

# Law Infringements in Social Live Streaming Services

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**Abstract.** Over the past few years, the popularity of Social Live Streaming Services (SLSSs) like Periscope, Ustream, or YouNow, has been on the rise. The services offer their users the opportunity to interact with the viewers in real time while broadcasting themselves. With this kind of human-computer interaction legal dangers are a possibility. We performed an empirical investigation on law infringements on YouNow, Periscope, and Ustream. To this end, a content analysis of live-streams was applied. We developed a codebook based on literature regarding the usage of social media and on the conducted observations of streams. Based upon the most restrictive law (German law), researchers defined categories on potential law infringements while using SLSSs which were the following: copyright violations regarding music, video and picture, violation of personality rights with an additional focus on data protection and insults, committed road traffic acts, the violations of the sports broadcasting rights, as well as violations of the Health Insurance Portability and Accountability Act. In a time span of four weeks we observed 7,621 streams from SLSSs in Japan, Germany, and the U.S. We further examined if there are differences regarding law infringements between age groups, genders, motivations, contents, countries, and platforms.

**Keywords:** Social Live Streaming Service (SLSS) · Social Networking Service (SNS) · Periscope · Ustream · YouNow · Law infringement

## 1 Introduction: HCI Research on SLSSs

Social Live Streaming Services, in short SLSSs, allow their users to broadcast themselves to everyone who wants to watch, all over the world. The streamer films himself with a camera, depending on the service, either on his mobile phone or from a webcam. The spectator sees everything what the user does in real time. This could be watching him just talking or drawing a picture, attending a concert or whatever the person is doing at that moment. The user can also interact with the streamer while he is streaming [26].

Critics and newspapers warn parents of the potential dangers of SLSSs. One major concern is the disclosure of personal information [17]. It is impossible to know every viewer personally. There could be people who gain the trust of the victim and misuse the data. Furthermore, younger users feel they have control over the disclosed information on

social network services [1], which can potentially be harmful. People also stream while they are outside, which could result in personality rights violations (for example, when a third person is shown in the stream without her or his permission) [8]. Some people even stream themselves while driving, which could possibly be dangerous, since some streamers engage with their viewers, thus ignoring the traffic [31]. Even the spectators can commit criminal offences by bullying or sexually harassing the streamer [29].

A possible solution to avoid those dangers is to educate teenagers and children as well as their parents about potential threats of SLSSs. With this study, we will investigate if the concerns of the critics and parents are to be justified.

Figure 1 shows our research model. A stream generates content, which in turn can include potential law infringements. A platform is the basis to broadcast a stream, in our case it is an SLSS. The investigated SLSSs are Ustream, YouNow, and Periscope. Streams have (in most cases) an audience. In the center of the streaming process we find the streamer, who has a certain age, a gender, and a motivation to stream. A streamer broadcasts from a country, which in our study is Japan, Germany, or the United States of America. The data for the different aspects was collected by observation of live streams in a span of four weeks.

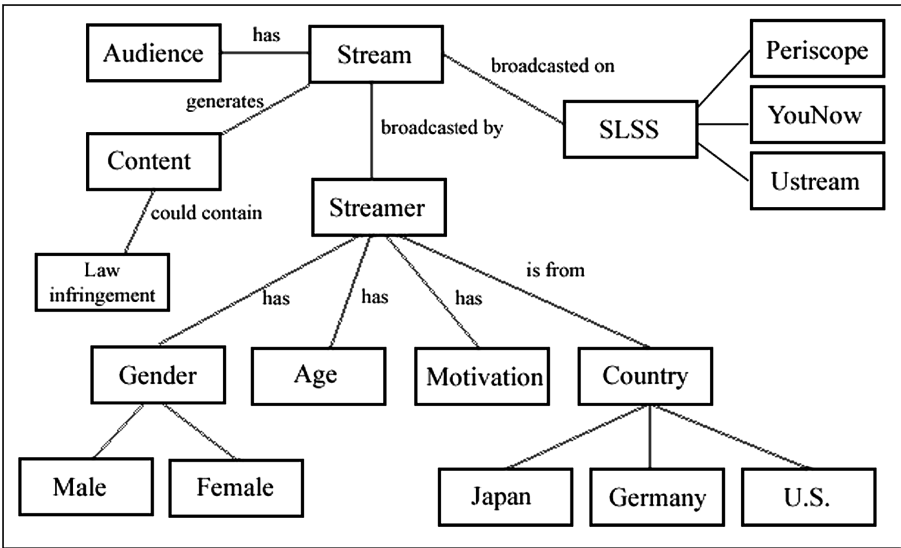


Fig. 1. Research model

A previously conducted study analyzed law infringements on YouNow in Germany and the U.S. [11]. On this basis, our analysis will expand the range of law infringements which will be evaluated and include another country, namely Japan, and two more services, Periscope and Ustream.

Different aspects of the law infringements on SLSSs will be investigated. According to the research model, our research questions (RQs) are:

- RQ1: Are there any law infringements on SLSSs and, if yes, which ones?
- RQ2: At what age do the users commit law infringements more often?
- RQ3: Are groups of people or rather single persons more likely to commit law infringements, and if it is a single person, which gender?
- RQ4: Are there relations between the motivation of a person to use an SLSS and law infringements?
- RQ5: In which content categories are the most law infringements committed?
- RQ6: Are there differences between the countries regarding the law infringements?
- RQ7: Are there differences between the SLSSs regarding the law infringements?

In the following section, the different SLSSs Periscope, Ustream, and YouNow will be introduced.

