Does Age Influence the Way People Interact with Social Live Streaming Services?

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Abstract. The interest in social media and in particular the social live streaming services (SLSSs) is increasing, as can be observed by the growing number of users in different age groups. However, the social live streaming services have not been satisfactory investigated yet. Therefore, knowledge gaps in this subject area are still present. This study focuses on the use of SLSSs in terms of content, motivation, and gender depending on the age of the streamer. A research team has been assembled for this purpose. 4,937 streams were analyzed for content, motivation, age and gender on three different platforms in three different countries. Dependencies of content and motivation regarding the streamers age could be determined. The results indicate that older age groups are more likely to share information and therefore broadcast content related to information. It could be observed that younger users are more likely to film their lifestyle on this medium. The genders differ for the age groups significantly. So, it can be assumed that a correlation between age and the content, motivation, and genders on social live streaming services is given.

Keywords: Social live streaming service · Age · Content
Motivation · Gender · Social network service

1 Introduction: Information Behavior on SLSSs

Today, almost everyone having an internet connection uses at least one social medium to communicate with others or share their opinion with the public. This is a possible reason why social networking services (SNSs) are becoming more and more popular. One can be connected with others regardless of time and place [1]. In recent years social live streaming services (SLSSs), which are part of SNSs, are gaining popularity [2]. Yet, the user behavior of the streamers on these platforms has hardly been scientifically investigated. This is exactly what should be done to find out why user numbers in this area of social media are rising and which clientele is addressed by this medium, which content they produce, and what their motivations to do so are. Since user groups on SNSs cover a large age rang, it would be especially interesting to investigate the content and the motivation related to different age groups.

There are already some studies dealing with the use of social live streaming services [3–6]. However, there is still no study that investigates the usage behavior of SLSSs in relation to the streamers' age. Moreover, this should be done since there are

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already studies that show the influence of age on motivation and content in the use of SNSs. For example, Brell et al. [7] have already discovered that the gender has an influence on the motivation to use a social medium. A dependency on the motivation to use social networks and the users' age can be observed [8, 9]. In addition, age is considered a key variable in the studies. Perhaps a similar dependence could be found between the age of the user and the motivation to use SLSSs. Pfeil et al. [10] were able to detect a difference in the use of a social medium depending on the age of the user.

An SLSS is an application on which users can generate content by filming themselves or others and broadcast the stream directly online to allow other users to participate. Depending on the platform, streamers can use their mobile devices or a webcam for filming. It is open to the streamer which content he or she generates, whether it is a city tour or an excerpt of his or her everyday life, everything can be streamed. However, one should try not to break the law [5, 11]. For our research we investigated the produced content and motivations of the streamers on the platforms Ustream, YouNow, and Periscope.

1.1 Investigated Social Live Streaming Services

Periscope[1] was developed by Kayvon Beypour and Joe Bernstein and launched by Twitter in March 2015 [12]. As a live streaming application for Android and iOS, Periscope enjoys a high level of mobility. Periscope itself presents the service as a tool by which the world can be seen through the eyes of someone else. Periscope was developed with the idea of creating something that comes close to teleportation [13]. Just like Twitter itself, Periscope is an information sharing platform that can be used for any purposes [14].

Ustream[2] was developed by Brad Hunstable, John Ham and Gyula Feher in 2007 with offices in San Francisco as well as in Budapest. In January 2016, Ustream was acquired by IBM and is now part of IBM Cloud Video [15]. Unlike YouNow and Periscope, Ustream tends to target companies rather than users. To use a professional streamer account, a monthly fee of $99 up to $999 is required. There are also free accounts offered, but these are provided with advertising. As a leading provider of cloud-based, end-to-end video solutions for media and enterprises, Ustream offers 80 million viewers per month the chance to watch live or on-demand streams from internal meetings to press conferences up to worldwide entertainment [15].

With the mission to create an interactive platform where anyone can participate and express themselves live [16], YouNow[3] was founded by Adi Sideman in 2011. YouNow is a live streaming service which is mostly used as a web application, but it is also offered for Android and iOS. According to YouNow [16], the service hosts more than 100 million user sessions a month and about 50,000 h of live videos every day. The most appreciated target group are teenagers [3].

[1] https://www.pscp.tv/.

[2] http://www.ustream.tv/.

[3] https://www.younow.com/.

There are many more than the three streaming providers we studied. These were not included in this study because of their specializations on subject areas or locations. These include, for example, Twitch[4], with focus on gaming, or niconico[5], addressing Japanese-speaking users or YY[6] in China.

