Unsafe Interactions in Dating Apps

Abstract

Online dating is a way for people to meet and connect with potential romantic partners over the internet. It is usually done through a dating website or a dating app, which allows users to create a profile, browse and view other users' profiles, and communicate with potential matches. Online dating can be a convenient and effective way to find a partner, especially for people who are busy or have difficulty meeting potential partners through traditional means. However, as every technology comes with its pros and cons, the same is with online dating. Risks associated with online dating include, for example, scamming, catfishing, and other forms of online fraud.

The thesis focuses on exploring unsafe interactions among dating app users. The research questions considered for this thesis are: 1) What kind of unsafe interactions users report facing in dating apps? 2) How have the reported unsafe interactions been solved? To see what kind of unsafe interactions users have had through dating apps, the data has been collected through a discourses survey. The study employs "Discourses survey" strategy to analyze complex social actions, which identifies public discourse on a specific subject without researcher bias. The data was collected using predefined keywords related to unsafe interactions in dating apps in the following news databases: CNN, BBC, CNBC, DailyMail, FoxNews, and TheGuardian. The searches in the above databases resulted in 391 relevant research articles. The articles were coded into the following categories of unsafe online interactions using a predefined codebook: Information Breaches, Online harassment, Sexual solicitations, Exposure to explicit content, and different Crimes. Each category further included several subcodes.

Most of the unsafe interactions reported in the news databases and included in the dataset were related to different crimes (81%), such as different scams, sexual assaults, murder, or fraud. The least were related to exposure to explicit material (0%). Overall, 58% of the incidents in the dataset were resolved most often by the law enforcement agencies such as courts and police, while 42% remained unresolved. For crimes, the resolved rate was slightly higher than the average at 61%, while 39% remained unresolved. Although dating apps offer safety features and detailed guidelines to ensure users' safety, from the data, it is clear dating apps could take more steps to eradicate unsafe user interactions and help support users in case such interactions happen. Regarding this, I offer some recommendations concerning how to promote a safe environment for online dating.

Thus, the main contribution of my thesis is to identify what kind of unsafe interactions are reported on the English-speaking open internet concerning dating apps and identify if these interactions usually get solved. I will also offer a discussion on whether the currently implemented safety features answer these concerns.

Keywords

Online safety, risk, unsafe interactions, dating apps

Supervisor

PhD, Postdoctoral researcher Heidi Hartikainen

Foreword

I would like to thank my family, who supported me throughout my Master's journey.

I am grateful to my supervisor Heidi Hartikainen who guided me in every single step of my Master's thesis. From collecting and analyzing data till the last citation, her valuable feedback provided me an extra push to conquer my thesis.

Muhammad Nabeel Ali

Contents

1.   Introduction and research questions

It is human nature to socialize and build meaningful connections. Getting into a relationship and moving on toward commitment is an important part of life for many (Shulman & Connolly, 2013). Today people's lives are influenced by technology and social media platforms (de Lenne et al., 2018). They use social media or dating applications to make new connections, which also reflects the way people meet and communicate (Anderon & Jiang, 2018). Nowadays, there are a lot of dating applications users can download to interact with each other. The popularity of dating apps in the last decade has boosted new ways to meet and socialize (Anzani et al., 2018). People use dating apps, e.g., due to the centrality of sexual relationships (Claxton & Van Dulmen, 2013). They might also use dating apps, for example, to recover from past relationships or recent breakups (Timmermans & De Caluwé, 2017). The boost in the use of dating apps is also a result of the abundance of usage of smartphones that assisted real-time location-based dating apps in transforming digital life (Strugo & Muise, 2019). However, the literature existing on dating apps suggests different reasons for using dating apps for men and women (Anzani et al., 2018). Men use dating apps to find relationships and have sex, while women use dating apps for self-validation and making casual friendships (Ranzini & Lut, 2016). Men also have high expectations of sex when meeting a new person on dating apps than women (Sumter et al., 2017). According to Statista (2021), Tinder is the most downloaded dating app in the world, with over 6.5 million downloads as of May 2021. Following the success of the dating apps such as Tinder and Grindr, other dating apps such as Happn and Bumble appeared (Iqbal, 2022). In the dating apps such as Tinder, registered users can post images of themselves to attract other users (Cambre & David, 2016). With the choice of filters, such as restricting the age and choosing the distance range, users can also customize what kind of profiles they see in the apps (Nair & K., 2020). Most dating apps work on the swiping feature in which swiping right indicates a user likes the profile while swiping left shows users' dislikes of a profile (LeFebvre, 2017). If both users have swiped right, there is a match, and either user can initiate a chat with the other. Bumble and Hinge differ from other dating apps as the authority to start a conversation even after a match is reserved for women only (Johnson, 2021).

