Research Question

What are the differences between male and female streamers in their neighbor relationship including (a) neighbor network features (b) gender preferences of neighbors?

Data Collection

We collected live streaming data from the three most-viewed channels on Douyu, which is often viewed as Twitch's counterpart in China (Dredge, 2020): League of Legends (LOL), Yanzhi, and Honor of Kings (HOK) (DouyuTV, 2021). In the LOL and HOK channels, streamers share their real-time gaming streams with viewers on these two Multiplayer Online Battle Arena (MOBA) games. While LOL can be played on PCs only, HOK is only available on mobile devices. The difference of the game playing devices influences the streaming practices. LOL streamers are bound to stream from PCs, but HOK streamers may stream directly from mobile devices or through screen mirroring to PCs. However, streaming HOK using mobile devices does not support webcam use. Therefore, HOK streamers who want to use a webcam need to mirror the game screen to a PC and add webcam elements separately. Unlike the game-focused LOL and HOK channels, the Yanzhi channel encompasses a wide range of stream content, including singing, dancing, casual chatting and lifestyle vlogging. The majority of streamers in the Yanzhi channel are women (Zhang & Hjorth, 2019). Unlike gaming or technology channels that require specialized skills,

Yanzhi streamers often attract viewers with their personal characteristics such as physical appearance and vocal qualities (Liu et al., 2022).

We first gathered a list of all active streamers who had broadcasted at least once in these three channels between April 3 and April 9, 2022. Then, we filtered the streamers using the following criteria: 1) The streamer's gender must be identifiable through either webcam presence or voice features; 2) The streamer account must be operated by an individual instead of an organization; 3) The stream must broadcast in Chinese; 4) The stream should have a chat box available for all viewers; 5) Each stream must be longer than 10 minutes; 6) The streamer's weekly average popularity must surpass the average value of all the streamers in the same channel. 1,454 streamers fit these criteria, including 508 in LOL, 457 in HOK, and 489 in Yanzhi. We further collected data on these streamers' activities from June 6 to July 31, 2022, using an API to capture textural data from their streams and chat boxes whenever they went live.