1.2 Research Model

A streamer broadcasts a stream on a platform (Ustream, Periscope, and YouNow) and has an age and a gender (Fig. 1). The produced content could possibly depend on the age of the streamer. The content is divided into five categories: food & lifestyle; information; entertainment; nature & spirituality; sports & arts. Probably dependent on the age, a streamer has several motivations to stream. The motivations were divided into four categories based on the Uses & Gratification Theory: entertainment; social interaction; social realization; information [6, 17]. To be investigated is the frequency distribution of the content as well as the motivation depending on the age of a streamer. Also, the age-dependent change in the gender-distribution will be examined.

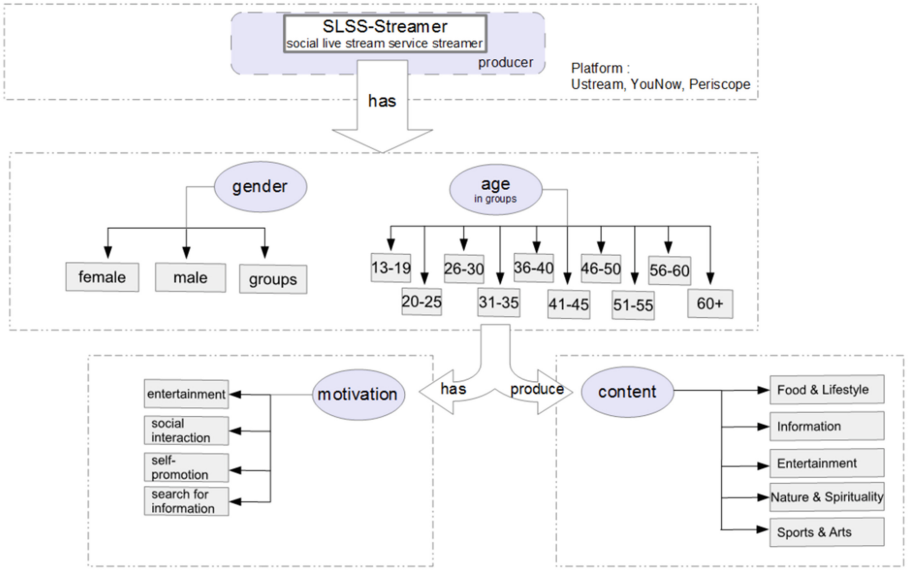

Fig. 1. Research model

[4] https://www.twitch.tv/.
[5] http://www.nicovideo.jp/.
[6] https://www.yy.com/.

2 Method

To calculate meaningful statistics, it was necessary to create standardized data sets. For this purpose, a codebook [18] based on literature concerning the usage of social media was made. Two different approaches were applied to ensure a qualitative content analysis with a great dependability. The directed approach was used with assorted literature to get guidance for the research variables and categories. Additionally, the conventional approach via observation was implemented [19] to get a general idea of the streams' content in each country (U.S., Germany, and Japan) and on each platform (Periscope, Ustream, and YouNow) that were chosen for this examination.

In addition to the literature review, streams on SLSSs were analyzed to determine appropriate categories for the content of the streamers' and the users' motives. The motives can be classified according to the Uses & Gratifications Theory: entertainment; social interaction; information; self-realization [20]. The Uses & Gratifications Theory asserts that users of a (social) medium use media to fulfill specific gratifications. Therefore, they are looking for a medium that best satisfies their needs [21]. Due to a high number of different content categories, related ones were aggregated into main categories. The chosen categories were influenced by commonly used topics. The topics are: entertainment {entertainment media, comedy}; nature & spirituality {nature, animal, spirituality}; information {share information, news, STM (science, technology and medicine), politics, advertising, business information}; sports & arts {make music, draw/paint a picture, gaming, fitness, sports}; food & lifestyle {to chat, 24/7, slice of life, food}.

For example, *entertainment media* and *comedy* are in the *entertainment* category, as they both provide entertainment for the viewers [22]. *Nature & spirituality* has been summarized as a top category since the idea of spirituality is closely related to nature and offers different approaches and forms to reconnect with nature [23]. Even according to the Bible, a connection between faith, nature, and animals can be observed [Job 12: 7 New Living Translation]. The category *lifestyle* describes a certain way of life. This includes content such as social interactions (to chat) as well as everyday tasks (slice of life, 24/7), which can be regarded as subfields. Food is also part of our everyday life and can reflect our lifestyle, for example through food culture. There are even fairs evolving around "food & lifestyle", for example the "Chester Food, Drink & Lifestyle Festival" or the "Ingolstädter Food & Lifestyle Messe". Sports can be considered as a form of art, for example through special movements [24]. Due to these points of contact, the contents of the sports activities (gaming, fitness, sport) were accommodated with those of the artistic actions (draw/paint a picture, make music) for this research in the *sports & arts* category. For the category *information*, the contents that serve to convey professional, educational, or business-related information were brought together (share information, news, STM, politics, advertising, business information).