*Periscope* can be used on a mobile phone and has no website. It was developed by Kayvon Beypour and Joe Bernstein and acquired by Twitter, Inc. in 2015 [4]. Ten million people have an account on Periscope, which Twitter stated on August 2015 [25], 58% of these accounts belong to citizens of the United States. After downloading the Periscope App for iOS or Android, the user can sign up with his Twitter account or mobile phone number. The service is free to use. While being logged in, the user can zoom in on a map of the world and choose an active streamer he wants to watch. Then, the stream along with a little screen window to chat with the streamer appears (Fig. 2).



**Fig. 2.** Live stream on Periscope with its chat panel

After sending a chat message, it disappears in a few seconds. Other users cannot see all the text messages that were sent a few minutes before. By tapping on the phone, hearts will appear on the screen for the streamer, showing him appreciation of his content. The users can be followed by clicking on their profile. One can see the newest streams, the own followers, and the followed people. Especially Periscope was criticized because people use it to live-stream sport events, for which the sports industry tries to keep their distribution monopoly [4]. This even led the service to be banned from several events [25]. However, it is hardly realizable to prosecute the offenders who violated copyright or personality rights [27]. Another aspect of Periscope is its adoption by professional journalists and usage for citizen journalism and civic streaming to live-broadcast breaking news, crisis, riots, or natural disasters [6, 25]. Periscope also has its place in neurosurgery and other science education. For instance, it can be used to live stream operations so that more students follow the procedures done by the neurosurgeon and thus supports the learning process. However, this way it is also possible to share critical protected health care information (PHI) [21]. This can be avoided, if the appropriate administrative, technical, and physical measures are taken to protect this information.

*Ustream* was founded in 2007 by Brad Hunstable, John Ham, and Gyula Feher and was acquired by IBM in 2016 [13]. 80 million viewers per month use it to see live videos or videos on demand [22]. Ustream offers not only its service for the public, but also for the employees of a company who bought Ustream Align, which can be used for internal video communication. Ustream also distinguishes between two kinds of broadcasting. The user can either choose the free “Basic” broadcast, which means the viewer will see ads before the stream starts and only 50 people per country can watch a broadcast, or the fee-based “Pro Broadcasting.” By choosing “Pro Broadcasting” the streamer must pay between 99\$ to 999\$ per month, depending on what features he wants to add to his channel. This could be showing no ads before the stream starts, channel password protection, Facebook and Twitter integration and so on. A third category, “Enterprise,” can also be booked. This includes custom plans which are especially adjusted to each individual business. The live-streams can be watched without being registered to the site, unlike the other two services. When creating a channel, the user gives his channel a title, chooses a category and writes a description or adds tags to make it easier for other people to find the channel. Each broadcast gets a new title. A chat panel is available while the stream is broadcasted; this way the spectators who are logged in are able to communicate with the streamer or other viewers (Fig. 3). Each broadcast shows the spectators that are watching the stream at the moment, total views, followers of the channel, and, whether the broadcast is a live-stream or was recorded a while ago. Since Ustream has a focus on more scientifically oriented content, it has the potential to be used in educational contexts [5].

*YouNow* as a website was founded in 2011 by Adi Sideman and since then an Android and iOS app is available. 100 million user sessions per month are happening on YouNow. The biggest user group, according to Alexa (as of January 2017) originates from the U.S. with 36.6%, followed by Germany with 12.3%, and Turkey with 6.6%. Teenagers and young adults are the most welcomed target group on YouNow [26]. When a user watches a stream, YouNow will grey out the screen after two minutes to make the viewer register to, or log in onto the site. To sign up for YouNow, one needs a Twitter, Facebook, Google+, or Instagram account. YouNow is free to use.

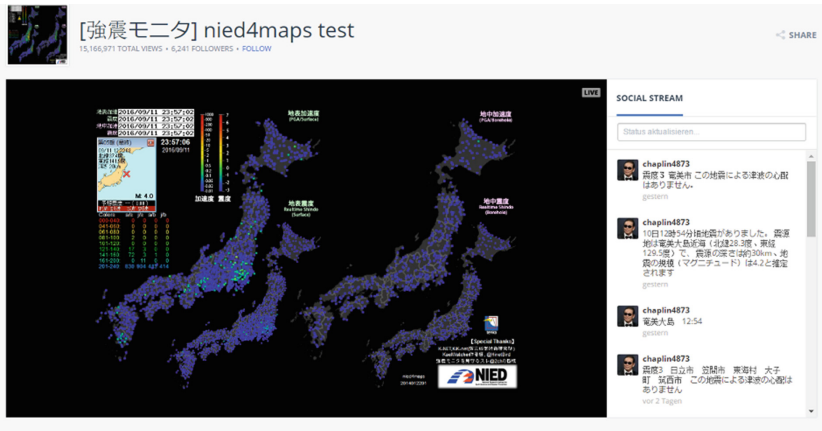


Fig. 3. Live stream on Ustream with its chat panel

When starting a stream, a hashtag needs to be assigned to the channel so other users can find it. On the left side of the website popular hashtags are displayed. Each broadcast shows the number of likes the streamer received for all his broadcasts combined, how often the current stream was shared, how many screenshots were taken, how long the stream is broadcasting and how many spectators are currently watching (Fig. 4). The user also has a level assigned to his or her profile, which is shown beside the user name. The level rises with activities on YouNow. This includes receiving gifts, likes, chatting, and getting new fans. Beside the broadcast panel a chat panel is available for logged in users, where the spectators and guests are shown, as well as the “#1 Fan” and “#2 Fan.” After the stream ends, the streamer and other people who visit the streamers profile can