Online dating is by no means something new. The internet dating concept was first officially introduced to the world in the mid-nineties (Brooks, 2011). Dating websites such as OkCupid still play their role in connecting people with the same interests (Smith, 2016). However, during the COVID-19 pandemic, daily conversations on dating apps have increased by 20 to 30% (Fastcompany). Considering the potential impact of dating apps on our lives, the research community has shown interest in researching them from multiple perspectives, such as users' safety and risks related to personal information (Eskridge et al., 2019).

Using dating apps to match with and potentially meet with complete strangers does not come without risks. The present potential risks go beyond cyber risks, such as stalking or identity theft (Lauckner et al., 2019). Sexual harassment and fraud are some of the risks that can be found on dating apps (Castro & Barrada, 2020). Due to a lack of checks and balances on dating profiles, users may fall prey to scams and promises such as sending money or personal information (Al-Rousan et al., 2020). Other concerns about dating apps are sexual violence and abuse, which are increasing day by day (Filice et al. (2022). According to a recent survey study, 35% of dating app users receive sexually explicit

messages, while more than 9% of them receive physical abuse threats (Anderson et al., 2020).

Women on dating apps are more likely to experience negative experiences in their lives that include harassment and exploitation of sexual images (Phan et al., 2021). The authors of the article also mentioned that women on dating apps receive threats twice as often compared to men. Further, in some cases, using dating apps may even lead people to physical violence (Rowse et al., 2020). As an extreme example, Farzan et al. (2019) bring up a case on Tinder that even resulted in the murder of a female user of the app for unknown reasons.

This Master's thesis will investigate different unsafe interactions that happen in dating apps as well as if and how they have been resolved. Following are the research questions:

1. What kind of unsafe interactions users report facing in dating apps?
2. How have the reported unsafe interactions been solved?

I will answer my research questions by carrying out a discourses survey. This will be done by investigating the unsafe interactions reported by users that have been shared by news media using a method called a discourses survey (Luoma et al., 2016). The advantage of using a discourses survey is to observe data that is gathered without any intervention from the researcher, which means the data is recorded without any external bias from the researcher (Hartikainen et al., 2016). Keywords such as Tinder scam*, Tinder risk*, Bumble crime*, and OkCupid threat* will be used to search in digital news databases such as DailyMail, CNN, and BBC. Relevant articles will be coded into Information Breaches, Online harassment, Sexual solicitations, Exposure to explicit content, and different Crimes using a predefined codebook. Each category further includes several subcodes.

I will then discuss my results based on relevant previous literature and offer suggestions on how dating apps can ensure users' safety. Thus, the contribution of my thesis is to identify what kind of unsafe interactions are reported in the English-speaking open internet concerning these dating apps and identify if these interactions usually get solved. I will also offer discussion on whether the currently implemented safety features answer these concerns.

The thesis is structured as follows:

Section 2 will discuss literature related to online dating applications, e.g., concerning unsafe interactions in dating apps as well as safety features of dating apps. In section 3, the research methods related to data collection and analysis will be discussed. Section 4 will present the results of the research, followed by a discussion in section 5 and conclusions in section 6.

