

Seeking Love and Companionship through Streaming: Unpacking Livestreamer-moderated Senior Matchmaking in China

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ABSTRACT

Livestreamer-moderated matchmaking has gained wide popularity among the elderly population in China. Compared to algorithm-mediated online dating, it is characterized by (1) the mediation of matchmakers in a synchronous virtual environment and (2) the natural development of livestreaming-based matchmaking communities. Nonetheless, how these new features influence single seniors' match-seeking remains unknown. To fill this research gap, we conduct a qualitative study consisting of observations and semi-structured interviews with 6 livestreaming matchmakers and 12 senior match-seekers (age: 50-70). We uncover matchmakers' mediation roles during and beyond livestreaming to facilitate seniors' match-seeking, and their additional duties to enhance seniors' safety in this process. Livestreaming-based matchmaking communities afford multiple important values for single seniors to acquire companionship and help in seeking late-life love. We unpack the perceived benefits and challenges of livestreamer-moderated matchmaking, and discuss how to support single seniors' match-seeking in an accessible, safe, and convenient manner.

CCS CONCEPTS

• **Human-centered computing** → **Human computer interaction (HCI)**.

KEYWORDS

live streaming, online matchmaking technologies, single seniors, romantic relationships, computer-mediated communication

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1 INTRODUCTION

“As a member of the single, left-behind elderly, we are really lonely and have many difficulties... I want to say, we also have the right to seek our own happiness. Knowing digital matchmakers on livestreaming brings me a second chance to look for love.”

— A 55-year-old digital match-seeker disclosed in the interview

The last century has witnessed increasing senior singlehood with the global population aging across the world. For example, 27% of adults aged 60 and older live alone in the United States [5]. In China, 27.9% of older adults are widowed [27], and many couples also choose to divorce so as to seek true love after retirement [25]. Lots of single seniors suffer from loneliness and depression [84, 87]. Besides, under the sociocultural context in China such as the massive migration of young people from rural to urban areas [103], many seniors in China have become the “left-behind” generation, who are lonely and vulnerable especially after losing their partners and living alone [17]. A survey by the Chinese Academy of Social Sciences reports that about 80% of widowed seniors want to remarry [36]. Consequently, facilitating seniors seeking love and companionship is crucial in promoting single seniors' quality of life in China.

Today, online matchmaking systems play a prominent role in supporting singles' match-seeking. Algorithm-mediated matchmaking, which allows users to create profiles to present themselves and matches them assisted by recommendation algorithms, is the mainstream online dating applications such as Tinder and Bumble [24]. A rich stream of research in HCI and CSCW has examined online dating in algorithm-mediated matchmaking settings, covering themes such as trait evaluation [24, 112, 112], trust and authenticity [26, 29, 89, 90], and privacy [15, 58]. Nonetheless, algorithm-mediated matchmaking services face challenges in attracting senior match-seekers in China. Based on a research report on China's online dating industry in 2019, algorithm-mediated matchmaking applications had gained wide popularity among well-educated singles aged 26 to 34, yet had not largely penetrated the elderly widowed or

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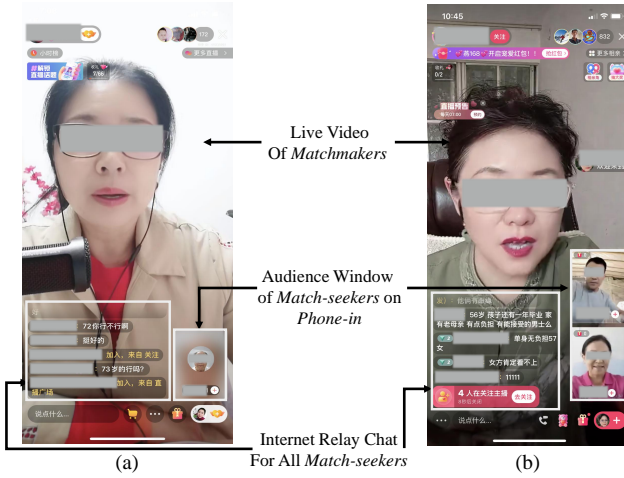


Figure 1: Examples of Livestreamer-moderated Matchmaking. With the *phone-in* interface, (a) the matchmaker guides the self-introduction of a match-seeker to other viewers; (b) the matchmaker mediates the communication between two match-seekers.

divorced groups [38]. How to design senior-friendly matchmaking applications to better support single seniors in finding love remains a critical problem for HCI researchers and practitioners.

Recently, the popularity of livestreaming has shed light on new directions for online matchmaking. First, livestreaming provides a pseudonymous and synchronous communication environment. Spectators could conduct “co-performance” with the streamer through the *phone-in* interface [52], which allows synchronous streamer-spectator connection and embeds spectators’ window within the streamers’ streaming video (as shown in Figure 1). It serves as an interactive channel for spectators’ video and audio self-presentation under the guidance of the streamer. Such co-performance affords an opportunity to adapt traditional matchmaking moderated by matchmakers in Chinese culture [95, 100, 107] to the online setting. Also, livestreaming naturally develops a community with common ground for the audience [23, 28, 55], which has been proved to facilitate self-disclosure and conversation and thus beneficial to relationship development [59, 82]. The rapid increase in the volume of senior users on livestreaming platforms, due to the easy access to viewing livestreaming, further provides favorable conditions for developing senior-targeted services through streaming [1]. As such, **livestreamer-moderated senior matchmaking**, with the streamer serving as a matchmaker to match spectators, has surfaced and gained wide popularity among the elderly population in China. For instance, on Kuaishou, one of the largest livestreaming platforms in China, some livestreamers specializing in senior matchmaking have hundreds of thousands of followers [108].

Compared to algorithm-mediated matchmaking, livestreamer-moderated matchmaking is characterized by two novel elements: (1) the mediation of matchmakers in a synchronous and interactive virtual environment and (2) the natural development of a livestreaming-based matchmaking community that may promote

relationship initiation [82]. The two characteristics largely differentiate relationship initiation in livestreamer-moderated matchmaking from the well-studied algorithm-mediated matchmaking [2, 3, 58, 59, 73, 74], and may afford unique opportunities to attract and facilitate seniors’ match-seeking online. Therefore, it necessitates an understanding of the matchmaking practices, benefits, and challenges in the new scenario. An investigation of livestreamer-moderated senior matchmaking would not only provide a new perspective on computer-mediated relationship building among senior groups, but also shed light on design opportunities in facilitating safe, trustworthy, and effective senior love-seeking. To fill this significant research gap, we propose the following research questions:

- **RQ1:** How do matchmakers help initiate romantic relationships among senior match-seekers in livestreamer-moderated senior matchmaking?
- **RQ2:** How do senior match-seekers communicate and socialize with each other in the livestreaming-based matchmaking community?
- **RQ3:** What are the perceived benefits and challenges of livestreamer-moderated senior matchmaking?

To answer the research questions, we conducted a qualitative study incorporating observations and semi-structured interviews with 12 senior match-seekers (aged 50-70¹) participating in livestreamer-moderated matchmaking and 6 livestreaming matchmakers in China. We uncover a comprehensive matchmaking eco-system mediated by matchmakers, comprising both flexible *on-streaming* interactions that meet the different preferences of seniors and diverse *beyond-streaming* activities that extend matchmaking in time, scale and pattern. We also reveal the sophisticated roles of matchmakers in not only facilitating relationship initiation, but also holding additional duties to enhance the service quality, differentiating them from general content-sharing streamers. Livestreaming-based matchmaking communities play a crucial role for senior match-seekers to acquire companionship, mutually remind one another of risks and discuss common issues in seeking late-life love. Though benefits of livestreamer-moderated matchmaking have been reported such as interactivity and authenticity, challenges such as the risk of fraud are also perceived. We discuss how our findings may provide insight into senior-friendly online dating applications.

In conclusion, this work contributes to HCI and CSCW mainly by: (1) discovering a comprehensive eco-system of livestreamer-moderated senior matchmaking, and reflecting on the potential and concerns of livestreaming as the matchmaking media and matchmakers’ live coordination as the matchmaking pattern; (2) understanding matchmakers’ labor beyond engaging and entertaining, and highlighting the significance of regulating duties and rewards to support this livestreaming-centered immaterial labor; (3) revealing values of cultural practices and communities in senior matchmaking, and shedding lighting on design implications for accessible, safe and efficient senior-targeted online services.

¹In this work, we use seniors to refer to people above 50, the earliest retirement age in China [106].

2 BACKGROUND AND RELATED WORK

2.1 Senior Singlehood and Matchmaking in China

Global population aging over the past century, as one of the most significant demographic changes in human history [7], has posed a myriad of challenges, including increasing singlehood in old age. In China, there were nearly 48 million widows and widowers based on the 2010 Chinese Census [40]. Under sociocultural factors in China such as large-scale migration of young workers [103] and imbalanced development of retirement homes [14], many widowed older adults have become a “left-behind” generation, who live alone and are vulnerable under adversity [17] such as COVID-19 social isolation [105]. It raises mental health challenges among Chinese single older adults, especially loneliness and depression [87]. In this scenario, remarriage becomes an appealing option. A survey by the Chinese Academy of Sciences reported that about 80% of widowed people wanted to remarry [36]. In addition, there is also a growing trend of divorce after retirement in China [25], when many couples divorce to look for true love after their children have grown up [25]. For some single older adults, a compatible partner not only signifies romance, but also represents companionship physically and mentally, especially during hard times.