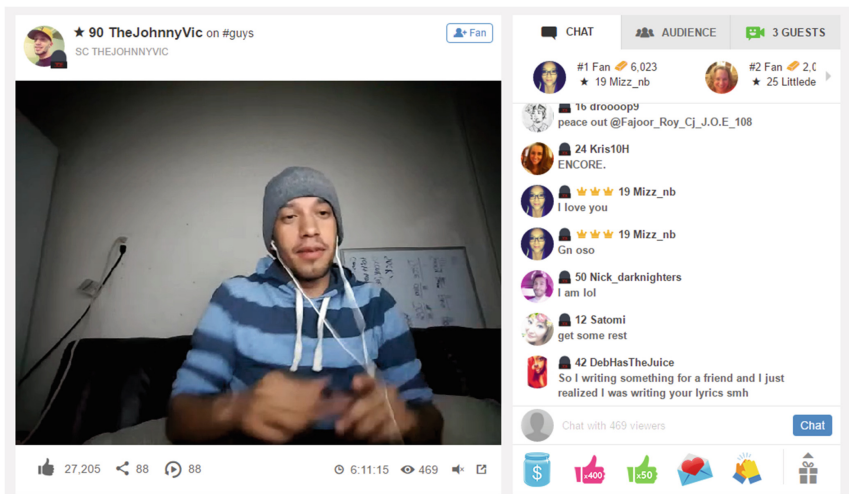


Fig. 4. Live stream on YouNow with its chat panel

see for each stream how many spectators were watching, how many messages, likes and gifts it received and how often it was shared. The user also sees which people were the biggest fans in the last 30 days, meaning, which fans gave the streamer the most Bars. Bars can only be bought with real money and can also be used to buy premium gifts. Coins are another form of currency on YouNow. Those can be obtained with broadcasting, watching, voting, and chatting, logging in or sharing YouNow on other social network sites like Facebook or Twitter. The profile also shows the best “Moments” of the streamer, some old streams, a discussion panel, fans and who they are, and of whom the streamer is a fan. Furthermore, the streamer can link all his social media accounts to his profile like Instagram, Facebook, or Twitter. A streamer can receive an “Editor’s choice” mark on his profile to push his site into prominence.

Overall, YouNow puts a big emphasis on building a brand for a streamer. YouNow offers its “YouNow Partner Program,” which means the streamer gets paid depending on how many viewers, audience interaction and gifts he gets. Qualified are users who garner an average of 500+ viewers per stream and conform to the Terms of Service and to the Digital Millennium Copyright Act Notification Guidelines. It is also possible to apply to the program with a YouTube, Vine, Twitter or Instagram account if one has 75,000+ Subscribers or Followers and 25,000+ average views per video on there. Some formal analyses of YouNow were conducted [28], in which it was stated that 93% of streaming sessions last less than 100 min. Furthermore, there are very few streams with a lot of spectators, 80% of the viewer traffic is garnered by 10% of the streamer. There are many streams that have very few spectators, 5% even have no viewers at all. Boredom, community acceptance, and the need to represent oneself are the main motivations to use YouNow [26].

Two other SLSSs were considered for this research but were disregarded because of different reasons. *Meerkat* was the competitor of Periscope but could not stand against it and has since then abandoned its live streaming service [32]. *Nico Nico Douga* is a popular streaming service in Japan, but due to the possibility that not enough streams could be investigated for Germany and the U.S., this service was also excluded from the study.

## 2 Law Infringements

In this section, the possible law infringements and how they could take place on SLSSs will be discussed. For the investigation, the German law was applied, because it is the strictest one of the three countries. An exception was made for the Copyrights regarding music. Here, the aspect of ‘fair use’ from the U.S. law was incorporated.

The German Act on *Copyright* and Related Rights (Copyright Act) states that only the author has the right to determine, if and how his work should be published. Furthermore, the author has the exclusive right of reproduction, the right of distribution and the right of exhibition of his work, even in non-material form, which includes broadcasting (Copyright Act § 15(II), § 20). Therefore, the live streamer needs the explicit permission to use the copyrighted content in a stream. An exception marks the case of reporting on current events, the reproduction and public distribution of those news (Copyright Act § 50). It is also permitted to quote other authors intellectual

property as stated in § 51 of the German Copyright Act. For this study music in the background was handled as incidental work (Copyright Act §57). In the U.S., it is permitted to use copyrighted material in case of news reporting or commenting because it falls under the doctrine of “fair use” (§107 U.S. Copyright). It was only marked as a copyright violation if the music was clearly the content of the stream, meaning it was played without someone talking over it. Violation of copyright is a big problem on the internet and on SLSSs in particular [25]. It could be argued that violating the copyright act has, of course, legal consequences, but economically, it could potentially help to make a product more popular and even raise the number of sales [19].

The *Personality Rights* are established by Art 1 and Art 2 of the German Basic Law, which state that the human dignity shall be indefeasible. The personality rights are protected according to § 823 (I) of the German Civil Code (BGB). This also means that a person has the right to not be filmed or streamed to the public, even if they are only standing in the background. If this scenario was observed, it was marked as a potential personality rights violation. Also, further individual cases of personality rights violations were investigated. Those are data protection, and insults. According to § 1 of the Federal *Data Protection Act*, every person has the right to be protected against violations of their privacy resulting from mishandling of their personal data. This could include giving away information about the home address of a person, their phone number or reading private messages from someone without his or her consent. Streamers chat about varying kinds of topics so it is likely that this law may be violated. *Insults* will be punished with imprisonment up to one year or a fine, according to § 185 of the German Criminal Code. Insults happen in everybody’s life and the internet is no exception. This potential law violation needs to be assessed in context of the respective stream, because an insult is not necessarily linked to a specific insulting word, but rather situation-dependent. For example, potentially insulting words can be used in a jokingly manner between friends and not be perceived as an insult.

