Pricing, and Fake Urgency) were more likely to be facilitated by designs than Designing strategies; Designing strategies more replied on sellers’ sale skills or styles. In sum, nine specific strategies were supported by design features or functions on the two livestream platforms. Below, we reflect how designs mediate the three categories of malicious selling strategies.

The designs **subscription, reminder tag, sharing, liking, gifting and chat channel** enabled or supported Compulsive malicious selling strategies such as Forced Subscription and Forced Endorsement. It is usual that e-shopping websites and livestream channels apply these designs to require customers’ or viewers’ subscription, sharing or gifting. However, we found that the backend
Table 4. The platform designs in livestream shopping that mediated malicious selling strategies.

| Design                        | Explanation                                                                 | Compulsive       | Deceptive       | Designing                      |
|-------------------------------|-----------------------------------------------------------------------------|------------------|-----------------|-------------------------------|
| Subscription                  | Viewers can click the “subscribe” button to follow the streamer and receive future livestream session notifications. | Forced Subscription |                 |                               |
| Reminder tag                  | The streamer can set up a message tag to display important reminders (e.g., a subscribing reminder tag) or positive comments from viewers. The reminder message tag is enlarged and displayed on the screen (section 5 in Figure 1(a)). | Forced Subscription |                 |                               |
| Sharing                       | Viewers can click the “share” button and share the livestream channel to social media or other viewers (section 4 in Figure 1(a)). | Forced Endorsement |                 |                               |
| Liking                        | Viewers can click the “like” button to express their like, enjoyment, or support to the streamer (section 4 in Figure 1(a)). | Forced Endorsement |                 |                               |
| Gifting                       | Viewers can click the “gift” button to send gifts to the streamer (section 4 in Figure 1(a)). | Forced Endorsement |                 |                               |
| Backend filtering tool        | Streamers can use a backend filtering tool to select a group of viewers by a criteria (e.g., the viewers who have subscribed to the streamer). | Forced Subscription, Forced Endorsement |                 |                               |
| Notification message          | The various events (e.g., purchasing, sold out, sending gifts, sending likes) are displayed on the screen above the chat channel (section 2 in Figure 1(a)). | Fake Scarcity, Fake Social Proof |                 |                               |
| Product page                  | Viewers can check the detailed information of products when they click a product on the product page (section 6 in Figure 1(b)). | Fake Scarcity, Fake Exclusive Pricing |                 |                               |
| Red pocket                    | The streamer can send an amount of money to viewers in a red pocket. The red pocket will pop up on the screen. | Fake Exclusive Pricing |                 |                               |
| Coupon                        | The streamer can send coupons to viewers, which can be redeemed for a discount or a cash rebate. The coupon will pop up on the screen. | Fake Exclusive Pricing |                 |                               |
| Countdown timer               | The streamer can set up a countdown timer for a product sale. The countdown timer will be displayed on the screen. | Fake Urgency |                 |                               |
| Back-ordered warning          | A warning message periodically pops up to remind viewers to finalize the payment. | Fake Urgency |                 |                               |
| Flash sale                    | The streamer can set up a time-limited sale. | Fake Urgency |                 |                               |
| Beautify camera filter        | The streamer can use a beautify camera filter designed for streamers to beautify their products and themselves. |                 | Visual Misrepresentation |                               |
| Chat channel                  | Viewers can post text-based comments and see others comments in a publicly displayed section in real time (section 1 in Figure 1(a)). | Forced Endorsement | Fake Scarcity, Fake Social Proof | Retaining Customers, Egoistic Norms |
filtering tool, which was orally claimed by streamers, was the key function to enable Compulsive malicious selling strategies. For example, before starting the lucky draw, the streamer of VT6 told the viewers that his assistant would check the viewers’ subscription. If viewers have not subscribed to his channel. The streamer would cancel the viewers’ prize even if they won. The streamer of VT7 required viewers to click the “like” button and send a required message “888” (stands for fortune in Chinese pronunciation) to the public chat channel. She said: “Everyone who wants a coupon sends 888.” However, it is not clear whether and how the filtering tool ran. Viewers could just follow the streamer’s requirement to obtain the coupon. Since Compulsive strategies were enabled or supported by platform designs, it suggests a need to modify or remove such design features to restrain malicious selling strategies.