In ancient China, marriage was regarded as the union of two families [104, 107]. As such, matchmaking was an essential ritual, in which professional matchmakers worked to match the reputations and social relationships of two households [104]. The matchmaking profession still exists today, and seniors are one of the target populations [95, 100]. Matchmakers for seniors work in specific places that seniors might gather (e.g., parks) [100], collect their personal information and expectations of prospective partners, and introduce two seniors with matched profiles to each other [95]. Offline matchmaking assisted by matchmakers helps lots of single seniors find love, and has advantages such as strong authenticity and low threshold [95]. Yet, it also suffers from limited choices due to the small size of the local single pool, and the complex process of requesting service. Livestreaming provides an opportunity to adapt such offline matchmaking to a less constrained online setting. In this work, we use the term of **matchmaker (MM)** to refer to those providing matchmaking services and **match-seeker (MS)** to refer to seniors seeking love in livestreamer-moderated matchmaking settings, though they also play other roles such as streamers and spectators.

2.2 Online Matchmaking

Online dating and matchmaking applications have been around since the 1990s [101], and are nowadays extensively used across different countries, cultures, and populations. The mainstream design of online matchmaking applications is algorithm-mediated matchmaking (e.g., Bumble and Tinder). In such systems, match-seekers build personal profiles to present themselves, and recommendation algorithms help to pair potential partners based on the profile data [63, 74] such as location proximity [58].

The wide adoption of online matchmaking applications has attracted a deluge of research in HCI and CSCW community, covering topics such as self-presentation and disclosure [22, 29], the value of

community in online dating [59], privacy and safety [58, 111], and specific considerations under non-western marriage customs [2, 3, 47]. The existing literature indicates that match-seekers largely rely on online dating profiles to evaluate traits and assess the attractiveness of potential partners, e.g., appearance in photographs [24], demographics and values [112], personalities [112], and even friend lists [49]. Self-disclosure, as a significant component in interpersonal relationship development [4], is thus of great significance in the online matchmaking process. As pointed out by Handel and Shklovski, more self-disclosure was an indicator of success in online dating [30]. However, self-disclosure in dating profiles also leads to security issues, especially privacy risks [15]. For example, Ma et al. showed that even though disclosing location overlap data helped users estimate convenience in meeting and establish common ground, security concerns emerged [58].

Another major concern of online matchmaking applications is trust and authenticity [26, 29]. As found by Toma et al., deceptive self-presentation in online dating profiles was ubiquitous though small in magnitude [90]. Consequently, establishing substantial trust was challenging in online matchmaking [68]. To figure out this problem, Toma and Hancock tried to detect profile deceptions, and found that profile deceptions were related to specific linguistic cues such as fewer self-references and increased negations [89]. From another perspective, some HCI researchers also designed novel interaction approaches to build trust and understanding for online dating. For example, Zytka et al. revealed that collaborative activities, such as multiplayer online games, could potentially reduce distrust and facilitate effective trait evaluation [110].

Different from algorithm-mediated matchmaking, the emerging livestreamer-moderated matchmaking brings new opportunities as well as challenges. For instance, the co-performance through *phone-in* interface affords live self-presentation and influences how match-seekers evaluate others. Besides, the involvement of a third party, i.e., the matchmaker, also demands the reassessment of privacy and trust in the new matchmaking process. This work contributes to the research of online matchmaking by investigating relationship initiation in livestreamer-moderated senior matchmaking. We uncover its advantages and challenges to single seniors, and provide implications for designing trustworthy, efficient and accessible online matchmaking services for older adults.

2.3 Relationship Development in Livestreaming Community

Typical livestreaming services are characterized by streamer-controlled sharing, such as gaming [28, 43], education [11], programming [12, 23], cultural practices [55], e-commerce [37, 88], self presenting [97, 98] and outdoor experiences [56]. As such, different from platforms intentionally built for relationship building and social connection (e.g., social networking sites), affordances for inter-spectator relationship development are often on the fringe of livestreaming services. Nonetheless, prior work still revealed the prevalence of relationship formation in livestreaming communities, from “in real-life” friends to even romantic partners [82]. As suggested by Hilbert-Bruce et al., consumers of livestreaming were highly motivated in socialization compared to those of the mass media [34]. Lu et al. also found that making more friends

and communicating with others were two important motivations for using livestreaming applications [57]. A notable reason for developing relationships in the livestreaming community is the assumed common ground among the viewers in the same channel [82]. Besides, the elevated visibility in small channels, and the facilitated self-disclosure due to pseudonymity and anonymity, also contribute to forming inter-spectator relationships [82].

The aforementioned works largely focused on text-based communication as the relationship initiation approach. Co-performance of streamers and viewers in livestreaming [52], supported by *phone-in*, brings new opportunities and challenges to relationship initiation. On the one hand, following the considerations of warranting theory proposed by Walter et al., people tend to be less skeptical of information that is more immune to manipulation [96]. As such, other viewers might hold more trust in the viewer who co-performs with the streamer in real time, where deception is more challenging compared to well-crafted dating profiles and text-based communication. In addition, the coordination and guidance of livestreaming matchmakers [108], as a third party, might also facilitate the relationship initiation process. On the other hand, stripping away anonymity and sharing real appearances and circumstances might discourage self-disclosure [77, 79], a critical component for relationship building.

Different from spontaneous relationship development in typical livestreaming communities, livestreamer-moderated matchmaking is specific for developing romantic relationships. Understanding how romantic relationships are initiated in such services, and what benefits and challenges are brought by livestreamer-moderated matchmaking, would not only provide a new lens to look at relationship development in the livestreaming community, but also help to adapt the specific design of livestreaming to facilitate romantic relationship initiation.

2.4 Designing Senior-friendly Online Services

Internet use by older adults is rising around the globe. In America, the percentage of Internet users of those aged 65 and older rose from 14% in 2000 to 73% in 2019 [53]. The proportion of people above 50 among all netizens in China also jumped from 16.9% to 26.3% across 2020 [10]. Concurrent with the increased Internet use among seniors, their roles also became rich (e.g., content creators [99] and caregivers [9]) instead of the historical perception of “passive” users or “lurkers” on social media. When older adults began to actively access and adopt online services such as health [42, 70], finance [32, 41] and communications [71], how to design senior-friendly online services has been a topic of concern.

Considering cognitive and physical decline with aging is not the principle of all scenarios when designing senior-targeted online services. Prior work highlighted the heterogeneity of being old and suggested focusing on specific practices to understand seniors’ concerns, instead of categorizing seniors as a homogeneous group [33, 86]. In some cases, distrust of online services was a dominant explanation for seniors’ non-use [45, 92]. For instance, seniors held less trust in online health information [109], and regarded social networking sites as dangerous places that would foster unacceptable behaviours [51]. Cybersecurity and privacy (SP) threats also troubled many older adults. Previous work revealed that

older adults were especially vulnerable to SP threats such as phishing, ransomware, and targeted misinformation campaigns [66, 69]. Countermeasures, such as involving collective sensemaking and collaborative work in the community [46, 62], were thus explored to safeguard older adults’ online activities. Recently, when applications for older adults became rich and diverse, more nuanced needs were considered, such as seniors’ engagement [76, 99], independence [67], and simplicity of interaction [78]. In general, a more holistic view of designing for older adults, away from stereotypes, is a growing trend in the HCI and CSCW community [93].

The COVID-19 pandemic triggered increasing offline activities to move online. Such shifts might raise challenges for less tech-savvy seniors, and call for designing specialized senior-targeted online services [67, 83]. On this note, livestreaming, characterized by synchronicity and interactivity, could simulate various in-person interactions and establish virtual communities, which has great potential to afford senior-friendly services. Nonetheless, little work looks at how seniors access online services through livestreaming [8, 57], and which aspects of such services particular attention should be paid to. This work makes the first attempt to investigate the livestreamer-moderated senior matchmaking, shedding light on implications for senior-friendly design in this specific scenario.

3 METHOD

To understand livestreamer-moderated senior matchmaking, we performed a qualitative study, incorporating observations and semi-structured interviews with 12 senior match-seekers (age: 50-70) and 6 livestreaming matchmakers in China. We collected data from both sources for their complementarity: observations directly reflected the natural interactions without the perceived presence of researchers, while interviews uncovered participants’ experiences and perceptions in depth. The study protocol was approved by the institutional review board (IRB).

3.1 Platform Selection and Background of Platforms about Senior Matchmaking

To perform the study, we went through different types of platforms that potentially supported livestreamer-moderated senior matchmaking, including the top 10 general livestreaming platforms in China (e.g., Kuaishou, Douyu) [57], popular video-sharing platforms with livestreaming functionality (i.e., Douyin, Huoshan) [55], top 10 dating applications [65] and one popular senior platform (i.e., Laolai [6]) with livestreaming interface. However, the findings reflected more on general streaming platforms, because of (1) the different transparency of different platforms, e.g., when researchers tried to recruit matchmakers on a dating app for interviews, the account was immediately banned; (2) the different user demographics in different platforms, e.g., a matchmaker on a dating app that we contacted replied, “*Yes I provide service for seniors. But the sample size is too small, so I can not give you useful information*”.