Regarding *Road Traffic Act*, it is not permitted to hold or pick up a mobile phone or a car phone while operating a vehicle. Only exclusions are if the vehicle is standing with the motor turned off (§ 23 of the German Road Traffic Act). Since Periscope, YouNow and Ustream can be used on a mobile phone, it is possible that road traffic violations are committed.

Law does not regulate the *broadcasting of sport events*, but there are still rules and related laws that apply. But for all those laws, counter arguments could be exercised, which will not be listed here [24]. For this study, sports’ broadcasting was marked as a potential law infringement if the stream was either broadcasted from a stadium via a mobile phone or streamed off a TV, with the following reasoning. For instance, if a person attends a Bundesliga soccer match of Borussia Mönchengladbach, he would be able to stream the match via his mobile phone. Now, following laws could potentially be applicable. Per §4 of the German law against unfair competition (UWG), someone is acting unfair, if he imitates the services of others and uses them for his own gain or impairs the gain of the services’ owner. The organizer of the event could be unfairly impaired because he is not able to use it for his commercial gain in the same scope as he would be without someone else broadcasting the event (§ 3 UWG). Furthermore, every host can use his domestic authority to prohibit streaming of the event (German Civil Law Code § 823 Abs.1, § 1004, § 862), which also applies to the organizer of

professional sport events. This grants them the security to receive the commercialization income. If the person streams a broadcast of the match off his TV, the act becomes a potential Copyright Violation (§ 87 UrhG), because the person streams material the TV station has paid for. The same rules do not apply to most amateur sports, though (German Federal Supreme Court, D. f. 10.28.2010 – I ZR 60/09). Edelmann [4] states that the sports industry could suffer losses because of live streaming. But on the other hand, this kind of behavior could also help to raise attention for an event.

The *Health Insurance Portability and Accountability Act* (HIPAA) regulates the use of information about the health status of a person in the U.S. That kind of information is protected under the Federal Data Protection Act in Germany, but we decided to observe violations of the data concerning health information separately since Periscope and maybe other SLSSs are used to live stream surgical operations.

The *age limit* is regulated by each service and their terms and conditions. YouNow sets its minimum age at 13, Ustream at 18. Periscope does not state a minimum age. The age limit was also marked if a minor was seen in the stream, even if the person was not the streamer.

### 3 Method

This section will describe how the empirical data was collected. A team of researchers assessed, evaluated and compared SLSSs' users' streaming behavior as well as the content of a stream and motives of a streamer to produce a live stream.

The empirical procedure of the content analysis was implemented as follows. A codebook [16] was developed, which was based on already existing literature regarding the usage of social media in order to create standardized data sets. Two different approaches were applied to ensure a qualitative content analysis with a high reliability. The directed approach was implemented with assorted literature to get guidance for the research categories. Additionally, the conventional approach via observation was used to get a general idea of what people stream about [12].

Several steps are necessary to guarantee a good outcome while analyzing the content. According to McMillan [23], the steps are: first, a draft of the research questions or hypotheses needs to be done. This is followed by selecting a sample. Step three is to define categories which include a period; in this case it was a time span of four weeks. Content units need to be identified as well as facets that are necessary for the research question. A spread sheet with four different categories was generated from this. The categories are:

*Content.* For the content of the stream, a tally chart was made. The different kinds of streaming content were: to chat; make music; share information; news; fitness; sport event; gaming; animals; entertainment media; spirituality; draw/paint a picture; 24/7; science, technology, and medicine (STM); comedy; advertisement; nothing; slice of life; politics; nature; food; business information.

*Potential Law Infringements and Violations of Terms and Conditions.* Norm entries were used for the possible law infringements and violations of the terms and

conditions. Those were: copyright violations regarding music, video, and picture (Pic.); violation of personality rights (Pe.Ri.) with an additional focus on data protection (D.P.), and insults; committed road traffic acts (R.T.A.); the violation of the sports broadcasting rights (S.B.R.); Health Insurance Portability and Accountability Act (HIPAA) violations. For the violation of terms and conditions the contempt of the age limit (Age Li.) was investigated.

*Motivation.* A tally chart was used for the motives of the streamer [15, 18, 20], which were: boredom [26]; self-expression [33]; to reach a specific group [3, 10]; to make money; need to belong; to become a star [2, 9]; socializing [1]; relationship management [30]; need to communicate [3, 14]; loneliness [2]; hobby; sense of mission [9]; fun; exchange of view; self-improvement; troll; no comment. “No comment” was marked if the streamer did not state a motivation or no person could be reached via chat, for example if an animal was shown or a 24/7 stream (e.g. from a webcam) was broadcasted.

*Formalities.* Norm entries were used for the formalities. Those were: gender (male, female, group, other); age of the streamer.

The data about the streams was collected from three different countries, namely Germany, Japan, and the United States of America, to see if there were differences in distant cultural areas. 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 data collectors had the required language skills for those countries.

The fourth step is to train the coders to ensure the reliability of their coding skills. Twelve research teams consisting of two persons per team were formed. The teams were evenly distributed between the three countries. The last step is the analysis and interpretation of the data [23]. Every coder received a spread sheet and coded the data in it when any of the investigated aspects was applicable to the stream.