The designs enabled or supported Deceptive strategies by presenting misleading information (i.e., notification message, product page, countdown timer, back-ordered warning, and chat channel) and inductive discounts (i.e., red pocket, coupon, and flash sale). These designs helped streamers create fake scarcity, social proof, exclusive pricing and urgency to induce viewers to buy products. For example, both Taobao and Douyin have the notification message feature. Once a viewer adds an item to his/her shopping cart, there will be a public notification message saying “User X is ordering the item” on the screen. Douyin also shows the total number of buyers on the screen. The public notification messages can be used as evidence of high demand. Using this evidence, streamers can urge viewers to make an order. In one case, the streamer claimed, “This is really the last one.” But the streamer asked her assistant to restock the product later. Although Deceptive strategies were enabled or supported by specific designs, it took time for viewers to detect or verify fake information compared to Compulsive strategies. It is necessary to provide tools to help viewers or customers to identify deceptive malicious selling.

The designs beautify camera filter and chat channel enabled and supported Designing strategies. For example, The visual misrepresentation enabled by the beautify camera filter facilitates malicious selling. The streamer of VD11 used the beautify camera filter provided by Douyin to hide the flaws of her apparel such as the bad texture and workmanship. Most Designing strategies were not mediated by platform designs but mostly implemented by streamers themselves.

The results also revealed that the chat channel supported all the three types of malicious selling strategies. It is also the only design used by viewers to counter malicious selling strategies. This is not surprising since the chat channel is the only means for viewers to provide negative feedback. For example, some streamers enforced Egoistic Norms by ask viewers to send certain positive terms in the chat channel. Viewers sent comments such as “poor quality products” to fight against malicious selling via the chat channel.

4.3 Challenges of Coping with Malicious Selling Strategies for Viewers (RQ3)

In the following, we report participants’ reactions to malicious strategies, including ways and challenges of coping with perceived malicious selling strategies.

For participants’ perceived malicious selling strategies, they reported multiple ways to cope with them. The most frequent coping way was selecting professional streamers due to their high reputation. A professional streamer is like a salesperson or agent between product manufacturers and customers, who takes a commission on the value of the sale [32]. Participants also reflected that choosing brands and stores with a good reputation is a means to circumvent malicious selling strategies. In addition, participants suggested “shopping around,” which means comparing products in different livestream channels before buying. Participants also leveraged the chat channel to push back against malicious selling strategies. For example, they reported low-quality products, poor return service, or astroturfers in the chat to remind other viewers.
The participants reported four ways to deal with malicious selling strategies. However, some participants did not consider these ways effective for some malicious strategies. For example, P5 planned to buy a pearl necklace for her mom. She watched different pearl livestream shopping channels and learned pearl knowledge introduced by streamers. After about one week, she gained a sense of high-quality pearl necklaces and found that some streamers had fake testimonials and did not tell the truth. It was also very time-consuming for her to gain the knowledge. This suggests a need to understand what were the challenges of defending against malicious selling strategies for viewers.

In this section, we focus on the reported challenges of coping with malicious selling. The reported challenges were due to highly personalized stream procedures, malicious designs that impair viewers, and the visual limitation of livestream for special products.

4.3.1 **Highly Personalized Stream Procedures.** Stream procedures vary across platforms, streamers, and even products within one streamer’s channel. There are no standards to guide streamers on how to sell products. Therefore, the procedures are highly personalized and selected by streamers themselves. It costs viewers huge efforts to select products.