A spread sheet was generated for the content and motivation categories as well as socio-demographic data. Norm entries were used for the formalities. Those were: gender {male, female, group} and the age of the streamer in groups {13–19, 20–25, 26–30, 31–35, 36–40, 41–45, 46–50, 51–55, 56–60, 60+}. Similar to the study of

Pfeil et al. [10] this study compares the user behavior of teenagers (13–19 years old) with those of older people (60+ years old). However, as not only these two age groups are relevant, other age groups were added for our study, each limited to a 5-year period. The investigation only applies to streamers over the age of 13, as younger children are not allowed to use social live streaming services according to the terms and conditions of the streaming platforms.

For each streamer, the top categories of content and motivation were marked (binary coded) once one of their respective subcategories were fulfilled. This prevents weightings of individuals on the content category. The data of the streams was collected from three different countries, namely Germany, Japan, and the United States of America, to ensure representativeness. To ensure that the streams originated from those countries the declaration of the country for a broadcast on each platform was checked for every stream. Additionally, the collectors of the data had the required language skills for those countries.

It was necessary to train the coders to ensure a good quality of their coding skills is given [25]. To guarantee this, coders need to work in teams with a minimum of two coders [26]. Twelve teams, each consisting of two persons, were formed. The coder gathered the data in two phases. In phase one they watched the streams and extracted the content [18]. In the next phase, they communicated with the streamers to find out their motivation to do a broadcast. To support the uniform analysis of the content, the 'four eyes principle' [27] was used. Each stream was observed simultaneously but independently by two people for two to a maximum of ten minutes. Communication always happened between the two observers to guarantee a 100% intercoder reliability.

The streams were not recorded, as for this, a consent of the streamer would be needed but could not be always obtained, possibly resulting in violation of personality rights.

This way, a data set of a total of 7,667 streams in a time span of four weeks, from the 26th of April to the 24th of May 2016, was collected. Of these, 4,937 streams were broadcasted from streamers who stated their age and therefore could be evaluated for this study. The analysis of the streams focused only on the producers (streamer); information on user-behavior of the participants and consumers (viewer) was not collected. The results of the observations were statistically analyzed and compared regarding different aspects of our research model.

3 Results

3.1 Gender

Of the 4,937 participants we evaluated, 33.42% were female, 50.53% were male and 16.05% were active in a group (Fig. 2). The age- and gender-dependent distribution of users shows surprising results. It can be observed that in younger age groups (13–19) a much higher proportion of female streamers (51.34%) prevails. This decreases with advancing age (8.33%). The proportion of male streamers is the opposite of female streamers. Percentages are lower in younger age groups (32.70%) and rise with increasing age (75%). The proportion of streamers who are active in a group remains between 15% and 20% in all age groups and is therefore hardly dependent on age.

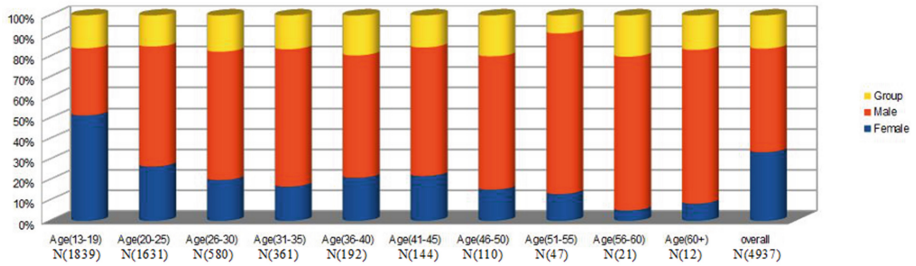

Fig. 2. Age division of gender on SLSSs (N = 4,937)

3.2 Age and Content

There also appear to be age-dependent differences regarding the streamed content (Fig. 3). By looking at the percentages, a ranking of the content categories can be determined. Streams that are related to the *food & lifestyle* category are broadcasted the most often for each age group, which ranges between 42% and 81%. In the second place are streams in the *information* category. These make up between 19% and 57% of the streams. Third rank the streams of the *sports & arts* section. These account for a percentage of 13% to 29% of all streams. The fourth place is occupied by the *nature & spirituality* category with values ranging between 2% and 34%. Lastly, there are the *entertainment* and *nothing* categories with values between 8% and 16% for streams related to entertainment and 5% to 18% for no content at all.