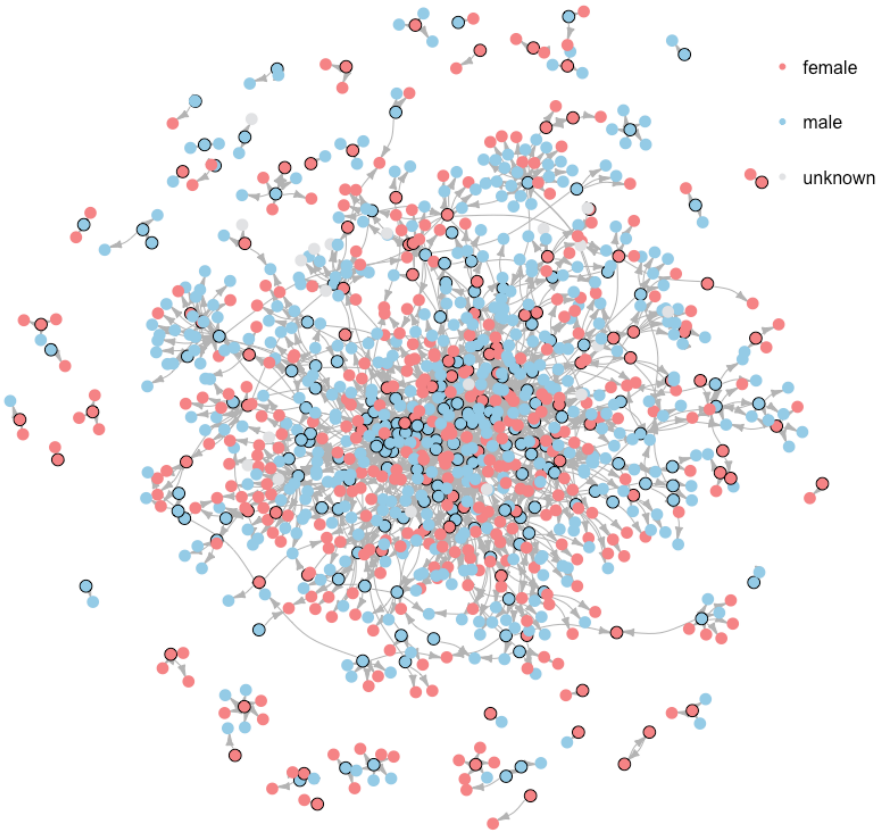
Results

We examined the differences between male and female streamers in neighbor relationship networks. Of the 339 streamers in the *LOL* channel, 97 had no neighbor relationship with someone else. The remaining 242 streamers and their neighbors were included in the study, obtaining a neighbor relationship network containing 1072 nodes (445 nodes are females, 608 nodes are males, and 19 nodes are of unknown gender) and 1471 edges, of which 345 pairs of edges (23.5%) were from the same guild (see Figure 4). A chi-square test of independence was performed to examine the

relation between gender and neighbor relationship building of streamers in the *LOL* channel. The relation between these variables was significant, χ^2 (1, N = 339) = 12.79, p < .001. Male streamers were more likely to build a neighbor relationship with others. An independent *T*-Test showed that male streamers (M_{male} = 5.58, SD_{male} = 6.61) compared to female streamers (M_{female} =2.79, SD_{female} = 4.34) had significantly more neighbors, t (325) = 4.66, p < .001. On the gender preference of neighbors, an independent *T*-Test showed that male streamers (M_{male} = 3.41, SD_{male} = 4.10) compared to female streamers (M_{female} = 1.18, SD_{female} = 1.98) had significantly more same-sex neighbors, t (281.61) = 6.57, p < .001.

Figure 1

The Neighbor Network in the LOL Channel

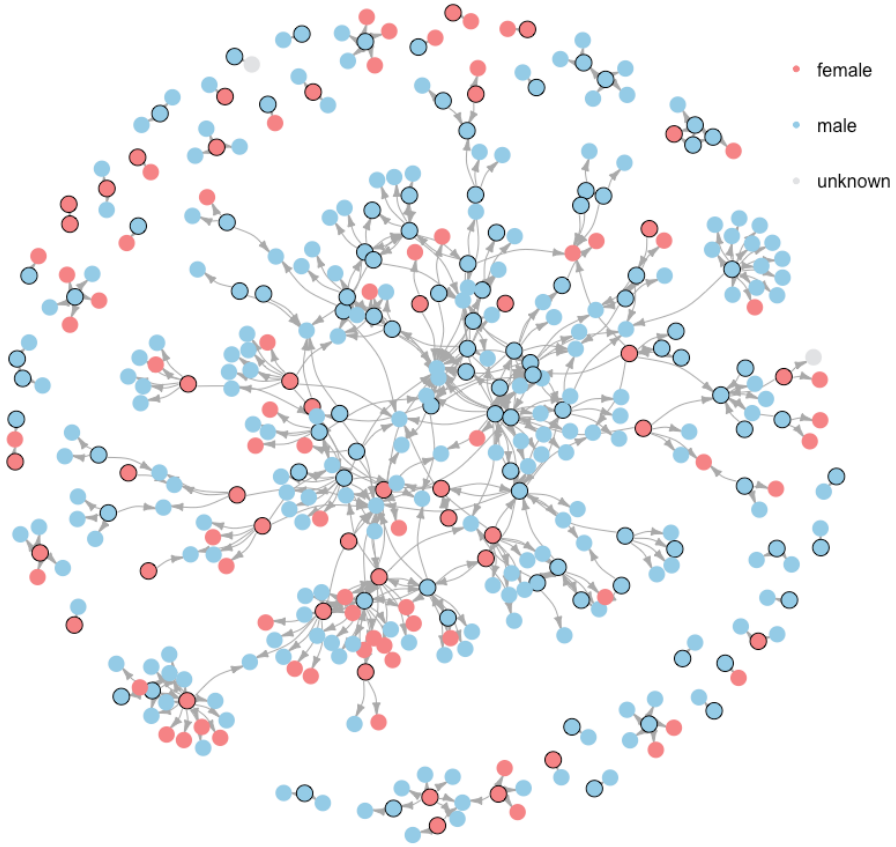


Note. The 339 *LOL* streamers in the sample have a black frame.