Within the same streamer’s channel, the problematic non-standardized procedures are incomplete presentation, versatile scenarios aiming to target multi-type customers, and unpredictable stream orders. Unlike product pages on e-shopping websites where product parameters and functions are presented in detail, product introductions on livestream are incomplete. The features or functions mentioned by streamers are highly selective and personalized. According to the participants, some streamers prepared stream scripts in advance, which articulated what aspects of products should be emphasized in stream and what aspects should not be mentioned. Streamers also communicated with vendors and revised the stream scripts accordingly. P13 provided an example of an incomplete presentation. She said that in livestream, it was easy to see the quality and appearance of a product but hard to see the expired date. The streamer only magnified the advantages of the products and did not tell customers the expired date. After receiving the product, customers would realize this.

When introducing products, streamers also obscure target users. This is related to the identified malicious strategy, Fuzzy Targeting. It was another type of incomplete presentations. That is, streamers did not specify the target users, which was usually a product parameter on product pages on e-shopping websites. P7 compared the difference between streamers’ product recommendations to customers and her recommendation to her friends. If a product was targeted at females aged 20 to 30, P7 would only consider whether the product was suitable for her friends. Alternately, streamers would convince customers that the product could also be used by their husbands and other family members.

The streamer will say ‘even if you don’t want to use it, you can give it to your boyfriend or husband.’ The streamer has a very tricky logic loop, that is, she or he will make you feel that no matter who you are, you can always use this product… (P7)

P13 mentioned another way of Fuzzy Targeting in livestream shopping. Instead of obscuring target users, streamers advocated the product could be used in multiple scenarios. For example, P13 recalled that one streamer tried to convince customers that a coat was suitable for many contexts, such as home, school, and work. By imaging the contexts, customers would be convinced that it was good to buy this coat to fit different contexts.

Non-standardized stream procedures are not only happening in single product introduction but also in the livestream’s schedule. Several participants reported that stream schedules were not transparent or predictable. According to P7, livestream channels usually posted stream previews. However, they did not specify the sequence of streamed products or the preview’s sequences were different from the real one. They also applied strategies such as not forecasting the prices of the
streamed products or forecasting part of the streamed products. P7 explained that the purpose was to keep customers staying in the livestream channels for a longer time and thus buying more products. If customers quit livestream channels, there is no way to know when their desired products will be streamed. They need to wait in the channels, which requires considerable time commitment.

P9 reported that after shopping in a livestream channel for three months, she could estimate when the product she wanted would be sold based on the forecast. But this only worked in that livestream channel because every product was usually displayed for five minutes in that channel. In other streamers’ channels, the duration varied a lot. Participants also reported that many social media accounts were created serving as livestream preview info hubs. It indicates a need for transparent livestream schedules for viewers.

Among different streamers channels, the non-standardized procedures influence the effects of the product displaying. Therefore, customers would like to choose streamers who followed a more standardized and professional way of selling products. P5 pointed out she used the non-standardized selling procedure as a criterion to distinguish good streamers and bad streamers. Bad streamers were not good at setting up their livestream rooms or displaying products. There were no guidelines or tools to support them. She suggested that the livestream platforms should help streamers improve their service by providing “intelligent modules,” similar to standardized tools for helping vendors to set up product pages on e-shopping websites.

Participants also reflected that different platforms have formed quite different stream styles. There was no standardized procedure for streamers to follow. P5 reported that Douyin streamers had formed specific styles but Taobao streamers did not. However, these styles were full of cyber slang, and the purpose was mainly for entertaining customers.

4.3.2 Malicious Designs Impairing Viewers. Designs, particularly the chat channel, impair viewers’ capability as buyers due to lack of identity and overwhelmed comments.