For collecting the data, the ‘four eyes principle’ was applied. 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, which sometimes resulted in discussions, but a consensus was always reached. Usually the streams were observed in two phases. First, the stream was watched and the data collected. In phase two, if some aspects were not clear, for example the motivation of the streamer, the streamer was asked via the chat system of the service.

The streams were not recorded, since this would require an agreement with the streamer, which would not be always possible, as not every streamer communicates with the viewer. Recording without streamer’s consent would result in personal right violations. Some streamers even denied the permission to record them.

In the end, a data set of a total of 7,621 streams in a time span of four weeks, from April 26 to May 24, 2016, was collected. The results of those streams were statistically analyzed and compared following the questions of our research model.

## 4 Results: Law Infringements on SLSSs

### 4.1 Law Infringements (RQ1)

In the following section the general results (RQ1) and the findings on law infringements regarding different generations (RQ2), genders (RQ3), motivations (RQ4), content categories (RQ5), countries (RQ6), and services (RQ7) will be examined. Total 1,364 out of 7,621 streams were identified with potential law infringements and breaches of terms and conditions. This means that 17.9% of all streams are concerned. The most potentially violated law is the Copyright Act, especially regarding music (53.5%) and videos (25.4%), followed by personality rights violations (9.2%) (Table 1), which was observed in another study as well [11]. Since music was only treated as incidental work, the total number of potential infringements as well as the number of music copyright violations measured on the German Copyright Act is potentially even higher, because it was observed that nearly every streamer had music playing in the background while broadcasting.

**Table 1.** Distribution of law infringements on SLSSs (all streams: N = 7,621; streams infringing law: N = 1,364)

Infringement	Amount	Relative Frequency
N	1,364	100.0%
Copyright – Music	730	53.5%
Copyright – Video	347	25.4%
Personality Rights	125	9.2%
Sports Broadcasting Rights	50	3.7%
Road Traffic Act	31	2.3%
Insult	27	2.0%
Data Protection	23	1.7%
Age Limit	19	1.4%
Copyright – Picture	12	0.9%
HIPAA	-	-

### 4.2 Law Infringements by Generations (RQ2)

The comparison of different generations regarding the potential law infringements first requires to define the concerned age groups. Generation Z (Gen. Z) defines the youngest users born after 1996. Generation Y (Gen Y.) was born between 1980 and 1996, Generation X (Gen. X) includes people born between 1960 and 1980. Baby Boomers (Baby B.) were born between 1946 and 1960 [7].

When looking at the distribution of the potential law infringements and breaches of the terms and conditions, the percentage of those infringements relative to the number of streams per generation, rises from Gen. Z (15.7%) to Gen. Y (16.3%), but then declines and reaches the lowest percentage with the Baby Boomers (12.1%).

**Table 2.** Distribution of law infringements by generation (N = 7,621)

	Gen. Z	Gen. Y	Gen. X	Baby B.
N	1,821	2,553	493	33
Infringement amount per generation	285	415	70	4
Relative frequency of infringements per generation	15.7%	16.3%	14.2%	12.1%
Infringement (N = 1,364)				
Copyright – Music	77.2%	77.6%	62.9%	50.0%
Copyright – Video	3.9%	4.3%	4.3%	25.0%
Personality Rights	5.3%	7.5%	10.0%	25.0%
Sports Broadcasting Rights	0.4%	2.9%	2.9%	-
Road Traffic Act	0.7%	2.9%	12.9%	-
Insult	3.9%	3.1%	4.3%	-
Data Protection	3.9%	0.7%	1.4%	-
Age Limit	4.9%	0.5%	-	-
Copyright – Picture	-	0.5%	1.4%	-
HIPAA	-	-	-	-

Even though older generations are usually less tech-savvy than younger ones, they appear to be more cautious when it comes to law infringements (Table 2). Younger people growing up with the internet perceive it as having no limitations or regulations, so they may be more prone to ignore the legal restrictions. The most potentially violated law for all generations is the copyright regarding music. Furthermore, all generations were responsible for personality rights violations. This shows that sensibility for this matter does not increase with age. Especially for Gen. Z (5.3%) and Gen. Y (7.5%) personality right is the second most violated law. Generation Z as compared to other generations, exhibits a high number of data protection violations (3.9%), which demonstrates that some teenagers act more careless than the other generations when it comes to the personal data of other people. A remarkable result is the relative frequency of violations of the road traffic act of Gen. X (12.9%), which is much higher than the values for all other generations.

### 4.3 Law Infringements by Groups and Gender (RQ3)

The frequency of the law infringements per groups and gender were split in different categories. First, a distinction was made between streams in which people streamed themselves (People), and streams without a streamer (No Person). For example, if an animal or a TV show was broadcasted. The category “People” was further split into groups, single male, and single female streamers.

The overall percentage of the potential violations does not differ by more than 2% between the genders and groups (Table 3). Nonetheless, groups were more often responsible for potential violations than single male and female streamers. The streams in which no person could be seen had the highest share of potential law infringements.