Of the 302 streamers in the *HOK* channel, 176 streamers did not have a neighbor relationship with someone else. The remaining 126 streamers and their neighbors were included in the study, obtaining a neighbor relationship network containing 408 nodes (106 nodes are females, 302 nodes are males, and 2 nodes are of unknown gender) and 505 edges, of which 113 pairs of edges (22.4%) were from the same guild (see Figure 5). A chi-square test of independence showed that there was no significant association between gender and neighbor relationship building of streamers in the *HOK* channel, χ^2 (1, N = 302) = 0.30, p = .586.An independent *T*-Test showed that there was no significant gender difference for the number of neighbors, $t(300) = 0.48$, $p = .635$, despite male streamers ($M_{male} = 1.74$, $SD_{male} = 3.28$) having more neighbors than female streamers ($M_{female} = 1.56$, $SD_{female} = 3.05$). An independent *T*-Test showed that male streamers ($M_{male} = 1.45$, $SD_{male} = 2.89$) had significantly more same-sex neighbors than female streamers ($M_{female} = 0.40$, $SD_{female} = 1.08$), $t(274.28) = 4.58$, $p < .001$.

Figure 2

The Neighbor Network in the HOK Channel



Note. The 302 HOK streamers in the sample have a black frame.

Of the 228 streamers in the *Yanzhi* channel, 138 did not have a neighbor relationship with someone else. The remaining 90 streamers and their neighbors were included in the study, obtaining a neighbor relationship network containing 480 nodes (339 nodes are females, 132 nodes are males, and 9 nodes are of unknown gender) and 478 edges, of which 80 pairs of edges (16.7%) were from the same guild (see Figure 6). A chi-square test of independence was performed to examine the relation between gender and neighbor relationship building of streamers in the *Yanzhi* channel. The relation between these variables was significant, χ^2 (1, N = 228) = 14.56, p < .001.

Male streamers were more likely to build a neighbor relationship with others. An independent *T*-Test showed that male streamers (M_{male} = 7.95, SD_{male} = 12.28) had significantly more neighbors than female streamers (M_{female} = 1.46, SD_{female} = 4.34), t (21.56) = 2.46, p = .022. An independent *T*-Test showed that there was no significant difference between male and female streamers for building relationships with same-sex neighbors, t (21.84) = 0.93, p = .362, despite male streamers (M_{male} = 2.32, SD_{male} = 6.65) having more the same-sex neighbors than female streamers, (M_{female} = 0.99, SD_{female} = 2.86).

Figure 3

The Neighbor Network in the Yanzhi Channel

Note. The 228 Yanzhi streamers in the sample have a black frame.

Discussion

Compared with female streamers, male streamers are more likely to have a neighbor relationship with other streamers and have more, besides streamers in the HOK channel. This may have something to do with HOK being a handheld game. Streamers in the HOK channel operate mainly on their phones, and the complex community features represented by adding neighbors are not their focus. More neighbors indicate that male streamers are more socially active than female streamers on the platform and have accumulated more social capital. Such social capital will

help male streamers transform into more cultural capital represented by live-streaming skills and economic capital represented by platform traffic. In game channels, male streamers have more same-sex streamers. Game communities have long been considered male-dominated. Between male streamers, it may be easier to meet resonance and share gaming experiences, leading to complementary or mutually supportive collaborations. Building a neighbor relationship functions as a traffic guide. The more and tighter the relationships form between the male streamers, the more traffic flows in the network of male streamers, exacerbating the marginalization of the female streamers. Such a network could be more conducive for female streamers to increase their platform influence and limit their ability to attract a wider audience.