The identity of viewers in livestream is anonymous, which yielded astroturfers or fake users. Several participants reported that there were astroturfers, who were hired by streamers to post fake comments. The fake comments were usually showing the intention of buying or the action of ordering. When being asked whether there were fake comments and whether they could distinguish them from real ones, some participants told us there should be fake comments but they could not tell which ones were. P8 described his experience of identifying the astroturfers in a seal stone livestream channel accidentally:

I wanted to buy a seal stone several days ago but someone raised the price a lot so I was not able to buy it. But two days later, I saw the same stone selling in the livestream channel again. I realized that the one who raised the price was an astroturfer. (P8)

Astroturters might send negative comments to competitors’ livestream channels. As far as we know, streamers can block users who have been identified as astroturters. However, participants reflected that some streamers used fake comments and astroturfers as excuses to deny real customers’ complaints. For example, P5 recalled that in one livestream channel, one user sent a negative comment. The streamer then blocked the user and claimed she was the competitor’s astroturfers. At first, P5 believed the streamer’s explanation. Later, another user sent a comment saying that “You blocked me? I switched to my friend’s account just to prove I am not an astroturfer!” P5 expressed her shock when she realized how the streamer could silence viewers.

In contrast to streamers, viewers have limited power to identify or block fake comments or astroturters.

Additionally, the chat channel design does not support conversations between customers. Thus, customers cannot share ideas within the livestream channel. P5 recalled an experience of exchanging
products with another viewer in a livestream channel. Since the Taobao livestream platform does not allow direct private messaging between viewers, they needed to type in their Taobao account usernames in the chat channel and add each other as friends on Taobao. The chat channel does not allow copy and paste, which made communication much more difficult for P5. It indicates that the design seems to favor streamers. Participants expressed that they would rarely use the stream comments for asking questions in the long run.

Participants (n = 3) also reported that the overwhelmed comments issue. In some popular stream channels, there were usually a flux of comments. Participants expressed that it was difficult to read comments. Besides, as aforementioned, streamers often use the comment feature for promotional purposes, such as asking customers to send positive messages, e.g., “I want it,” or “I have ordered it.” Streamers can orally highlight positive comments during the livestream to induce viewers to buy products, but these comments are not helpful for viewers to understand products.

4.3.3 **The Visual Limitation of Liverstream for Special Products.** Livestream overcomes some limitations of online shopping. It creates “the feeling of presence.” However, livestream still cannot fully replace the offline shopping experience for “special products.” Special products are usually non-industrialized and non-standardized products with large individual differences (e.g., jewellery and artwork). The malicious selling strategy Visual Mispresentation is related to this. To leverage the visual limitation of livestream, streamers could use special light or embedded camera filters to beautify products; In contrast, in offline shopping, sellers can’t manipulate it.

P2 said that livestream was not suitable for buying non-industrialized and non-standardized products. Since every single product is different from another one, it is risky to select this type of products through livestream. He bought a pair of walnuts on livestream. The pair of walnuts was not food but an “article for amusement.” As it was a pair, it required the two walnuts to look almost the same. He said it was impossible to observe the product exactly as it would appear offline. This is the limitation of livestream shopping and Visual Misrepresentation amplifies the risky of buying non-industrialized products from livestream shopping:

> It (the pair of walnuts) is not the kind of industrialized products so you are not able to see the product very intuitively only from streamers’ livestream and pictures. You can only get a general idea, and that’s based on the fact that everything he (the streamer) says is true. (P2)

To add to this challenge, P8 also pointed out it was difficult to overcome the visual limitation of livestream shopping. P8 was interested in buying seal stones through livestream. He mentioned he spent a long time figuring out how to select high-quality seal stones. He usually spent a few days staying in a channel and observed the selling process to evaluate if it was worth buying. P8 shared that the light used by streamers could beautify the stones. Some streamers also hid flaws on stones and only showed the parts without flaws. However, without seeing the real product, he still failed to judge the quality of the products. But his initial motivation for purchasing seal stones was quick buying. The limitation brings a lot of time and money loss.

The above examples show that there is still a gap between livestream shopping and offline shopping. The two researchers also experienced such limitation when coding recordings for selling jewelry.