Kuaishou and Douyin/Huoshan (Chinese version of TikTok; Huoshan was rebranded to Douyin in 2020), as representative general livestreaming platforms in China, became major platforms that this work focused on. Both platforms attract hundreds of millions of users [13], including a large proportion of older adults (both

had nearly 20% users aged 50+ [75]) owing to the platforms' characteristics of life-sharing content and effort for digital inclusion (e.g., [21]). The two platforms have similar *phone-in* interfaces as a basic component to afford streamer-spectator co-performance and thus support matchmaking. Taking Kuaishou as an example, spectators are required to (1) request *phone-in*; (2) choose video or audio connection; (3) wait for the streamer's approval to connect; (4) start *phone-in* after matchmakers' approval. Streamers typically ask for virtual gifts before approving spectators' *phone-in* requests as the business model for "*paid phone-in*" (to be detailed in Section 4.5.2).

3.2 Observations

We took observations to investigate the natural interactions in livestreamer-moderated senior matchmaking. We randomly chose livestreamers who indicated *senior matchmaking* in their profiles, and observed one whole livestreaming session for each of them (typically lasting from 1 to 3 hours). During the observations, we paid close attention to interactions between matchmakers and match-seekers, especially how matchmakers mediated the matchmaking-targeted communications and how match-seekers participated in them. We took detailed anonymized notes during observations for further analysis. Observations also helped us to develop interview questions. For example, observations informed us that *phone-in* was the main approach for match-seekers' live presentation, which guided the interview question "*How do you evaluate whether a potential partner is suitable through phone-in?*" for match-seekers. The observations lasted for four weeks in two stages (stage 1: March and April 2021; stage 2: October 2021), with the frequency of 2-3 observation sessions per day and 2-3 days per week. The two-stage observations aimed to capture whether there were interface updates that might lead to changes in interaction patterns. In total, we collected about 48 hours of observation data from 30 matchmakers.

3.3 Interviewee Recruitment

We recruited matchmakers by sending messages on the livestreaming platform or WeChat if disclosed on their streaming profiles. To be eligible as a participant, matchmakers should provide services for people above 50 years old, and have more than 10,000 followers to make sure that they were experienced in matchmaking. We targeted participants by searching "matchmaker" ("红娘" and "月老"), and then identified whether they provided services for seniors based on: (i) the profile description, (ii) the curated short videos (typically used to advertise match-seekers), or (iii) the livestreaming content. The recruitment of matchmakers was challenging. In total, we contacted 164 matchmakers and only 6 agreed to participate in the interview. More than 60% of matchmakers ignored the message, and others refused to take the interview due to (i) being unable to provide useful information, (ii) being suspicious of our motives, and (iii) the concern of violating the platform's rules.

The recruited matchmakers' information is shown in Table 1. Though we did not control the gender and age of matchmakers, the interviewed matchmakers were all female and in their fifties. Based on matchmakers' description, four mainly served seniors (MM1, MM2, MM5, MM6), and two served match-seekers of all ages yet had a rather large number of senior participants (MM3, MM4).

Four were full-time livestreamers specific for matchmaking (MM2, MM3, MM4, MM6), and two streamed in their free time (MM1 was a farmer and MM5 was a teacher). With more than one year of online matchmaking experience, all matchmakers reported no substantial difficulty in using their devices.

To recruit match-seekers, we first tried to send messages on the livestreaming platform [55–57], but no one replied after we contacted 50 match-seekers (we realized a possible reason afterward: a social norm in the community is being cautious of strangers who send private messages to prevent fraud). In addition, we could not easily join the match-seekers' groups to recruit interviewees, as most matchmakers would strictly validate one's identity such as ID card and single certificate (e.g., divorce certificate) before inviting seniors to join the group. Therefore, we finally decided to recruit participants by asking matchmakers to introduce senior match-seekers after getting their consent. Eligible participants should be above 50 years old, have actively viewed matchmaking streaming for at least 2 months, and have participated in matchmaking for at least 2 weeks to be acquainted with livestreamer-moderated matchmaking. This recruitment method was practical and had advantages including: (1) the demographic information of interviewees had been validated; (2) the matchmaker could help to diversify the interviewee's background (e.g., gender, divorced or widowed); and (3) the interview results of matchmakers and match-seekers could complement each other. However, those who had relatively bad experiences in livestreamer-moderated matchmaking would be excluded, which might bring bias. Generally, this recruitment method provided an applicable alternative in livestreaming research when the ties between streamers and spectators were strong, while directly recruiting spectators was challenging.

The recruited match-seekers' information is shown in Table 2. MS1-MS8 were recruited from MM2's livestreaming channel, and MS9-MS12 were recruited from MM5's livestreaming channel. However, most match-seekers (except for MS2, MS6) had viewed or participated in matchmaking on more than one matchmaker's channel. Therefore, the results were without loss of generality. We covered senior match-seekers with different backgrounds such as *previous status* (widowed or divorced), *matchmaking status* (having successfully found a partner or still ongoing), and *gender*. All interviewees had used mobile devices for more than 1 year, and declared no substantial challenges in using mobile devices and livestreaming applications at the time of the interviews.

3.4 Semi-Structured Interviews

We conducted semi-structured interviews with 18 participants (6 matchmakers and 12 match-seekers) in April and May 2021. The interviews were remotely conducted using video or audio calls. Each interview lasted 40 minutes to 1 hour, and each participant was provided a 60 CNY (about \$9) honorarium through WeChat transfer [81]. Interview questions for matchmakers pertained to their motivations and practice for matchmaking, the way they interacted with match-seekers, the approaches they used to mediate communication between match-seekers, and the perceived benefits and challenges. Interview questions for match-seekers were related to their interaction and communication with matchmakers and other match-seekers, the relationship initiation process, and the

Table 1: Basic information summary of interviewed matchmakers. Location: cities listed according to the Chinese city tier system, in which Tier 1, New Tier 1, Tier 2, Tier 3, and Rural indicated the development level from high to low [102]. Livestreaming Platforms: K–Kuaishou, H–Huoshan, D–Douyin; L–Laolai. NA indicates Not Available (not disclosed)

ID	Gender	Age	Education	Location	Matchmaking Experience Online (Year)	Made Couples	Senior Match-seeker %	Part-time or Full-time	Platform
MM1	F	56	Primary School	Rural	2	20+	~100%	Part-time	K
MM2	F	56	High School	New Tier 1	3	200+	~95%	Full-time	H, K, L
MM3	F	50	High School	Tier 3	3	30+	~50%	Full-time	K
MM4	F	58	Primary School	Rural	3	~300	~20%	Full-time	K
MM5	F	50-60	NA	NA	2+	100+	~100%	Part-time	K
MM6	F	50-60	Primary School	Tier 3	1+	NA	~90%	Full-time	D,K

Table 2: Basic information summary of interviewed match-seekers. Location: cities listed according to the Chinese city tier system [102]

ID	Gender	Age	Education	Previous Status	Matchmaking Status	Location	Months of Match-seeking	Viewing Frequency (#/week)	Years Using Smart Phones
MS1	F	51	High School	Widowed	Ongoing	Tier 2	3	3-4	4
MS2	M	68	High School	Widowed	Ongoing	Rural	3	7	2
MS3	M	54	High School	Divorced	Ongoing	Tier 3	2	7	5
MS4	M	55	Middle School	Divorced	Successful	New Tier 1	1	7	5
MS5	F	51	Primary School	Divorced	Successful	Tier 1	< 1	7	4
MS6	M	70	Primary School	Widowed	Ongoing	Rural	24	7	3
MS7	F	55	Bachelor	Divorced	Ongoing	Tier 3	8	7	8
MS8	M	51	High School	Divorced	Ongoing	New Tier 1	4	5	5
MS9	F	62	High School	Widowed	Successful	Tier 3	3	>4	3
MS10	M	66	Middle School	Divorced	Successful	Tier 1	6	5	5
MS11	M	50	Middle School	Divorced	Ongoing	Tier 3	1	5	4
MS12	F	54	High School	Divorced	Successful	Tier 3	12	3-4	7

relevant benefits and challenges. The full list of interview questions is provided in Appendix A. Interviews were conducted in Mandarin, audio-recorded, initially transcribed by the Mandarin transcription service iflyrec.com, and then manually revised by the first author to correct the auto-transcribing mistakes.

3.5 Data Analysis

In total, we collected 48-hour observation data with detailed notes and 16-hour interview transcripts. We adopted an open coding method [18] to analyze the data, in which we avoided using any predefined codes and let the codes emerge from the analysis. Two coders independently read through the data line-by-line for multiple rounds and generated the initial codes that closely reflected the data. The two coders resolved the differences in codes through several rounds of meetings, comparisons, and discussions to reach a consensus. Then, the credibility of the codes was validated in two ways: (1) external member checking [19], in which we invited two matchmakers to review the initial codes, and then slightly improved the codes based on their suggestions (e.g., removing some codes on challenges that they regarded less critical); (2) internal code comparison (as a triangulation approach [91]), in which we checked codes generated from different sources (observations, matchmakers' interviews and match-seekers' interviews) to see whether they were consistent. Affinity diagramming [60] was finally used to develop

thematic clusters, in which codes with highly similar meanings were organized together to generate high-level themes.

3.6 Research Position Statement

The authors conducting observations, interviews and data analysis were born and raised in China, and were familiar with Chinese matchmaking-related traditions.