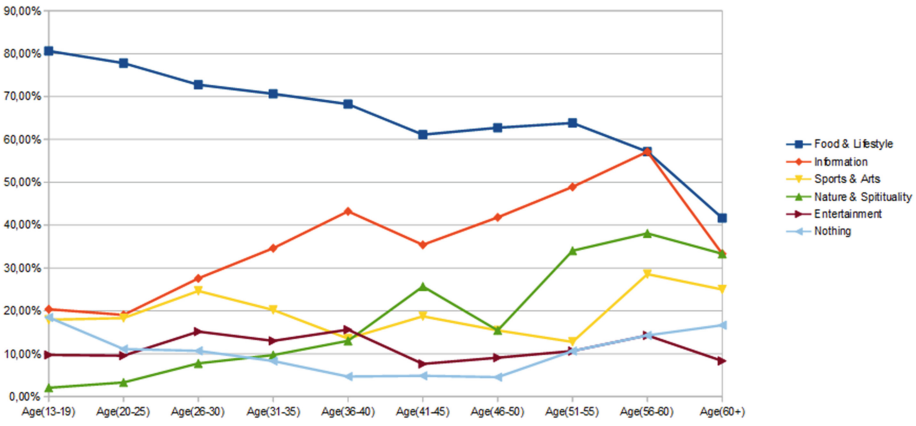

Fig. 3. Content distribution on SLSSs (N = 4,937)

It can be generalized that the content of the streams changes with age. In the groups *nature & spirituality*, *food & lifestyle*, and *information* a change of content frequency is clearly recognizable. The groups *entertainment* and *sports & arts* show only small fluctuations. Therefore, no dependency of content frequency on age can be observed for these groups.

The content frequencies of the *information* and *nature & spirituality* categories show potential growth with increasing age. Conspicuous is the information value of the age group 60+ , since the value decreases sharply from 57.14% down to 33.33%. This decrease could be explained by the relatively small number of observations for this age group. The *food & lifestyle* sector decreases almost continuously with increasing age. The category *Nothing* is rather unsteady in relation to age. However, it has a parabolic shape, with a low point in the age group between 41 and 45 years. Thus, it can be assumed that streamers aged between 36 and 50 are more prepared for their streams and do not broadcast streams without pre-arranged content.

The reasons for these changes can be clarified by looking at the individual contents of the groups. Beginning with the *food & lifestyle* sector (Fig. 4), it can be seen that the sector is heavily influenced by the content *to chat*, as it accounts for the largest percentage. It is easy to recognize that chatting with the viewer decreases with increasing age of the streamer. Streams broadcasting 24/7 are the only ones of the lifestyle group that is becoming more prevalent with age. *Slice of life* and *food* are rather unsteady, whereby slice of life has a tendency to decrease, whereas food has a tendency to increase with raising age.

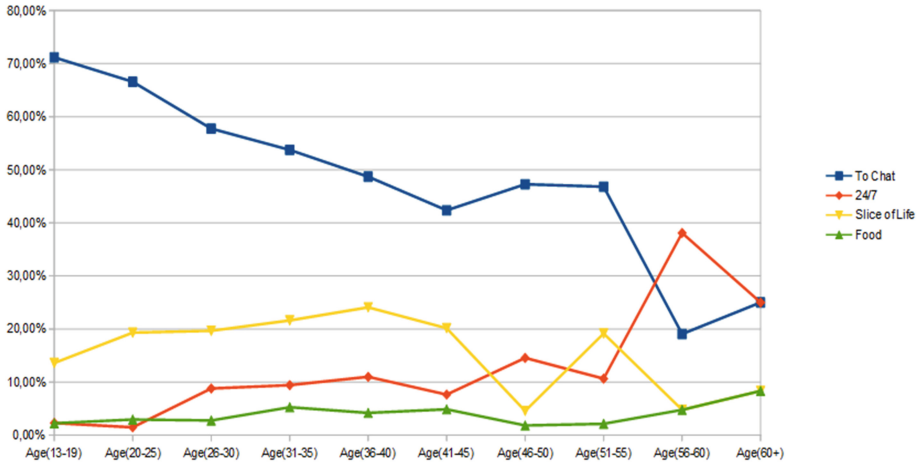

Fig. 4. Distribution of the *food & lifestyle* category split into the respective subcategories

The *information* domain is dominated by the content category *share information,* with values ranging between 17.04% and 44.68% (Fig. 5). The *news*, *STM*, *business information*, *advertising*, and *politics* categories range in values between 0% and 15%. Between the age of 41–50 there is a decrease in frequency that runs through all the content categories, except for advertising. The same can be observed for streamers who are 55 years old, except with a much sharper decline in frequencies.