5 **DISCUSSION**

In this paper, we aim to provide an empirical understanding of malicious selling strategies in a newly emerged online shopping platform: livestream shopping. We sampled 40 livestream shopping videos as a data corpus and conducted qualitative coding analyses. We identified three categories of malicious selling strategies. They are Compulsive, Deceptive and Designing selling strategies. Out
of the 16 sub-category malicious strategies, nine were enhanced by various designs in livestream platforms. The interview study revealed viewers’ awareness of malicious selling strategies, ways to cope with malicious strategies, and challenges of fighting against malicious strategies. In the following section, we reflect our main findings, and discuss the regulation and cultural context of livestream commerce in China, the unbalanced power between viewers, streamers and platforms, as well as policy and design implications to counter malicious selling in livestream shopping.

5.1 A Reflection of Malicious Selling Strategies and Dark Pattern Designs in Livestream Shopping

The recording coding process referred to existing typologies of dark patterns. Although malicious selling strategies and dark patterns are two different concepts, “dark” intentions or strategies behind selling strategies and dark pattern designs shared some similarities. We borrowed codes such as “urgency,” “scarcity,” “social proof,” “forced action,” and “nagging” from the existing typologies [24, 37, 60]. More importantly, our study contributes new findings that are different from existing studies from the two aspects.

First, malicious selling strategies (i.e., Compulsive, Deceptive and Designing) are more malicious and immoral than dark patterns [60] or impulse buying in e-shopping [62, 80]. The Compulsive and Deceptive selling strategies involved forced actions and fake information; even Designing selling strategies were manipulating viewers or customers in a more aggressive way. However, some participants were not aware of these malicious selling strategies, as shown in Table 3. We found that participants were more aware of Compulsive and Deceptive selling strategies than Designing selling strategies. One reason could be the frequency of these strategies were different. On a deeper level, the implementation of Designing selling strategies more relied on sellers than platform design features or functions. Here, it seems that platform designs serve as checkpoints to verify if selling strategies are malicious or not. Without the checkpoints, malicious selling strategies might be more concealing. Thus, it is worth investigating if the absence of design features and functions will make the awareness of malicious selling strategies more difficult.

Second, compared to prior studies about malicious selling strategies in TV shopping, our study identified new malicious strategies: Sophistry, Forced Subscription, Forced Endorsement, Retaining Customers, Egoistic Norms. These strategies were enabled by the frequent and various interactions between the streamer and viewers, such as the streamer’s verbal communication and viewers’ comments in the chat channel, sending gifts and likes. It shows a trend that malicious selling strategies should be more paid attention to when the interaction between the seller and customers is more frequent and diverse.

We also found that more than half of the malicious selling strategies were enhanced by the platform designs. The chat channel design supported more malicious selling strategies than other designs. It is the only design used by viewers to fight against malicious selling. Compulsive selling strategies (e.g., Forced Endorsement, Forced Subscription) and Deceptive selling strategies (e.g., Fake Scarcity, Fake Social Proof, Fake Exclusive Pricing, and Fake Urgency) were more likely to be amplified by designs than others. Moreover, the Forced Endorsement and Forced Subscription strategies were amplified by multiple engagement designs such as subscription, reminder tag, sharing, liking, and gifting. These features are initially designed to engage viewers. However, they were maliciously used by streamers. Gray and colleagues suggested that the intentions and motivations behind designs should be examined as well even the designs were not dark patterns [36]. In our work, the engagement and communication designs should be studied with human behaviors (both streamers and viewers). An isolated investigation might overlook the potential “dark” side of the designs. Our study only investigated the features and functions level. In the future, an
interesting direction could be to explore what properties of these features and functions can amplify malicious selling strategies.

5.2 The Regulation and Cultural Context of Livestream Commerce in China

We studied two popular livestream shopping platforms in China. The specific regulation and cultural context of China might impact malicious selling and platform designs. To provide a better context for readers, we discuss how regulation and cultural context in China impacts livestream commerce, especially malicious selling strategies and dark pattern designs.