4 FINDINGS

In this section, we described five major themes that captured livestreamer-moderated senior matchmaking. In sections 4.1 and 4.2, we described how romantic relationships were initiated during and beyond livestreaming respectively moderated by matchmakers (RQ1). Relevant to it, we also illustrated matchmakers' additional duties to promote the matchmaking service quality in section 4.3, which characterized matchmaking-intended streaming compared to general content-sharing streaming. In section 4.4, we unpacked the substantial role of the matchmaking community brought by streaming in facilitating single seniors' matchmaking (RQ2). These components formed a comprehensive matchmaking eco-system for single seniors as shown in Figure 2. Finally, we showed the perceived benefits and challenges of livestreamer-moderated matchmaking (RQ3) in section 4.5.

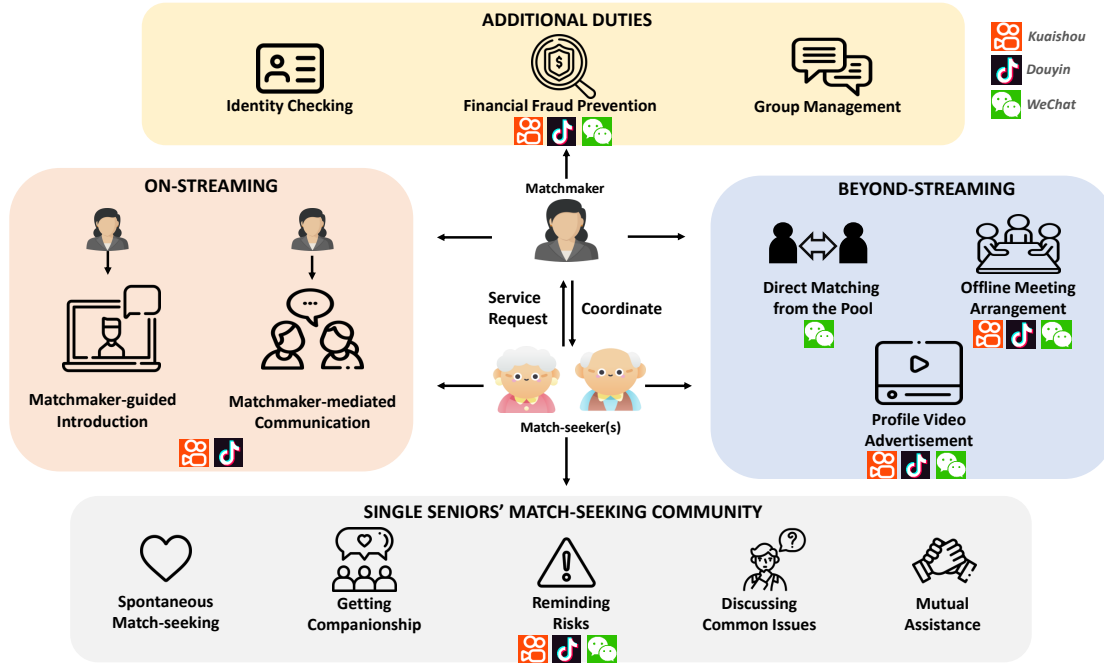


Figure 2: Eco-system of livestreamer-moderated senior matchmaking

4.1 Matchmaking during Livestreaming

The interactivity of livestreaming and the recent support of streamer-audience co-performance [52] shed light on the potential of livestreaming to bring traditional matchmaking online. In this study, we uncovered two representative interaction patterns for relationship initiation on streaming as shown in Figure 2 (on-streaming), including *matchmaker-guided introduction* and *matchmaker-mediated communication*, which fulfilled different interaction needs of matchmaking under the coordination of matchmakers.

4.1.1 Matchmaker-guided Introduction. Observations indicate that matchmaker-guided introduction was the basic approach for match-seekers to present themselves, as shown in Figure 1 (left). Specifically, after one match-seeker disclosed the willingness to look for a partner in the live chat, the matchmaker would invite the match-seeker for *phone-in* with live video or audio. Then, the matchmaker asked the match-seeker a sequence of questions, through which the match-seeker could comprehensively describe his/her profile. Such questions included age, height, weight, location, marital history, pension information, health conditions, children’s information, expectations of a potential partner, and so on. Meanwhile, other spectators could ask detailed questions that they cared about through the live chat, e.g., “*whether the match-seeker smoked or drank*” (MS7) and “*whether the match-seeker was willing to move to another city to live together*” (MS10).

We observed that the matchmaker served as a coordinator during the whole process. They guided match-seekers’ presentations through conversations, repeated questions in the live chat so that the match-seeker could answer, and invited other spectators for three-party interaction (Section 4.1.2). Senior match-seekers largely

valued this self-presentation channel through matchmaker-guided conversations, which could “*avoid the embarrassment of a long self-introduction*” (MS2). Alternatively, when match-seekers felt uncomfortable with such “*self-advertisement*” (e.g., MS1: “*It is like selling myself as a product, which makes me uncomfortable*”), the matchmaker could be the agent to make introductions for them after getting their profiles through private communication in advance. As such, the two types of presentations afforded flexibility for seniors with different preferences.

4.1.2 Matchmaker-mediated Communication. After the matchmaker-guided introduction, another match-seeker might be interested and hope to engage in more in-depth communication. Under this scenario, we observed that matchmakers would simultaneously hold two *phone-in* audience windows as shown in Figure 1 (right), and mediate the communication between the two match-seekers to help them know each other and examine whether they were a good match. Matchmakers noted that they would coordinate the communication to make it more targeted and in-depth, so that the two match-seekers could have a deep and comprehensive mutual understanding. MM4 gave the example that she would typically ask “*how did your last marriage end*” if one match-seeker was divorced, and MM6 claimed that she would particularly lead a discussion between the two match-seekers on the financial issues such as “*bride price and dowry*”. In addition to the reciprocal profiles that were disclosed, match-seekers noted that they would also leverage this opportunity of live communication to observe “*traits beyond one’s profile*” (MS10), such as “*tone, expression and dress*” (MS9).

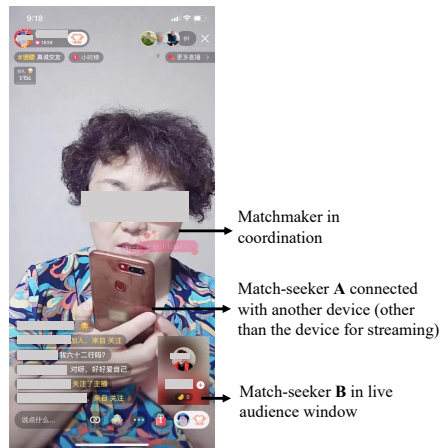


Figure 3: A typical example of three-party interaction using an additional device. This interaction pattern affords accessibility for less tech-savvy seniors who can not use *phone-in* interface.

We also observed that it was a common scenario when a senior match-seeker (MS A) wanted to communicate with the match-seeker in the audience window (MS B), yet did not know how to take a *phone-in* due to the non-proficiency of using livestreaming platforms. Under such circumstances, the matchmaker would moderate a three-party interaction using an additional device. Specifically, the matchmaker called MS A through a WeChat voice call or phone call using a different device from the streaming one. The matchmaker then enabled the loudspeaker, or put the device near the microphone so that MS B on the live audience window and other spectators could hear the communication. Next, the matchmaker would mediate the interaction between the two match-seekers and enable them to get to know each other. A typical example of three-party interaction with an additional device is shown in Figure 3. Matchseekers noted that such interaction methods made online matchmaking accessible to less tech-savvy seniors, even to those only having dumbphones if they had provided the contact information to the matchmaker through friends or family.

4.2 Matchmaking beyond Livestreaming

On-streaming relationship building is interactive yet limited in time, scale, and pattern: it only supports synchronous interaction during the matchmakers' regular streaming time for the narrow audience who are available to watch the streaming. From the interviews, we found that matchmakers developed multi-faceted beyond-streaming methods as supplements to on-streaming activities, which largely extended the matchmaking service to make it more flexible, accessible and comprehensive. In this section, we illustrated these beyond-streaming approaches for relationship initiation, including *directly matching from the pool*, *profile video advertisement*, and *offline meeting arrangement*, as shown in Figure 2 (beyond-streaming).

4.2.1 Set-up for Long-term Match-seeking: From On-streaming to Beyond-streaming. With establishing serious relationships for marriage as a general goal, online match-seeking among Chinese older adults typically takes a long-term effort from months to years (also reflected in Table 2). It necessitates off-streaming asynchronous connections between matchmakers and match-seekers. Interview results indicated that after the first contact on livestreaming platforms (through phone-in interaction or private messages), matchmakers and match-seekers tended to establish off-streaming connections for long-term matchmaking services. Steps included (1) matchmakers and match-seekers becoming WeChat friends; (2) matchmakers inviting match-seekers to matchmaking-centered WeChat groups (detailed in Section 4.4); (3) matchmakers adding match-seekers into *the match-seekers' pool* maintained by the matchmaker physically in the notebook or digitally in the phone. Match-seekers' pool was continuously updated when new match-seekers requested service (added to the pool), or match-seekers got into romantic relationships (moved out from the pool). Such off-streaming connections set up the foundations for the beyond-streaming matchmaking activities to be introduced in the following sections.