A particularly surprising result is the continuously strong increase in spiritual related content in the *nature & spirituality* category (Fig. 6). The occurrence of this content starts at 0.44% of the streamers in the age group 13–19 and increases with

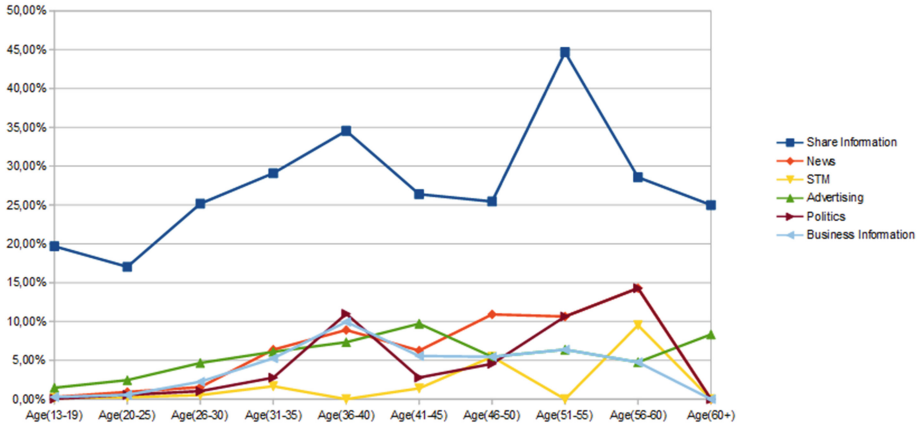

Fig. 5. Distribution of the *information* category split into the respective subcategories

rising age to 33.33%. Especially broadcasted Holy Masses increase the frequency of the spirituality category in the mature age range. The frequency of streamers broadcasting nature increases from the age of 13 to 45 and has a steady decline after that but rises again with the age groups between 50 and 60+.

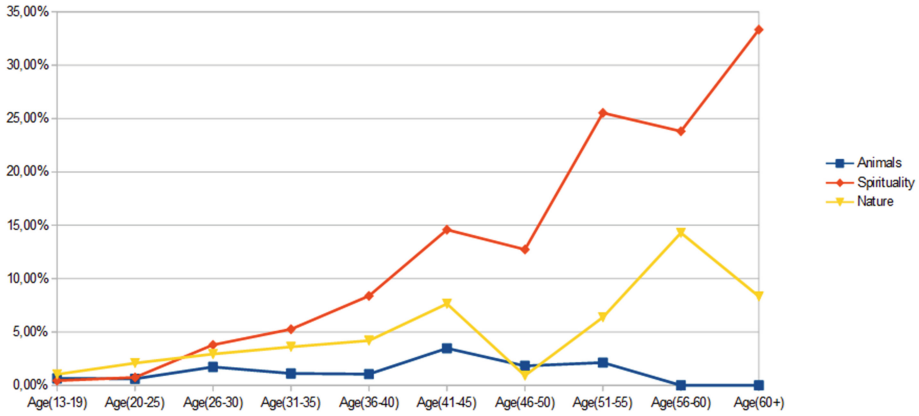

Fig. 6. Distribution of the *nature & spirituality* category split into the respective subcategories

The self-made music category of the *sports & art* sector varies greatly between the age groups (Fig. 7). This increase could also be possibly explained by the streaming of church music, as explained earlier for spirituality. The other content categories (sports, fitness, draw/paint a picture, and gaming) show slightly fluctuating frequencies ranging between 0% and 6%, with no discrepancies within the age groups.

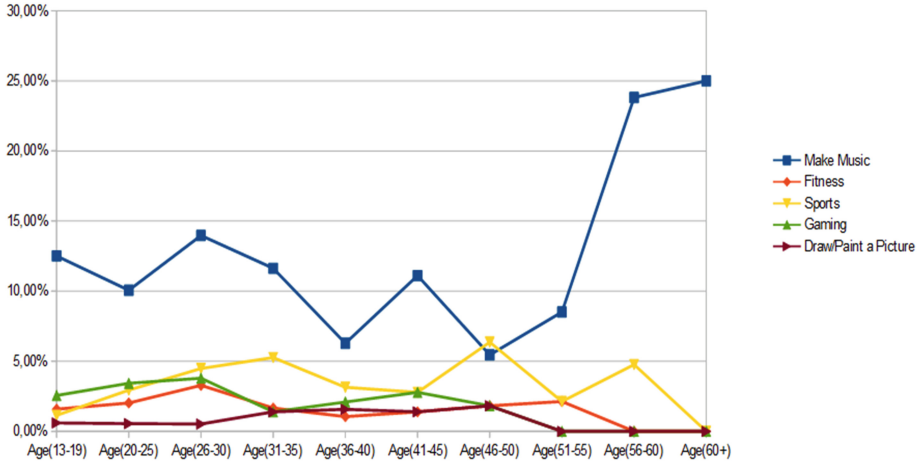

Fig. 7. Distribution of the *sports & art* category split into the respective subcategories

The group *entertainment* is, with a maximum value of 14%, seldom represented in streams (Fig. 8). There are no clear tendencies in terms of age groups. The values show high fluctuations in this small frequency range for both content categories. However, entertainment media is much more common on SLSSs than comedy related streams.