First, from the regulation perspective, livestream commerce is regulated by the state government departments in China. As previously mentioned, with the ambition of developing "digital China," the state government has provided great support to the internet economy, including livestream commerce. The government also encourages small businesses to leverage livestream to expand their business. Thus, many small business owners become streamers and sell their products via livestream. It leads to various streamers on livestream platforms, ranging from professional streamers to amateur streamers from different industries (e.g., students, farmers). Thus, there are versatile and various selling strategies, including malicious selling strategies.

The state government tries to seek a balance between economic development and regulation. This attempt at balance facilitates a delayed regulation from the government. The government took actions for regulation after many illegal or immoral behaviors were reported in livestream commerce [26, 68, 82]. Recently, the State Administration of Market Regulation (SAMR) announced that all livestream platforms should “quickly conduct self-control and comprehensive inspections” on product quality, and should punish streamers who sell shoddy products [68].

Second, from the cultural perspective, users in China prefer to use one app for many different functions [53]. For example, WeChat has combined social media, e-commerce, payments, and many other functions into a self-contained ecosystem [28]. The integrated platform is rarely seen in the U.S. (e.g., Facebook, Apple). Similarly, in livestream shopping, the platforms try to include many features and functions on the interface. However, in the U.S. and other countries, the interface design for livestream shopping is much simpler. For example, Amazon has only four main features in its livestream interface: the streaming video, a list of products being sold, a chat area, and a reaction button where viewers can send “likes” to the streamer [2]. The platforms and streamers benefit from a great degree of stability and opportunity in China and also experience a greater precarity in policy and regulation [26].

In China, the ecosystem of livestream commerce is becoming mature. It mainly consists of three roles: product and service providers (e.g., manufacturers, supply chains), marketers and retailers (e.g., livestream commerce platforms, streamers, online stores), and consumers [48]. It might be fruitful in the future to investigate the roles of different stakeholders in this ecosystem, and to understand how they influence platform designs and regulation and how they perceive and cope with streamers’ malicious selling strategies.

5.3 The Imbalanced Power Between Viewers, Streamers, and Platforms

Our study found negative behaviors from the streamer perspective. Although some of the streamers’ malicious selling strategies were highly enhanced by system designs, we also identified seven malicious strategies that were purely implemented by streamers. These problems revealed standardized product stream procedures have not been established yet in livestream commerce. On the surface level, participants expressed that streamers were skilled in introducing products and persuading customers to buy. When we asked participants if they think the ways or the strategies streamers used were malicious strategies, they were not sure. Participants expressed that it was hard to differentiate exaggeration and deception. Our participants reported cases where customers were
controlled by streamers or designs. We found that most of the malicious strategies were directly or indirectly related to this factor. Compared to other e-shopping channels, customers are in a much more inferior position to streamers in livestream shopping. Streamers had a high level of freedom to decide how they sold products in livestream channels.

Prior work has analyzed viewers’ negative behaviors during livestream and how livestream platforms allow viewers to report inappropriate content [76]. For example, viewers performed trolling and being talkative in livestream channels. Given the unbalanced power between customers and streamers, the platforms need to provide more ways for customers to combat malicious selling, such as collective reporting.

In the interview study, the participants mentioned several types of streamers as professional, i.e., professional streamers, celebrity streamers, and influencer streamers. Participants showed a consistent preference for “top streamers,” who are on the top of streamers rank list. The most frequently mentioned streamers are Li Jiaqi and Viya, who are contracted as professional streamers on Taobao livestream platform. The two streamers’ sales account for 35% of 11/11 Taobao livestream shopping festival in 2019 [20]. Some participants watched livestream commerce hosted by celebrities. Participants also watched Internet influencers’ livestream and shop in their channels. Before starting livestream selling, these Internet influencers shared self-generated content (short videos) on Douyin and drew a large base of fans. Participants’ trust and preference towards these professional streamers are due to their professionalism in choosing high-quality products and introducing products, and their authenticity within or outside of platforms. To fight against malicious selling, more professional streamers are needed.