4.2.2 Directly Matching from the Pool. With match-seekers' pool established and updated, matchmakers could take advantage of their experience to pair two seniors with matched profiles in the pool, and then introduce them to each other. This approach is based on match-seekers' trust in matchmakers, as mentioned by MS7, "*The matchmaker worked on her career for such a long time, and I even believe she might know who suits me better than myself*". Such direct matching was the main choice of the conservative or cautious seniors who held distrust of online activities. For instance, MS3 disclosed, "*I would not contact someone actively, and would ignore anyone's message without the introduction of matchmakers. I am worried about Internet risks, and afraid of being cheated. In my opinion, if someone sneakily contacts me instead of through the matchmaker, their motivation is suspicious*".

4.2.3 Profile Video Advertisement. Making and advertising profile videos was another common beyond-streaming strategy for matchmaking according to the interviews. With match-seekers' approval, the matchmaker would make curated profile videos to introduce them, which typically included match-seekers' photos, personal profiles, and expectations of prospective mates. It could be a self-presentation guided by the matchmaker, or an introduction made by the matchmaker, as shown in Figure 4. As described by matchmakers, they would publish the video on both the livestreaming platform and WeChat Moments, advertising match-seekers' information to a broad audience and breaking the limit of synchronous interaction on streaming. Some match-seekers held a very positive attitude towards this approach. For example, MS6 claimed, "*When my video was published, it immediately got hundreds of thousands of views, and many people contacted me. I think this method is efficient*". However, some match-seekers were unwilling to make such videos, as mentioned by MS5, "*I have not made such videos...It would be so embarrassing if it is seen by friends and relatives*".

4.2.4 Offline Meeting Arrangement. Three matchmakers (MM1, MM3, MM5) reported that in addition to online matchmaking as a primary component, they also organized offline group meetings

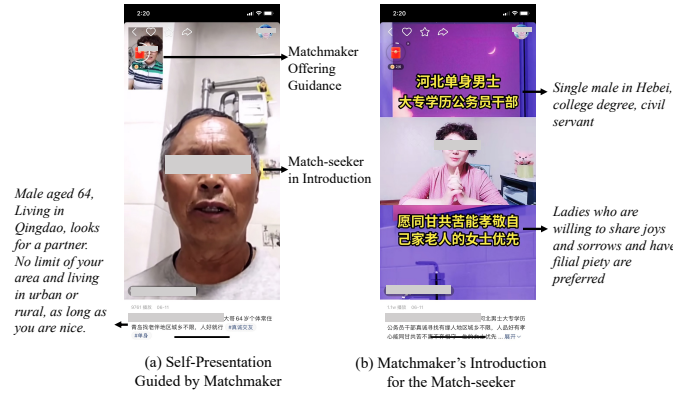


Figure 4: Two types of curated profile videos: (a) self-presentation guided by matchmaker; (b) matchmaker’s introduction for the match-seeker

for match-seekers. A common feature of the three matchmakers was the obvious regional identity (e.g., using regional dialect in the streaming). Therefore, the local audience accounted for the majority, which provided favorable conditions for offline meetings. Matchmakers recruit participants through livestreaming and WeChat groups to cover a wide audience. Generally, matchmakers disclosed that offline meetings supplemented livestreaming when people in the same community and with the same goal could physically gather and chat, “*after all, you meet the real person, and could have more in-depth communications with others*” (MM1). Note that such offline group meetings also existed in traditional offline matchmaking in China [100], but livestreaming helped to build a virtual community beforehand and largely extended the scale of offline meetings, e.g., “*as some of them had known each other in streaming, these parties are typically in a good atmosphere*” (MM3). However, the COVID-19 pandemic limited offline gathering, and online matchmaking activities were playing an increasingly important role, e.g., “*previously I held offline meetings monthly. After COVID-19, I have not organized any till recently*” (MM3).

4.3 Beyond Building Relationship: Matchmakers’ Additional Duties

One salient feature to characterize matchmaking-intended streaming was providing *services* in addition to entertaining and engaging viewers. As such, matchmakers took additional duties, beyond building relationships, to ensure service quality. This section describes these additional duties, including *identity checking*, *fraud prevention* and *group management*.

4.3.1 Identity Checking for Safeguarding. To filter out those with impure motivations for matchmaking (e.g., people who wanted to have an extramarital love affair), all interviewed matchmakers disclosed that they played the role of safeguarding through identity checking. Specifically, before exchanging match-seekers’ contact information on streaming or providing matchmaking services beyond streaming (e.g., offline parties), matchmakers would check match-seekers’ identity cards and single certificates (widowed certificates, divorce certificates, or household registers indicating unmarried)

in advance. It not only aimed to protect stakeholders’ safety, but also made senior match-seekers hold trust in the matchmaking service. As described by MM4, “*only in this way other viewers would believe your matchmaking was reliable and be willing to participate in it*”. Some matchmakers might further check certificates of match-seekers’ profiles to avoid deceptive or exaggerated self-presentations, such as “*certificates of property ownership and pension*” (MM2). All matchmakers emphasized that if they found someone with fake information, the service to the match-seeker would be immediately suspended, e.g., the match-seeker would not be added to the single pool for future relationship initiation.

4.3.2 Financial Fraud Prevention. With the prevalence of financial components in Chinese marriage customs (e.g., bride price and dowry), matchmakers noted that “*many seniors lack alertness in money transfer during relationship development*” (MM5). It made some senior match-seekers vulnerable to financial fraud and conflicts. Only identity checking was not sufficient to prevent it. As such, all matchmakers took additional measures to reduce financial fraud during matchmaking. Reminding the potential risks in online matchmaking during streaming was a basic duty that all matchmakers had performed, e.g., “*I would remind that do not develop relationships with the guys who always ask for money and gifts*” (MM3). Some matchmakers took stricter measures to reduce financial fraud and conflicts to a minimal level, such as forbidding money transfer during relationship development, “*Once caught asking for money, give a warning; twice, stop matchmaking for him/her*” (MM2).

4.3.3 Group Management. Matchmakers noted that they would create WeChat groups to provide an off-streaming community where single seniors could gather, discuss and spontaneously seek love (to be detailed in section 4.4). In these groups, matchmakers or their teams took duties in management and defined a set of rules, such as:

“(1) changing alias to a structured form with the region, gender and age included; (2) prohibiting vulgar and pornographic speech; (3) prohibiting inviting others to join the group without permission; (4) prohibiting irrelevant advertisements, and (5) controlling private money transfer.” (MM5)

They invited new members after identity checking, and kicked out the ones who violated the rules. Matchmakers highlighted the necessity of group management, “*If we don’t intentionally manage the group for two weeks, we would be overwhelmed by match-seekers’ complaints.*” (MM2)

4.4 Matchmaking Community for Single Seniors

The algorithm-mediated matchmaking services were typically limited in forming match-seekers’ communities due to the pairwise style of interaction [59]. Livestreamer-moderated matchmaking, on the other hand, naturally gathered match-seekers mediated by the same matchmaker as a matchmaking community, which further extended beyond streaming and developed group chats for off-streaming communication. We discovered that such communities developed sophisticated and specialized functions, which

played a substantial role in supporting seniors to seek late-life love and providing virtual companionship for lonely single seniors. In this section, we introduce this special community of senior match-seekers.

4.4.1 Spontaneous Match-seeking in Group Chat. Interviews indicated that identity-checked match-seekers gathered in matchmaker-managed WeChat groups that kept long-term and off-streaming connections. In such groups, match-seekers could freely communicate and initiate relationships with others without the matching of matchmakers. Generally, match-seekers held basic trust in other group members, as “*at least their identities have been validated by the matchmaker*” (MS1). Besides, we learned from interviews that when a matchmaker had a wide audience (e.g., MM2), granular groups clustered by regions, age ranges and special needs (e.g., no child) were built, and a match-seeker could choose to join several groups based on certain expectations in a relationship, which afforded flexibility for match-seekers.

4.4.2 Getting Companionship from a Harmonious and Active Environment. The interviews with match-seekers revealed their effort to build a harmonious and active environment in the community. The seniors that joined groups earlier and were familiar with livestreamer-moderated matchmaking would voluntarily serve as welcomers, who greeted newcomers and helped them better integrate into the community. For instance, MS2, who joined the single groups for more than 3 months, would “*say hello to our new members, and make them feel like part of a big family*”. Also, activities such as “*group voice chatting*” (MS4) and even “*singing*” (MS6) were spontaneously held in single groups, in which single seniors could not only know each other better, but also have fun and not feel alone. In addition, some seniors also encouraged those who were shy to disclose themselves to join the group communication and take *phone-in* on livestreaming, promoting a positive and energetic atmosphere in the community. The harmonious and active environment afforded not only the feeling of companionship, but also optimism and enthusiasm for life, as noted by MS2, “*You would definitely be in a good mood when you can chat with so many nice, enthusiastic and interesting peers*”.

4.4.3 Reminding Peers of Potential Risks. Potential risks in online matchmaking, e.g., online love swindlers and privacy leaks, are detrimental to seniors. Most match-seekers believed that they could reduce such risks to a minimum level through circumspect behaviors, and some match-seekers would spontaneously remind others in the community. As noted by MS3, “*the matchmaker would definitely remind such risks, but some people are still reckless. Consequently, I would also emphasize risk prevention in livestreaming and groups, especially when someone reports issues that may bring potential risks, such as over-fast relationship development*.” Seniors regarded such reminders from peers as valuable and effective. For example, MS9 described, “*When someone is in love, he or she might lose vigilance and judgment, which is very dangerous in online match-seeking. Sometimes reminders from peers would be more valuable than anything else*”.