2.   Background

In this section, I will present literature related to the background of online dating applications, unsafe interactions in dating apps and safety features of dating apps.

2.1 Different online dating applications

Online dating originated from **Match.com** when it was launched in 1995 (Kauflin, 2015). 10 years after its launch, online dating became one of the top revenue generating industries in paid online content (Matthews, 2018). Where Tinder and other dating apps focus on casual relationships, Match.com offers more sophisticated ways of finding people who are looking for serious relationships (Wong, 2022).

The main functionality of Match.com is to assist individuals in finding romantic relationships. Upon creating a profile, users are required to provide basic information, photos, as well as more in-depth details concerning their occupation, education, and relationship goals (McDermott, 2023). The platform utilizes an algorithm to suggest potential matches based on the user's preferences and profile information, while users can also search for matches utilizing filters such as age range, location, and interests (Hemingway, 2020). To facilitate communication, Match.com offers messaging tools, including email, instant messaging, chat rooms, and MatchPhone, which allows users to speak on the phone with their matches without revealing their phone number (McDermott, 2023). Additional features include coaching services and in-person events that facilitate user engagement with other singles in their area (Hernbroth, 2019).

OkCupid was launched in 2004 and transformed from a simple quiz website to a dating app (Clark, 2022). What makes OkCupid different than other apps is its unique way of allowing users to choose icons to display on their profile (Awa-abuon, 2022). For example, users can choose an icon that shows they support climate change efforts or support the LGBTQ community.

OkCupid is a dating application designed to connect users with potential partners based on their preferences and compatibility. Users create a profile, answer questions to determine compatibility, and search for matches based on various criteria such as location and age (Awa-abuon, 2022). The app also offers features such as "DoubleTake" and "Incognito Mode" and ultimately, the primary objective of OkCupid is to facilitate romantic connections and relationships (OkCupid, 2017).

Grindr, launched in 2009, was the first mobile application that utilized location-based technology to connect users in the LGBTQ+ community (Tulio, 2015). Its unique focus on gay and bisexual men contributed to its rapid popularity and widespread use (Garratt, 2021).

It offers additional features such as chat messaging, photo sharing, and profile customization for dating and social networking within the LGBTQ+ community (Jie, 2020). Grindr also offers my tags feature that allows the users to select their tags and then match with people with the same interest (Lundberg, 2021).

Tinder was launched in 2012, and it is the most successful dating app to date, with more than 1.4 billion users swiping in a day within 196 countries (Clifford, 2017). What makes Tinder unique and popular is its features: including for example a super like, which lets

the users alert the potential match before even the users' swipe (Pugachevsky, 2019). Tinder also has a smart photo algorithm that shuffles the profiles well and only shows those profiles to users with common interests (Chadwick, 2021).

Tinder is a dating app that matches users based on their mutual attraction and facilitates communication through its messaging feature (Sands, 2020). The app's primary function and algorithm is to connect individuals interested in dating or forming romantic relationships based on their preferences and location (Sharabi, 2022).

Hinge was launched in 2012, and its mobile app was released in 2013 (Hinge, 2021). What makes hinge unique and different than other dating platforms is its tagline that says "the only dating app designed to be deleted." - The app targets users who seek lasting relationships rather than casual hookups (Antonelli, 2021).

Hinge is a dating app that uses a "relationship-oriented" approach to match users based on shared interests and values (Aspinall, 2023). Its main functionality is to facilitate meaningful connections and conversations between individuals interested in dating or forming romantic relationships (Antonelli, 2021).

Bumble was launched in 2014 (Hartmans & Williams, 2021). The reason for the popularity of Bumble is it aims to give protection to women against harassment (Lapowsky, 2021). To achieve this Bumble came up with the idea of giving women the opportunity to start conversations first (Johnson, 2021). Bumble also offers features, such as Bumble BFF, that allow users to make platonic relationships, such as making yoga buddies or finding a friend nearby (Alter, 2021).