5.4 Design Implications

Our findings suggest that viewers’ behaviors are constrained by the current designs of livestream platforms. In the livestream shopping setting, we found that nine malicious selling strategies were enhanced by design features in livestream shopping channels. For instance, there were multiple notification features (e.g., purchase notification, viewing notification, sold-out warning notification) that allowed streamers to create fake scarcity or urgency. The feeling of scarcity led to many impulse buying behaviors. Thus the streamers played with such feature and intent. The chat channel, which is the main way for viewers to interact with the streamer and other viewers, was also manipulated by the streamer to create a fake scarcity impression. Previous research showed synchronous chat facilitated knowledge sharing among viewers [79]. However, the streamer asked all viewers to post required content such as their desired products in the chat channel thus a viewer might only see thousands of “wanting” messages in the channel instead of product related knowledge shared by other viewers. Additionally, the chat channel did not support viewer-centric functions such as search, filter, and reply. The missing functions further restrained viewers’ power to defend malicious selling behaviors.

Based on these findings, various design implications can be proposed to protect users from these malicious selling strategies and designs. First, it might be helpful to increase the transparency and viewers’ autonomy in designs. For instance, the backend filtering tool was the key function for Compulsive selling strategies. Viewers need to know what filter mechanisms are conducted if they comply with such forced actions. The chat channel needs to be improved to enhance viewers’ autonomy. Additional functions can be added to the chat channel, such as filter, search, and reply. The viewers should also be able to switch off message features (e.g., purchase message, viewing message, sold out message) on the screen so that they can focus on the product presentation and avoid being affected by others. Second, it might be helpful to implement crowd sourced features to validate information provided in livestream channels. For example, to counter the Fake Exclusive Pricing selling strategy, viewers can check prices across different e-commerce platforms or check
other viewers’ ratings or reviews to verify whether it is true or a false claimed exclusive pricing. We acknowledge such designs are unlikely to be adopted by the platform itself as it may be against its own business interest. But third party developers may implement such designs as system add-ons to support viewers.

One general finding of our paper is that the streamer’s selling behaviors are loosely regulated. Even if they have bragged or promised something during the real-time streaming session, it is very hard for buyers to double-check whether or not it is true at the moment, and it is even more difficult to track back to what the streamer said after the session ends. For example, a streamer may promise an unconditional return policy during the livestream session, but the actual return policy written on the product information page is conditional. Since malicious selling strategies more relied on streamers’ sale skills and styles rather than platform features and functions, the platform and the regulators should make and enforce policies to regulate streamers’ selling practices as they regulate an offline salesperson. For example, it is important to look at if forced actions are legal or necessary for customers to purchase products during livestream shopping. The platform can also implement features such as machine learning-based solutions to automatically transcribe and record what the streamer is saying during the livestream session, thus can further extract the keywords (e.g., return policy, brand, and manufacture info, etc.) from the transcripts and cross-reference the product information page. If there is a mismatch, the system may pop up a real-time alert to the viewers. The buyers can also use the recorded transcripts as evidence in post-sale customer service.

5.5 Limitations and Future Work
Our study only examined two livestream shopping platforms — Taobao and Douyin. Our interview participants were mainly users of the two platforms. The findings of malicious selling strategies cannot be generalized to other platforms given their different platform policies and designs.

Additionally, we only recorded 40 livestream sessions in a short term. The researchers did not analyze the recordings in a real shopping context. In the future, we plan to conduct a longitudinal analysis, that is, observing several livestream shopping channels as a real viewer over a long term; we will also conduct an interview study for streamers to understand their motivations and attitudes.

6 CONCLUSION
In summary, our paper fills in the research gaps of understanding what malicious selling strategies are in livestream shopping platforms and how designs support these malicious behaviors. These findings contribute to the broader HCI discussion about how to counter malicious strategies and dark pattern designs, and to protect target users’ welfare while the platforms have the motivation and power to adopt more and more dark patterns. We welcome researchers from various backgrounds to join our effort to push forward this prominent research agenda.

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