4.4.4 Discussion of Common Issues. Due to sociocultural factors, some seniors faced obstacles when looking for partners in old age, e.g., children’s opposition (MS4, MS6), malicious judgment from

others (MS1) and property division issues after remarriage [36]. In the match-seeker community, seniors disclosed concerns, discussed these issues, and shared their opinions on countermeasures. Such discussions could be in text or voice call, and sometimes even be raised as activities in livestreaming. For example, MS4 introduced:

“I remember that there was a debate held in <match-maker’s name>’s livestreaming channel, which was about whether old-age remarriage needed to get marriage certificates. Some held positive attitudes by claiming the marriage certificate was necessary as the direct proof of love, and some held negative attitudes with arguments such as there were too many troubles regarding property distribution. Such debates were really cool and truly reflected our concerns.”

4.4.5 Mutual Assistance of Problems. Seniors sought and provided help in the match-seekers’ community. It could be related to technical issues, e.g., “*At the beginning, I asked how to send virtual gifts and take a phone-in in Kuaishou*” (MS10), or regarding problems in relationship development. As noted by MS1, “*One senior member in the group helped me a lot. He was more than 10 years older than me, and I treated him as a senior and friend. When I just joined the group, he suggested I boldly try to contact others but have to be careful about transactions. Later when one guy contacted me, I also asked for his suggestions, as he knew the guy much earlier than me.*” In another example, MS4 disclosed some members including himself in the community formed a public relation team to persuade some seniors’ children who were against parent’s match-seeking, “*letting them know how important it is to our happiness*”.

4.5 Perceived Benefits and Challenges of Livestreamer-moderated Matchmaking

Livestreamer-moderated matchmaking naturally exploits the synchronicity and interactivity of livestreaming, bringing traditional matchmaking online to a wider audience with richer interaction patterns. Also, the role of livestreamers has evolved extensively, initiating a human-moderated matchmaking eco-system. Nonetheless, current mechanisms remain immature in some aspects, especially lacking consideration for match-seekers’ vulnerabilities and matchmakers’ labor. In this section, we reported the perceived benefits and challenges of livestreamer-moderated matchmaking, providing insight into more senior-friendly design.

4.5.1 Benefits. We identified three core perceived benefits of livestreamer-moderated matchmaking, including:

- **The “similarity” to traditional matchmaking.** As interviews indicated, the matchmaker-coordinated eco-system, different from the algorithm-mediated matchmaking in general dating platforms, was more in line with seniors’ understanding of matchmaking. Also, the synchronicity of livestreaming made senior match-seekers feel real when they could directly interact with matchmakers and potential partners on streaming, e.g., “*it is just like chatting with the potential partner and matchmaker in real life, and the only difference is not sitting together*” (MS3). Consequently, most single seniors disclosed that they were more willing to learn, hold

trust in, and participate in livestreamer-moderated match-making.

- **Rich interaction patterns.** Due to the interactivity of livestreaming, match-seekers felt engaged whether they were presenters or spectators. For example, when presenting themselves through *phone-in*, senior match-seekers felt happy and surprised to receive virtual gifts that expressed love, as noted by MS7, “*when people send gifts for my self-introduction during phone-in, I realize that I am also very attractive*”; as spectators, match-seekers were also engaged in watching the co-performances between matchmakers and match-seekers and asking matchmaking-related questions through live chat. MS4 even believed it is “*much more interesting than If You Are the One*” (a popular matchmaking TV series in China) because of the sense of participation.
- **The reduced loneliness because of the companionship of single peers.** Many senior match-seekers felt accompanied in the process of mutually sharing personal life, discussing common problems, and expressing emotions on the streaming channel or in the single groups. Some match-seekers even valued the companionship of peers more than the possibility of finding a partner, e.g., “*For me, whether the match-seeking is successful is not primary. Emotional communication and interaction among peers are truly significant things.*” (MS2).

4.5.2 *Challenges.* We uncovered four representative challenges that bothered matchmakers and match-seekers, including:

- **Risk of Fraud in Streaming Settings:** Though one of the major duties of matchmakers was to check the certificates and exclude those with impure motivations, interviewees reported that love swindlers still existed. They either bypassed the guard of matchmakers by sending private messages to particular match-seekers, or sneaked into the WeChat groups using fake identities and single certificates. As MM2 reported, “*Showing single certificates can not guarantee someone is truly single. For instance, what if someone divorced and remarried, and showed me the divorce certificate of the first marriage?*” In addition, online love swindlers also existed in the form of “confederates” that performed fraud together with vicious matchmakers. As described by match-seekers, these deceivers were typically active in *phone-in* and skillful in co-performing with the matchmaker. The vicious matchmaker whose real goal was to cheat money would then instigate the audience to send gifts to take *phone-in* and get the contact information of the confederate. Then, as noted by MS11, “*After one day’s communication, you would be blacklisted by the confederate without any reasons*”. Four match-seekers (MS3, MS6, MS10, MS11) reported that they encountered such joint fraud by malicious matchmakers and confederates before finding current matchmakers.
- **Repetitive Manual Work as a Load:** Different from traditional dating apps that matched love-seekers based on the recommendation system [63], livestreamer-moderated matchmaking largely relied on the manual labor of matchmakers in every step: from on-streaming coordination, beyond-streaming activities to safeguarding measures. All

interviewed matchmakers, whether they were full-time or part-time, complained about such manual labor as a load on their time and energy, especially some repetitive work such as identity checking. For example, MM2 disclosed:

“*(As a matchmaker) you need to repeatedly process hundreds of people’s requests on finding a partner, check their identity, and evaluate their profiles. It is really tiring and sometimes frustrating...*”

- **Emotional Pressure in Matchmaking:** Matchmakers disclosed that they experienced emotional pressure from multiple sources, including (1) anxiety when failing to matchmake lonely seniors. They felt the pain of some single seniors, when “*many older adults take phone-in to complain of their loneliness*” (MM2), and MM3 noted that “*I would feel guilty if they ask for my help many times but I can not find a suitable partner for them*”; (2) nervousness in preventing fraud and conflicts. MM5 explained that “*after all, it is too common to violate someone’s interests during matchmaking*”; (3) disappointment when labor was not acknowledged. MM1 noted that some match-seekers blacklisted her after matchmaking to avoid potential charging, “*Actually I accept free service, but some people don’t even say thank you*”.
- **Limited Traffic for Specific Business Models:** Interviews revealed that matchmakers adopted different business models for their matchmaking services, including (1) voluntary gifting in streaming (MM1, MM3, MM4, MM5). Match-seekers who sent virtual gifts or had a higher level of “intimacy”² were prioritized for *phone-in*; (2) paid *phone-in* (MM6), when the matchmaker explicitly asked for specific gifts (about 30 yuan or \$4) before approving a match-seeker’s *phone-in* request; and (3) one-time payment, lifelong service (MM2). Such payment was based on the WeChat transfer after the matchmaker and match-seekers added WeChat friends for long-term connections. Unfortunately, though “one-time payment, lifelong service” well suited the long-term nature of older adults’ loveseeking, unexpected consequences emerged. MM2 felt like her streaming channel was in “*traffic limiting with few new audiences*”, and attributed it to fewer gifts compared to matchmakers adopting “*paid phone-in*”. It indicates that not all business models developed by matchmakers are equally supported in the current design, and we propose corresponding design implications to cope in Section 5.4.4.

5 DISCUSSION

This study makes the first investigation into livestreamer-moderated senior matchmaking, which not only brings a new form of online dating to light, but also uncovers the potential of livestreamers’ live mediation and matchmaking-centered communities in facilitating seniors’ online love-seeking. In this section, we situate the findings within the existing literature on online dating applications, livestreaming and senior-targeted

²The “intimacy” in Kuaishou platform measures accumulated engagement and interactions (e.g., gifts, comments and watching time) of a spectator in a specific streamer’s channel.

online services, and discuss how this work sheds light on inclusive and efficient senior matchmaking online.

5.1 Reflecting on the Future of Online Dating: Livestreaming in Media and Matchmakers in Coordination

Today, algorithm-mediated matchmaking is the mainstream online matchmaking model, which has been explored by a large volume of work in the HCI and CSCW community [2, 3, 24, 29, 58, 73, 74]. It is typically featured by (1) automatic pairing supported by recommendation systems, and (2) pairwise communication without a third mediator. This work makes the first attempt to look at livestreamer-moderated matchmaking, uncovering the potential of livestreaming as a matchmaking media, and matchmakers' live coordination as a matchmaking pattern. In this section, we discuss the opportunities and limitations of livestreamer-moderated matchmaking, and propose corresponding implications to support seniors' love-seeking.

The diverse interaction patterns on livestreaming including "co-performance" have been proven beneficial in engaging viewers and facilitating viewers' participation [52]. This work further demonstrated the advantages of synchronicity and interactivity of livestreaming in the matchmaking setting. As indicated in section 4.5.1, senior match-seekers felt more authentic in synchronous text, audio or visual interactions, and acquired a comprehensive understanding of potential partners' suitability through live communications. It dovetails with warranting theory [96], when the live interaction, a form more immune to manipulation, is regarded as more trustworthy and valuable compared to profiles that match-seekers could easily have control over. Also, the livestreaming community grouping peers with common grounds [57, 82] reduces the loneliness of single seniors. To this end, it is a promising direction to *import livestreaming as a supplementary to the pairwise communications* in algorithm-mediated matchmaking systems. As there have been some successful attempts of livestreamed dating across the globe (e.g., MeetMe [80] and Blued [97]), we suggest researchers broadly investigate how the streaming setting affects self-presentation and relationship development across different populations and cultures. Meanwhile, when matchmaker-mediated matchmaking has historically been a significant component across many marriage cultures (e.g., South and South East Asia [47]), how livestreaming affords and facilitates matchmaking may also shed light on the digitization of matchmaking services in other sociocultural contexts.