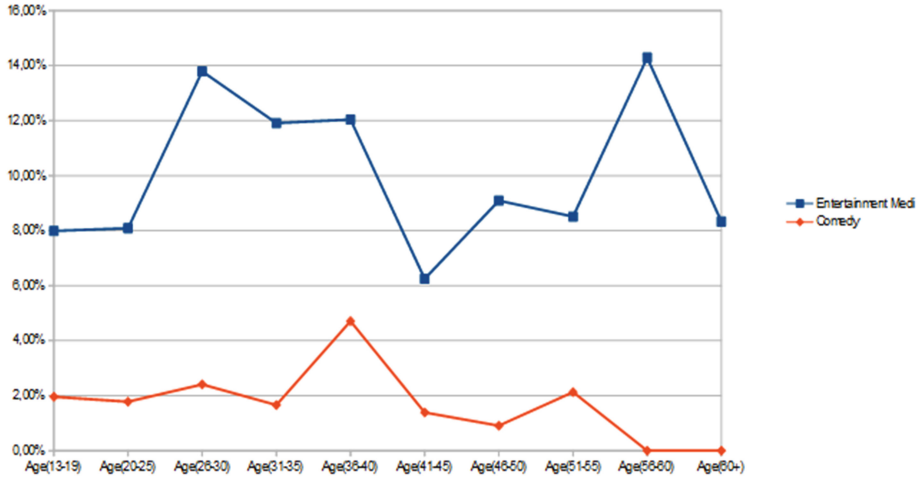

Fig. 8. Distribution of the *entertainment* category split into the respective subcategories

Thus, it can be said that older streamers are less prone to talk nonsense and to devote to other, more concrete topics like spirituality, making music, or news. This could be explained by the high number of professional channels or the increasing life experience of older streamer [28]. They tend to share information and approach specific topics. In contrast, young streamers tend to stream without a precise plan.

3.3 Age and Motivation

An equivalent occurrence of the topic *information* between motivation and content becomes apparent (Fig. 9).

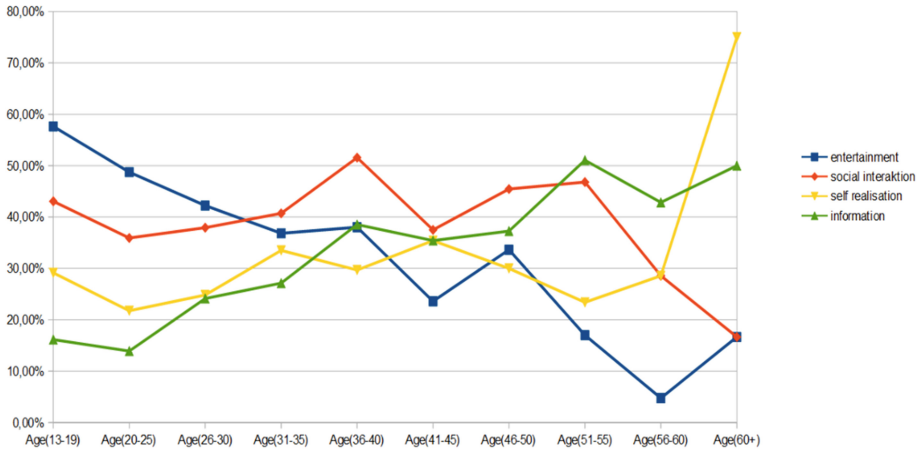

Fig. 9. Distribution of the motivations among SLSSs

The streamers' willingness to entertain decreases with increasing age from 57.64% to 4.67%. In contrast, the will to inform increases from 13.92% to 51.06%. These two motives behave almost in opposite directions. The motivations *social interaction* and *self-realization* hardly show dependencies regarding the age of the streamer. Noticeable is the sharp rising of the need for self-realization in the age group 60+. When the motivation category *social interaction* is broken down into its individual components, it becomes clear that the need to communicate and desire to socialize have the greatest importance for the streamers (Fig. 10).