**Table 3.** Distribution of law infringements among people (group, single male, single female) and streams without people (N = 7,621)

	No Person	People	Group	Male	Female
N	2,036	5,585	1,072	2,759	1,754
Infringement amount per group/gender	458	906	186	450	270
Relative frequency of infringements per group/ gender	22.5%	16.2%	17.4%	16.3%	15.4%
Infringement (N = 1,364)					
Copyright – Music	18.1%	71.4%	58.1%	71.6%	80.4%
Copyright – Video	63.5%	6.2%	11.3%	5.8%	3.3%
Personality Rights	9.6%	8.9%	16.1%	8.0%	5.6%
Sports Broadcasting Rights	5.9%	2.5%	1.6%	4.0%	0.7%
Road Traffic Act	-	3.4%	0.5%	5.6%	1.9%
Insult	-	3.0%	4.8%	2.7%	2.2%
Data Protection	0.9%	2.1%	4.8%	0.9%	2.2%
Age Limit	-	2.1%	2.7%	1.1%	3.3%
Copyright – Picture	2.0%	0.3%	-	0.4%	0.4%
HIPAA	-	-	-	-	-

First, the streams for which a gender (including groups) and for which no gender could be determined will be compared. Obviously, all age limit violations, road traffic acts and insults can only happen when groups, men or women were seen. When it comes to potential copyright infringements, music was more often played when people were streaming (71.4%) and videos when no streaming person could be determined (63.5%), which could be explained with the rather socially motivated reasons for people to listen to music rather than streaming videos while they are broadcasting themselves. Potential data protection violations happened more often when people were streaming (2.1%) than when no gender could be determined (0.9%).

Now, the streams for which a gender or a group could be determined will be compared. Overall, groups have the highest percentage of violations in five categories, namely the age limit, copyright regarding videos, data protection, insults, and personality rights. Groups may be more careless than a single streamer when it comes to regulations on the internet, because people often feel more protected in a group. Another explanation could be peer-pressure, making children feel the need to ignore the age limit and sign up, for example, on YouNow. It was observed that groups were more often outside than single persons, which could explain the high percentage of personality rights violations in contrast to single men and single women streaming more from inside. Men potentially commit more road traffic acts and violate sports broadcasting rights more often than women and groups. Women have the highest percentage of potential violations in the music copyright category. Lin and Lu [18] observed that women care about the opinion of the members using the SNSs whereas men do not. This could be one of the reasons why women commit the least law infringements.

#### 4.4 Law Infringements by Streamers' Motivations to Stream (RQ4)

In the following, the law infringements and the streamer's motive will be further analyzed. Since one streamer could name more than one motivation to stream, the overall number of infringements will be higher as well. If we were able to correctly identify the streamer's motivation to stream (Table 4), the highest absolute number of law infringements (with 311 cases out of 1,659; 18.7%) was committed while the streamer was bored, which was followed by the streamers need to socialize (221 cases out of 1,245; 17.8%). The highest relative frequency of violations was observed when the motivation of the streamer was to make money (137 cases out of 479; 28.6%), followed by the streamers need to belong with 23.7% or 74 cases out of 312. The third highest percentage of infringements (23.0%, 43 cases out of 187) was observed when the streamer felt lonely.

**Table 4.** Distribution of law infringements by motivations (N = 7,621); Pe.Ri = Personality Rights, S.B.R. = Sports Broadcasting Rights, R.T.A. = Road Traffic Act, D.P. = Data Protection, Age Li. = Age Limit. Pic. = Copyright Picture

Motivation	N	Offenses	Rel. freq.	Law infringement								
				Music	Video	Pe.Ri	S.B.R.	R.T.A.	Insult	D.P.	Age Li.	Pic.
Money	479	137	28.6%	11.0%	73.7%	8.8%	5.1%	-	-	0.7%	0.7%	-
Need to belong	312	74	23.7%	73.0%	5.4%	2.7%	-	4.0%	2.7%	2.7%	9.5%	-
Loneliness	187	43	23.0%	62.8%	2.3%	20.9%	-	7.0%	-	2.3%	4.7%	-
Troll	84	19	22.6%	31.6%	-	10.5%	-	-	36.8%	21.0%	-	-
No Comment	2,245	451	20.1%	35.5%	39.9%	11.1%	7.3%	2.0%	2.0%	1.1%	0.2%	0.9%
Fun	1,022	195	19.1%	76.4%	5.1%	10.3%	-	3.1%	1.0%	1.5%	2.0%	0.5%
Boredom	1,659	311	18.7%	74.9%	4.2%	8.7%	0.3%	2.9%	3.2%	1.3%	3.5%	1.0%
Self-Expression	840	152	18.1%	80.3%	1.3%	8.5%	-	5.9%	2.0%	-	2.0%	-
Socializing	1,245	221	17.8%	72.8%	3.2%	9.1%	-	5.9%	2.7%	1.8%	3.6%	0.9%
Relationship mgmt	270	48	17.8%	75.0%	-	6.2%	-	4.2%	4.2%	4.2%	2.1%	4.2%
Sense of mission	331	52	15.7%	36.5%	32.7%	17.3%	1.9%	3.9%	3.9%	-	3.9%	-
Reach specific group	1,163	175	15.0%	55.4%	18.3%	12.0%	3.4%	1.7%	0.6%	2.9%	0.5%	5.1%
Need to communicate	1,112	166	14.9%	62.7%	5.4%	12.6%	4.8%	3.0%	3.0%	5.4%	1.8%	1.2%
Hobby	676	100	14.8%	69.0%	9.0%	9.0%	1.0%	3.0%	-	-	1.0%	8.0%
Become a star	301	42	13.9%	76.2%	2.4%	11.9%	-	-	4.8%	2.4%	2.4%	-
Exchange of view	495	68	13.7%	55.9%	-	26.5%	1.5%	4.4%	7.3%	2.9%	1.5%	-
Self-Improvement	245	31	12.6%	87.1%	-	9.7%	-	3.2%	-	-	-	-

For music copyright infringements, the motivations with high percentages seem to be socially motivated (boredom, socializing, fun, need to belong), whereas videos seem to be broadcasted because of the desire to make money or because the streamer has a sense of mission. Especially exchanges of view provoke infringements of personality rights (26.5%). Some children seem to ignore the age limit (9.5%) because they have a need to belong. The highest relative frequencies for music copyright infringements are self-improvement (87.1%), self-expression (80.3%), and the desire to become a star (76.2%). Data protection violation has the highest percentage if the streamer was a troll (21.0%), which makes it potentially dangerous since trolls usually want to harm others.