More notably, we exhibited how the third stakeholder - matchmaker as the streamer - built an accessible, flexible, and reliable matchmaking "bridge" in relationship initiation for single seniors. First, matchmakers' manual work provided multi-faceted on- and beyond-streaming methods for relationship initiation, making the bridge inclusive and flexible to meet different preferences. For example, those unable to take *phone-in* could also join the three-party interaction when matchmakers used an additional device as shown in section 4.1.2. Meanwhile, section 4.3 indicates that matchmakers protected their clients' safety by checking identity, validating singlehood, and excluding potential scammers. Such manual safeguarding made the bridge more reliable and trustworthy to seniors. When establishing trust is a challenging task in online matchmaking [68],

matchmakers' mediation provides a potentially effective approach to dispel the concerns of seniors, who are typically believed to hold less trust in technology [45, 61]. Finally, matchmakers' experience in pairing was also valued in the matchmaking process (recall that one match-seeker even disclosed that "*the matchmaker might know who suits me better than myself*"). Therefore, the role of matchmakers extends far beyond moderators, serving as "facilitators" [20] that build trust, ensure safety, afford accessibility, and finally facilitate relationship initiation among seniors. In this regard, we suggest future research consider exploring *the organic integration of matchmakers' experience and wisdom into online dating systems* to facilitate matchmaking.

Nevertheless, concerns also emerged when livestreamer-moderated matchmaking gained increasing popularity. First, some malicious matchmakers performed fraud with confederates as shown in 4.5.2, targeting the lack of alertness of some older adults. *System-supported safeguarding measures*, such as normative training and regulation of matchmakers, were thus expected to reduce such risks. Second, when matchmaking generally relied on the manual organization and mediation of streamers, the scalability was limited. To this end, we suggest platforms *take over part of repetitive work with automated approaches* to reduce matchmakers' load, which is detailed in Section 5.4.4.

5.2 Beyond Engaging and Entertaining: Understanding Streamers' Labor in Matchmaking

Existing work on livestreaming, whether it is entertainment-centered [28, 43, 56] or knowledge-centered [11, 23], has largely examined how livestreamers engage viewers by cultivating entertaining or participatory experiences. Recent work has begun to take a more holistic and critical view to unpack streamers' labor (e.g., self-empowerment through streaming for Chinese rural female streamers [88]). Focusing on the matchmaking activity in streaming, this study takes a close look at livestreamers' "immaterial labor" [39, 48] in matchmaking beyond engagement and entertainment. In this section, we think critically about matchmakers' immaterial and emotional labor in establishing a matchmaking ecosystem on and beyond streaming, and highlight the significance of regulating duties and rewards to support such labor.

This study revealed livestreamers' immaterial labor in constructing a comprehensive matchmaking ecosystem. In addition to mediating match-seekers' communication in livestreaming, matchmakers managed match-seekers' WeChat groups, made profile videos for match-seekers to advertise them, and even organized offline meetings as shown in section 4.2. These types of labor largely supplement on-streaming matchmaking services that were limited in time, scale, and pattern, which play a substantial role in promoting the effectiveness and quality of matchmaking. These findings echo existing literature that livestreamers extend their work beyond streaming (e.g., creating learning communities [23, 55]) to keep a more sustainable ecosystem, especially in providing services beyond content sharing. Also, when many matchmakers are female older adults, this work also enriches the understanding of female empowerment through livestreaming [88]. To support such

immaterial labor involving multiple applications, we suggest HCI researchers broadly explore how to ease matchmakers' work by *organically connecting on- and beyond-streaming components in the ecosystem and proposing specialized interfaces to adapt to this specific setting*.

In particular, we highlight matchmakers' *emotional labor* in the matchmaking process that might be less recognized [35, 72]. As noted in section 4.5.2, they feel anxious when they fail to help single seniors find a suitable partner in an expected time, get stressed when conducting repetitive manual work, and sometimes need to have affective labor to mediate conflicts in matchmaking. Therefore, we also call for *paying attention to matchmakers' mental well-being*. For example, livestreaming platforms may consider providing a more accessible channel for dispute resolution and psychological counseling that may reduce the emotional burden of matchmakers.

In addition, we warn of the potential harm when there is a lack of regulation of duties and rewards for matchmakers' labor. When the labor of livestreaming extends beyond engaging and entertaining, matchmakers hold additional duties to ensure the service quality such as safeguarding and conflict mediation as shown in section 4.3. However, which stakeholders should bear the risks of failure to perform duties (e.g., letting love swindlers bypass the guard and cause losses) is still vague. Meanwhile, the business models of matchmaking are less regulated, and section 4.5.2 uncovers that risks of fraud emerge when deceivers maliciously exploit them, e.g., inducing senior match-seekers to take paid *phone-in*. We suggest future research to critically reflect on *how boundaries should be set on streamers' duties, how technology could assist in fulfilling these duties, and how streamers should be rewarded, protected, and regulated as service providers*.

Finally, we note that the development of livestreaming has led to a boom in diverse streamed "services" beyond engaging and entertaining, such as relationship problem solving [54], live e-commerce [37], psychological consultation [64], and matchmaking. These streamed "services" enrich the value of livestreaming, and also renew the demand for understanding streamers' labor in these specific settings. A broad investigation on streamed "services" in different sociocultural contexts is warranted for future research.

5.3 Cultural Practices and Communities: Implications for Senior-targeted Online Services

How to support older adults with senior-friendly online services has been a topic of concern in HCI and CSCW, which has been investigated across different types of applications such as health [42, 70], finance [41], and inter-family communications [71]. Based on the case of livestreamer-moderated senior matchmaking, we discuss how (1) incorporating cultural practices and (2) embedding seniors' communities in services might contribute to senior-friendly design.

First, we propose the potential of incorporating traditional and cultural practices in online services to attract seniors. Previous work argued that the paramount barrier to seniors' ICT adoption was the negative attitudes such as fear, anxiety, and a lack of motivation and interest instead of skill-deficit [50, 94]. The cognitive dissonance between online activities and their offline experiences prior to the ubiquitous presence of ICT might be the plausible reason [94]. On

this note, adapting traditional and cultural practices, which seniors feel familiar with, to online services, would be beneficial for seniors to cross the cognitive barrier. In the case of matchmaking, most seniors in China are familiar and comfortable with traditional matchmaking organized by matchmakers [104, 107]. Consequently, compared to dating applications relying on recommendation systems, senior match-seekers found livestreamer-moderated matchmaking, which merges traditional matchmaking with technology more naturally, more acceptable and authentic, as shown in section 4.5.1. It is important for future designers to consider *the natural integration of traditional/cultural practices into online applications* to provide more accessible and user-friendly services to seniors. Such considerations may bring new design opportunities with novel forms of technology facilitation and empowerment in broad contexts (e.g., livestreaming church services for older adults in rural areas [85]).

Second, we emphasize the significance of communities in senior-targeted online services. Peer support is particularly valued by older adults [44], and leveraging older adult tech-enthusiasts to help those in need is a promising approach for technical support when they can "speak the language" of older adults [16, 83]. Recent work has uncovered the value of seniors' communities in health discussion [31] and coping with cybersecurity and privacy threats [46, 62]. Our findings resonate with these works by showing that a naturally-developed community could serve as an irreplaceable place for seniors' mutual learning, helping and warning of risks, which not only promotes seniors' understanding of online services but also enhances the security in the process (see section 4.4). How to naturally *embed communities in senior-targeted services to promote peer support* is a critical question for future research.

5.4 Design Implications

5.4.1 Design for Smooth Matchmaking. The evolving design of livestreaming platforms in China (e.g., Kuaishou and Douyin) is increasingly making the matchmaking practice smoother and more convenient. For instance, the observations in two stages witnessed the emergence of multiple-audience-window support that facilitated synchronous matchmaker-mediated communication. In addition, a separate "matchmaking" category grouping matchmaking channels and more romantic virtual gifts (e.g., *crazy for you*) also emerged in Kuaishou in late 2021 and 2022, indicating the platform's recognition for livestreamer-moderated matchmaking. Nonetheless, this work reveals that the livestreamer-moderated matchmaking ecosystem was much richer than on-streaming components, which calls for naturally incorporating beyond-streaming activities into the ecosystem to make matchmaking smoother. For example, *a phone-in scheduling interface (among two match-seekers and the matchmaker) attached to curated profile videos* might be helpful when a match-seeker knows a potential partner from the curated profile video, and wishes for in-depth matchmaker-mediated communication. *A surveying and polling interface on streaming*, allowing matchmakers to introduce offline meetings and collect consent forms, would also help matchmakers recruit participants and manage their information.