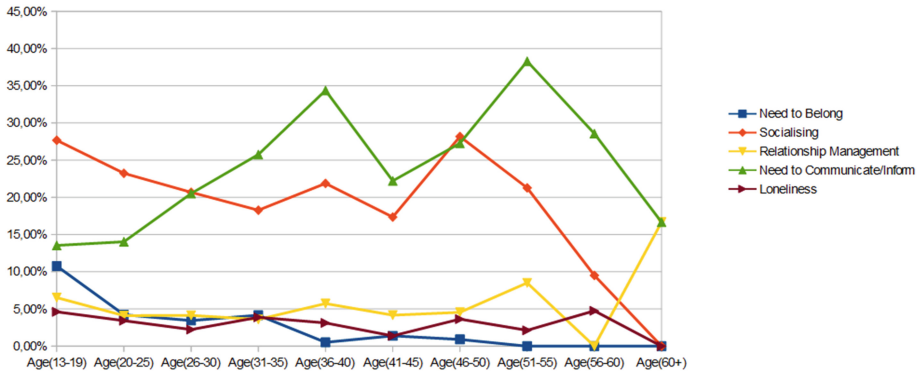

Fig. 10. Distribution of the *social interaction* motive split into the respective subcategories

The motive *need to communicate* behaves similarly to the content *share information*, both show a significant increase from age 13 to 40 and decrease in the years between 41–50. In the group of 51–55 year old streamers, this increases again and then decreases slightly in the age group 56+ .

Streamers aged between 13 and 50 years have a need for socializing for which the values range between 17% and 28%. However, from the age of 51, the interest in socializing decreases sharply and even drops to 0% eventually. Thus, it can be assumed that older people do not want to socialize. The interest in the management of relationships is rising by the age of 60+ (16.67%). The need to belong has its highest value among teenagers with 10.77%, which falls to 0% with maturing age. This could be due to the self-discovery phase (puberty) of the youth, which also passes with age.

The motivation to stream out of boredom is mostly represented by teenagers (41.87%) and decreases with increasing age (Fig. 11). Boredom could be associated with the content *to chat*, as they have parallels in relation to the age groups. Broadcasting for fun is represented by a decreasing line from 19.36% (age group 13 to 19) to 0% (age group 60+). Only streamers in the age group 46 to 50 seem to really enjoy streaming (24.55%).

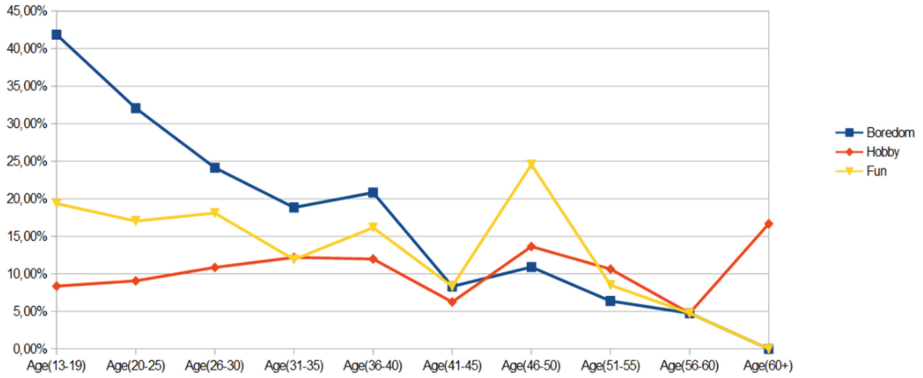

Fig. 11. Distribution of the *entertainment* motive split into the respective subcategories

The motivation to reach a specific group increases with age with values ranging between 7.67% and 50% (Fig. 12). The motivation to stream because one wants to exchange different point of views has little peculiarities in terms of age and frequency of occurrence, except for the age groups 36 to 40 and 51 to 55. In these groups, the motive appears more often, resulting in the small measuring tips of 20.31% (age group 36 to 40) and 25.53% (age group 51 to 55). It is surprising that these two motivations occur so differently, especially in regard to age, although they seem to be related to one another.

Streamers seem to have little to no interest in trolling or the desire to improve themselves (Fig. 13). The wish for self-expression decreases with age, with a value of 20.07% (age group 13 to 19) declining to 2.13% (age group 51 to 55). The motivation to make money, and a sense of mission show a tendency to rise with increasing age.