### 4.5 Law Infringements by Content Categories (RQ5)

In the following, the law infringements and the stream content categories will be further analyzed. Since one stream can produce more than one content category, the overall number of infringements will be higher. Since chatting was the most produced content overall (3,349 streams), the number of infringements will be high as well (556 streams; 16.6%) (Table 5). But the highest relative frequency happened in the entertainment media category with 51.2%, which also had the second highest number of infringements overall (458 cases). Remarkable is the fact that even though there were four times as many streams in the “to chat” than in the “entertainment media” category, the number of infringements is just about 20% higher. The second highest percentage of violations (27.9%) happened in the category drawing, with 17 cases out of 61. The category sport event had the third highest relative frequency (25.6%) with 77 cases out of 301.

**Table 5.** Distribution of law infringements by content categories (N = 7,621); Pe.Ri = Personality Rights, S.B.R. = Sports Broadcasting Rights, R.T.A. = Road Traffic Act, D.P. = Data Protection, Age Li. = Age Limit. Pic. = Copyright Picture

Content	N	Offenses	Rel. freq.	Law infringement								
				Music	Video	Pe.Ri.	S.B.R.	R.T.A.	Insult	D.P.	Age Li.	Pic.
Entertainment media	894	458	51.2%	40.8%	56.1%	0.7%	0.4%	-	0.4%	0.7%	0.4%	0.4%
Drawing	61	17	27.9%	88.2%	-	-	-	-	-	-	-	11.8%
Sport event	301	77	25.6%	23.4%	13.0%	3.9%	58.4%	-	1.3%	-	-	-
24 / 7	1,151	279	24.2%	28.3%	54.1%	12.6%	1.1%	-	2.1%	1.8%	-	-
Gaming	415	98	23.6%	30.6%	56.1%	2.0%	-	-	3.1%	-	2.0%	6.1%
Slice of life	1,084	227	20.9%	58.6%	2.6%	23.8%	0.9%	6.2%	2.2%	4.0%	1.3%	0.4%
Make music	734	141	19.2%	87.9%	2.8%	2.8%	-	3.6%	0.7%	0.7%	1.4%	-
To chat	3,349	556	16.6%	77.0%	2.7%	7.7%	0.2%	4.7%	3.2%	1.3%	2.7%	0.5%
Advertisement	222	34	15.3%	82.3%	2.9%	-	5.9%	-	2.9%	2.9%	-	2.9%
Share information	1,299	195	15.0%	69.7%	2.6%	12.8%	0.5%	2.6%	1.5%	8.2%	1.5%	0.5%
Fitness	110	16	14.5%	50.0%	6.2%	31.2%	-	6.2%	-	-	6.2%	-
Comedy	116	15	12.9%	40.0%	46.7%	6.7%	-	-	-	6.7%	-	-
Food	176	22	12.5%	77.2%	4.6%	13.6%	-	-	4.6%	-	-	-
Nature	421	43	10.2%	20.9%	2.3%	67.4%	-	4.7%	2.3%	2.3%	-	-
STM	72	7	9.7%	42.9%	57.1%	-	-	-	-	-	-	-
Business information	105	10	9.5%	60.0%	10.0%	10.0%	-	-	-	20.0%	-	-
Politics	105	8	7.6%	50.0%	25.0%	12.5%	-	-	-	12.5%	-	-
Spirituality	239	16	6.7%	68.7%	-	18.7%	-	6.3%	6.3%	-	-	-
News	261	17	6.5%	58.8%	11.8%	23.5%	5.9%	-	-	-	-	-
Animals	516	20	3.9%	65.0%	15.0%	20.0%	-	-	-	-	-	-

When entertainment media is broadcasted, one can expect copyright violations in both, music (40.8%) as well as videos (56.1%). In the sport event category, every second streamer (58.4%) ignored broadcasting rights. Potential personality rights violations were observed when the streamer was outside (nature, slice of life, animals, and fitness), for example, when he or she accidentally streamed other people being in the background.

#### 4.6 Law Infringements by the Streamer's Country (RQ6)

Germany had the highest absolute as well as relative numbers of potential law violations with overall 614 out of 2,586 streams. This means that 23.7% of all streams in Germany were concerned. Japan has the second most potential violations with 390 streams out of 1,919 (20.3%), and the U.S. the least with only 360 out of 3,116 streams (11.6%).

There are recognizable differences between the three countries (Table 6). Concerning relative frequencies of law infringements, music copyright, age limit and data protection was violated more often in the U.S. compared to the other two countries. In Germany, video copyright violations have an over twice as large relative frequency as Japan and the U.S. Sports broadcasting rights were more often potentially violated in Germany as well. In Japan, no one was insulted, the age limit was not ignored, and the data protection act was never violated. However, they committed a comparably high percentage of potential personality rights violations, committed the most road traffic acts and showed the highest number of copyrighted pictures.