5.4.2 Design for Safe Matchmaking. Section 4.5.2 indicates the *interactional asymmetry* between matchmakers and match-seekers

given the current paid *phone-in* business model: vicious streamers could induce match-seekers to send virtual gifts without providing the expected service, e.g., not approving *phone-in* requests with the promised gifts, or inviting fake match-seekers (“confederates”) for deception. Therefore, livestreaming platforms are suggested to *regulate the business model of paid phone-in*, such as proposing transparent and formal paid *phone-in* (e.g., time-based payment) as an alternative to the informal gifting-and-approving mode. Also, the platforms should pay attention to *the reporting and moderation mechanism* in particular to ban malicious matchmakers and “confederates” and safeguard match-seekers’ financial safety. Besides, *platform-moderated identity validation* (e.g., real-name registration) could further complement matchmakers’ manual checking to filter out suspicious match-seekers.

5.4.3 Design for Accessible Matchmaking. As noted in Section 4.4, not knowing how to take *phone-in* (e.g., failing to find the *phone-in* button) still challenged some older adults when they had to seek assistance from the community. To this end, it is warranted for livestreaming platforms to provide *step-by-step guidance* to familiarize senior users with the *phone-in* interface during their adoption period. *Scaling up the mutual assistance* from a small streamer-centered group to a platform-wide community would also be beneficial to utilize the power of peer support to enhance accessibility. Meanwhile, it is also important to note that people living without Internet still accounted for more than 50% of the population above 60 in China, and the digital divide was more severe in Chinese rural areas [10]. Section 4.1.2 indicated that matchmakers’ coordination work partly afforded accessibility to these older adults: matchmakers used an additional device to call less tech-savvy seniors with dumbphones. Yet, this special three-party interaction relies on complex manual operations (e.g., putting the additional device near the microphone) and might suffer from low sound quality. To this end, we call for the support of *dumbphone-based “phone-in”* connection to facilitate communication between internet-connected spectators and phonecall-connected spectators.

5.4.4 Design for Supporting Matchmakers’ Work. Section 4.5.2 reveals that matchmakers spent much time and energy repeating some tedious work such as checking match-seekers’ identities, the load of which largely harmed their enthusiasm. Consequently, we suggest *adopting automated approaches to promote efficiency at the bottleneck*. For instance, using AI agents to collect basic profile data of match-seekers and presenting the structured data to matchmakers might be effective methods to lift efficiency. Platform-moderated identity validation might also work as the first-level gatekeeping that may ease matchmakers’ manual work in identity checking.

We also call for *ensuring the fairness of business models* to support matchmakers’ work. As shown in Section 4.5.2, MM2 found her channel in limited traffic with few new audiences, as her business model “*one-time payment, lifelong service*” through WeChat transfer could not attract as many gifts as “*paid phone-in*”. Therefore, we suggest designers of livestreaming platforms acknowledge diverse business models and propose corresponding interfaces to promote fairness. For example, platforms could consider allowing gifts/payment for service contracts to support “*one-time payment, lifelong service*” and considering them in recommendation algorithms.

5.5 Limitations and Future Work

This work has the following limitations: (1) Most interviewees were from urban areas as we did not take any deliberate control during recruitment, and all of them were familiar with the basic use of smartphones. However, it is important to note that many left-behind and vulnerable single seniors in China live in rural, and some with relatively low digital literacy also try to participate in livestreamer-moderated matchmaking; (2) Though we tried to investigate different types of platforms, most of our participants were from general livestreaming platforms, instead of online dating applications or seniors’ platforms that afforded livestreaming; (3) This work lacked a large-scale quantitative analysis which may deepen the understanding of livestreamer-moderated matchmaking, such as which relationship initiation methods were preferred; (4) Design implications suggest automating specific manual work (e.g., profile collection and identity checking) to reduce matchmakers’ labor and promote efficiency. However, we did not systematically evaluate whether automating these steps affected senior match-seekers’ acceptance and engagement, and to which extent the automation should be (even though match-seekers did not show strong expectations of manual work in fulfilling these tasks). Participatory design and careful user studies are warranted to cope with this concern. Future work is suggested to address these limitations, compare the livestreamer-moderated matchmaking practice between participants with different demographics, provide proof-of-concept interfaces to get a comprehensive evaluation of design implications, and broadly explore how to build accessible matchmaking systems for seniors to seek late-life love safely and efficiently.

6 CONCLUSION

Livestreamer-moderated matchmaking has emerged as a popular online matchmaking system among seniors in China. Different from algorithm-mediated matchmaking, it supports live self-presentation guided by matchmakers and affords livestreaming-based matchmaking communities. In this work, we make the first investigation into the practices, benefits and challenges of livestreamer-moderated senior matchmaking through observations and semi-structured interviews with 12 senior match-seekers (aged 50-70) and 6 livestreaming matchmakers. We discover a comprehensive matchmaking ecosystem coordinated by matchmakers, including flexible on-streaming interactions that meet different preferences of seniors, and diverse beyond-streaming activities that extend livestreamer-moderated matchmaking in time, scale, and pattern. Matchmakers also bear additional duties beyond building relationships such as identity checking to protect seniors’ love-seeking. In the matchmaking process, livestreaming-based matchmaking communities afford a significant channel for seniors to seek companionship, discuss common problems and provide mutual assistance. We reveal the benefits of livestreamer-moderated matchmaking such as authenticity and interactivity, as well as the challenges such as repetitive manual work as a load on matchmakers. We discuss how to facilitate accessible, efficient, and safe matchmaking for older adults to seek love and companionship online.

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A INTERVIEW QUESTIONS

We conducted semi-structured interviews with participants (matchmakers and match-seekers). Though we prepared interview questions across different themes, we might skip some predetermined questions and develop impromptu questions based on participants' responses during interviews. We informed participants that they could refuse to answer any questions. The interview questions below (translated from Chinese) were developed after a period of observations.

A.1 Matchmakers (Livestreamers)

Basic Information:

- (1) What is your age?

- (2) What is your education level?
- (3) Which city do you live in?
- (4) How long have you streamed as a matchmaker?
- (5) How many couples have you made?
- (6) Where do your participants typically come from?
- (7) Which platforms do you use to stream as a matchmaker?
- (8) Are you a full-time matchmaker?
- (9) Have you worked as a traditional offline matchmaker?
- (10) What is the percentage of seniors above 50 in your streaming channel?

Motivation and Practice:

- (1) What motivates you to work as a livestreaming matchmaker?
- (2) How long do you stream per day?
- (3) What activities do you hold during streaming?
- (4) What matchmaking-related work would you do when you are not streaming?

Interaction:

- (1) How do you attract match-seekers to participate in match-making?
- (2) What do you talk about with match-seekers when they take *phone-in*?
- (3) How do you mediate communications between two match-seekers?
- (4) How do you interact with spectators who post comments?
- (5) How do you interact with spectators who send virtual gifts?

Relationship:

- (1) How do you help two match-seekers get to know each other during livestreaming?
- (2) How do you help to build trust between two match-seekers?
- (3) Would you help to build connections between two match-seekers after livestreaming?
- (4) (If building WeChat groups is mentioned) What duties do you take in the WeChat group?
- (5) (If holding offline meetings is mentioned) What duties do you take in the offline meeting?
- (6) Are there any other duties in matchmaking that you want to share with me?

Benefits and Challenges:

- (1) What advantages of streaming-based matchmaking do you think compared to other forms of matchmaking?
- (2) What disadvantages of streaming-based matchmaking do you think compared to other forms of matchmaking?
- (3) Have you noticed any specific difficulties of senior match-seekers?
- (4) Do you have some impressively interesting experiences as a matchmaker?
- (5) Do you have some impressively awful experiences as a matchmaker?

Platform Design:

- (1) Do you think it is difficult to use current livestreaming platforms?
- (2) As a matchmaker, which design do you like or dislike in current livestreaming platforms?

A.2 Senior Match-seekers (Viewers)

Basic Information:

- (1) What is your age?
- (2) What is your education level?
- (3) Which city do you live in?
- (4) Are you currently in a relationship through matchmaking or still looking for love?
- (5) How long have you watched and participated in streaming-based matchmaking?
- (6) How often do you watch streaming-based matchmaking?
- (7) Have you participated in offline matchmaking?
- (8) Which platforms do you use for streaming-based matchmaking?
- (9) How long have you used smartphones? Are you familiar with your devices?

Motivation and Practice:

- (1) How did you learn about streaming-based matchmaking?
- (2) What motivates you to participate in streaming-based matchmaking?
- (3) How long do you watch streaming-based matchmaking per day?
- (4) How do you participate in streaming-based matchmaking?
- (5) In which criteria do you choose a matchmaker for his/her service?

Interaction:

- (1) How do you interact with matchmakers and other match-seekers?

- (2) Do you have experiences of *phone-in*?
- (3) What would you talk about during *phone-in*?
- (4) Do you post comments when you watch the livestreaming? What would you post?
- (5) Do you send gifts when you watch the livestreaming? Why do you send gifts?

Relationship:

- (1) How would you initiate relationships with potential partners?
- (2) How do you evaluate whether a potential partner is suitable through *phone-in*?
- (3) Based on your experience, what is the role of the matchmakers during the process of relationship development?

Benefits and Challenges:

- (1) What are the advantages of streaming-based matchmaking compared to other forms of matchmaking?
- (2) What are the disadvantages of streaming-based matchmaking compared to other forms of matchmaking?
- (3) Do you have some impressively interesting experiences?
- (4) Do you have some impressively awful experiences?

Platform Design:

- (1) Do you think it is difficult to use current livestreaming platforms?
- (2) Which design do you like or dislike in current livestreaming platforms?