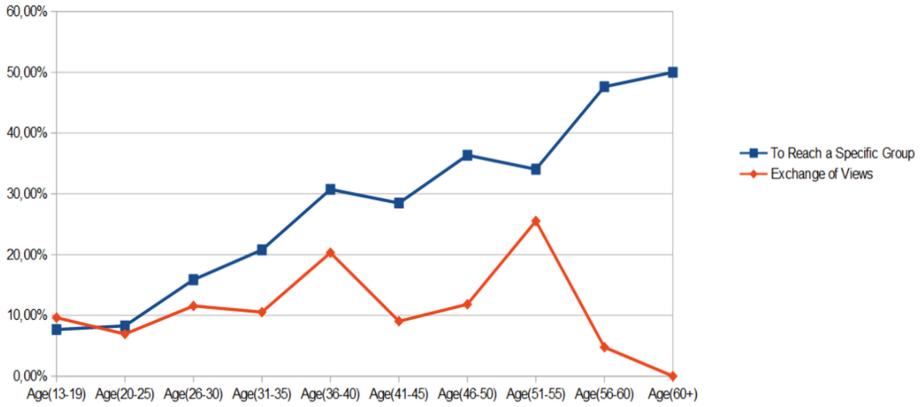

Fig. 12. Distribution of the *information* motive split into the respective subcategories

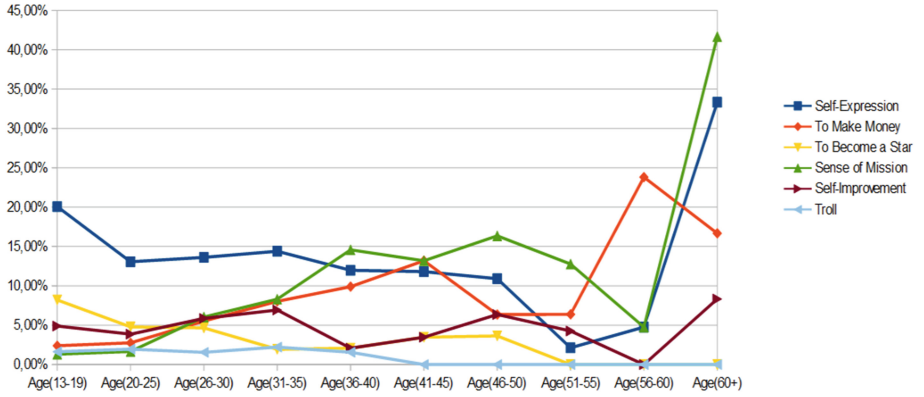

Fig. 13. Distribution of the social-realization motive split into the respective subcategories

Noticeable are the high percentages of the streamers being 60+ and their sense of mission as well as their desire for self-expression when using SLSSs. Apparently, in this age group, the need for self-realization through streaming is high.

4 Discussion

In this study, we examined whether age has an influence on the content of streams or the motivation of the streamer on SLSSs. We conducted a broad analysis to compare social media usage of SLSSs for different age groups. The results indicate that there were differences in the generated content and the driving motivations of the users in relation to the respective age groups. Also, some connections between content and motivations could be observed.

Some age-dependent differences in streamed content could be recognized, for example, the *information* and *nature & spirituality* content categories increase with rising age of the streamer. By contrast, streams with *food & lifestyle* related content decline with advancing age. From this observation it could be concluded that people with increasing life experience are more likely to share their knowledge [28] through SLSSs. A need for spirituality becomes more and more apparent as we grow older, often associated with the recognition of mortality and failure [30, 31]. This could explain the sharp increase of spiritually related content in context with increasing age on SLSSs.

Similar results can be found for the motivations of the streamers. According to our study, the motivation to gather and search for information is influenced by the age of the streamer, it increases with maturing age. Those findings could be explained with the appearance of professional services, such as news or radio broadcasts, which are more likely to be represented by older age groups [32], which could also apply to streams on SLSSs.

The motivation to entertain others or be entertained through SLSSs is strongly decreasing with age. This observation could be explained by the declining desire for attention with rising age [33].

It was astonishing to observe an age-dependent change in the gender-distribution. At a young age, mostly female streamers were represented, while male streamers use SLSSs even at an advanced age. This could have different causes. On the one hand, it could be assumed that a more pronounced technical affinity [34] tends to make males more likely to venture into SLSSs. On the other hand, there could be also other reasons such as parenting and the associated shortage of time [35], or job relationships involving more masculine individuals [32]. This phenomenon can be the foundation for a closer examination of the relationship between the distribution of genders between age groups on SLSSs.

This study is the first study dealing with the content of streams and motivations of streamers in terms of age on general SLSSs. With 4,937 examined streams in different countries and on different platforms, this paper is a first representative study in this area. However, this number comparatively small to the monthly streams broadcasted on each platform. So, it is just a drop in the ocean and should be further investigated.

For possible further research, the connection between the streamers' motivation and the produced content on SLSSs could be investigated in more detail, since correlations between these variables seem to exist. Another possible aspect should be the examination of the streamers' gender and his or her motivations and produced content on SLSSs. This promises to gain further insights into the users' behavior on SLSSs.

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