**Table 6.** Distribution of law infringements by countries (N = 7,621)

	Germany	Japan	U.S.
N	2,586	1,919	3,116
Infringement amount per country	614	390	360
Relative frequency of infringements per country	23.7%	20.3%	11.6%
Infringement (N = 1,364)			
Copyright – Music	44.0%	54.4%	68.9%
Copyright – Video	43.0%	12.8%	9.2%
Personality Rights	2.0%	23.6%	5.8%
Sports Broadcasting Rights	5.5%	2.8%	1.4%
Road Traffic Act	1.1%	3.6%	2.8%
Insult	2.4%	-	3.3%
Data Protection	0.8%	-	5.0%
Age Limit	1.1%	-	3.3%
Copyright – Picture	-	2.9%	0.3%
HIPAA	-	-	-

#### 4.7 Law Infringements by SLSSs (RQ7)

Ustream had the highest relative frequency of observed law violations with 20.6% (553 out of 2,681 streams), followed by Periscope with 18.7% (546 out of 2,927 streams), and YouNow with 13.2% (265 out of 2,013 streams). We were able to identify differences among the platforms in relation to the potential law infringements (Table 7).

Concerning music copyright violations, there is a clear ranking: on YouNow, you find the highest number of relative frequency (81.5%), followed by Periscope (69.7%), and Ustream (only 24.8%). The ranking of SLSSs by video copyright infringements is

**Table 7.** Distribution of law infringements by SLSSs (N = 7,621)

	Ustream	Periscope	YouNow
N	2,681	2,927	2,013
Infringement amount per SLSS	553	546	265
Relative frequency of infringements per SLSS	20.6%	18.7%	13.2%
Infringement (N = 1,364)			
Copyright – Music	24.8%	69.1%	81.5%
Copyright – Video	57.0%	4.6%	2.6%
Personality Rights	9.9%	11.7%	2.3%
Sports Broadcasting Rights	4.9%	3.8%	0.8%
Road Traffic Act	-	4.9%	1.5%
Insult	0.2%	3.1%	3.4%
Data Protection	1.6%	2.0%	1.1%
Age Limit	0.2%	-	6.8%
Copyright – Picture	1.5%	0.7%	-
HIPAA	-	-	-

reverse: Ustream (57.0%) followed by Periscope (4.6%), and YouNow (2.6%). We could observe personality rights violations primarily on Periscope and Ustream, but seldom on YouNow. Problems with sports broadcasting rights occur mainly on Periscope and Ustream as well, while on YouNow there are more insults and age limit violations. The last fact is not surprising since many very young streamers use YouNow [26]. Since Periscope was used outside more often than the other two services, the most potential infringements of road traffic acts happened on this platform.

**5 Discussion**

The study showed that there are indeed many potential law infringements happening on SLSSs. Furthermore, the number of those infringements could possibly be even higher since music was handled as incidental work and many streams were observed in which music was playing in the background.

The question arises, should parents and critics be concerned? Yes and no. It depends on where they look at and what they are worried about. First, Generation Z had the second highest percentage of potential law infringements in contrast to the other generations. If parents are concerned about their children committing copyright act violations, then they are right, since 77% of all potential infringements committed by Generation Z were related to it. But there is another, more concerning aspect about the law infringements committed by Generation Z. They committed 4% of data protection violations, which was three times higher than for the other generations. This clearly shows that the younger streamers do not act sensible when the data of other people is concerned and which, potentially, can be very harmful. Furthermore, 4% of all potential violations of Generation Z were related to insults, which is the highest

percentage in contrast to the other generations as well. Those insults could potentially be linked to serious bullying and have traumatic consequences for the victim. Should parents have a special focus on a specific platform or even country? Interestingly, yes. In Japan, not one instance of data protection violation or insult happened, regardless of generation, so the parents do not need to worry about those potential infringements there. Unfortunately, potential data protection violations happened on all three platforms. It is advisable to help children understand that they need to act more careful with the personal data of other people.

Other general observations can be made about the video copyright and sports broadcasting rights. Those potential violations usually happened when no age or gender of the streamer could be determined, meaning, anonymous people committed them. If a person could be contacted, they usually stated that the motivation to broadcast entertainment media or sport events was to make money. Especially on Ustream and in Germany a high amount of video copyright violations was observed. Even though Periscope was criticized for live streaming sport events, Ustream has a higher percentage of streamers doing so than Periscope.

When the personality rights are concerned, which is another problematic factor on SLSSs, as this was observed by another study [11] and witnessed in this research as well, every generation and gender or group was responsible for this kind of potential violation. On Periscope, 12% of all violations and 10% on Ustream were related to personality rights. But the execution and how they happened was different on the platforms. On Periscope, the violations were committed when the streamer (or group) just wanted to chat because he was bored and streamed while he was outside with people in the background. This kind of streaming was especially popular in Japan, where the streamer broadcasted himself being in nature or when he was out with friends. On Ustream it was not a person, but a fixed camera which broadcasted a city or nature 24/7. Therefore, the potential violations on Periscope happened because of social reasons. On Ustream there is presumably no person having an eye on the stream all the time. Periscope is especially designed for mobile phones so it is not surprising that the highest percentage of this violation happened on there.

This study's approach is a quantitative one. In further research, it should be completed by qualitative interviews with streamers on their awareness of law infringements while streaming. Only users on YouNow, Periscope and Ustream were studied; other general SLSSs as Nico Nico Douga, YouTube Live or Facebook Live have to be investigated in the future as well.

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