The main functionality of Bumble is to empower women to take the lead in initiating conversations and forming connections with potential partners (Orchard, 2019). Users create a profile and swipe through potential matches, and if there is a mutual match, only the woman can initiate a conversation within 24 hours, after which the match expires (Johnson, 2021).

Facebook dating was launched in 2018 and what makes it unique is that it is an all-in-one place app (Sharp, 2019). Facebook dating was expected to beat Tinder because of the massive user range they have (*Facebook: Global Daily Active Users 2022*). Users do not have to install a separate dating app to match and chat with people. Instead, they can use and broaden their match ranges with Facebook due to its number of users. However, too many fake profiles and scam messages did not allow Facebook dating to grow (Yasseri, 2022). This is also one of the reasons why people do not trust Facebook dating and rely on apps that are only focused on dating niches (Sattler, 2019).

The main functionality of Facebook Dating is to facilitate connections between individuals who share similar interests, events, or groups on Facebook (Johnson, 2022). Users create a separate dating profile, which is not visible to their Facebook friends and are suggested potential matches based on their preferences and activity on Facebook (Wylde, 2021).

2.2 Unsafe interactions in dating apps

Due to lack of check and balance on users' profiles, unsafe interactions with dating apps have increased in the last few years (ProPublica, 2019). Since dating apps do not run criminal or any kind of background check on users, thereby, anyone with a history of

crimes can register on these dating apps (Holt et al., 2015). Online dating gives those with ill intentions the ease of accessibility to vulnerable victims from a larger pool (Choi et al., 2018). Following are a few unsafe risks in dating apps that can pose a bigger threat to the users.

2.2.1 Information security and privacy risks

Risks to information security and privacy involve interactions where personal information or photos are shared or used online without the users' permission or those shared by the user and later regretted (Wisniewski et al., 2016). The misuse of personal data in online dating apps can lead to, e.g., stalking, nonconsensual pornography, and identity theft. The risk of sharing vulnerable information with each other is high when two people plan to meet with each other via a dating app (Yeao & Fung, 2018).

Stalking. Dating apps use geolocation features that assist people in matching with other people near them. However, this feature also allows stalkers to track down their targets in a convenient way (Veel & Thylstrup, 2018). Stalkers can stalk remotely without the fear of being caught or leaving behind their tracks (Eterovic-Soric et al., 2017). Stalking is a serious issue that can even lead to serious violent crimes, as explained in section 2.2.4 of this thesis.

Non-Consensual pornography. One of the biggest threats to online dating that has been widely discussed in the literature is non-consensual pornography (Kamal & Newman, 2016). Non-consensual pornography involves the distribution of pornographic photos or videos of the users to others without their consent (Wexler, 2018). The motive for non-consensual pornography could be blackmail, revenge from ex-partners, or selling pictures/videos on the dark web (Wexler, 2018; Rigg & Punyanunt, 2020). An incident published in TheGuardian News (PA Media - Guardian News and Media, 2020) described a woman registering as a man on a gay dating app (Grindr). The woman posed as a man to a potential match. However, due to his doubt about her identity, the man ended the relationship with her. This act triggered a revenge, and as a result, she leaked his intimate photos to his family.

Ex-partners sometimes also post personal information such as work address, home address, or personal phone number on the internet (known as Doxing) (Freed et al., 2018), which can further lead to cyber harassment and identity theft (Blanch & Hsu, 2016).

Identity theft. Users usually give access to Tinder or other dating platforms to use their Facebook or Instagram posts. This allows dating platforms to keep an eye on users' data or even to record users' activities across social media platforms (Tinder, Privacy policy 2022). Since dating profiles are public, users do not know who can see their profiles. Thereby, anyone can take screenshots of the user's photos which may lead to identity theft (Lutz & Ranzini, 2017). In an example attempt for cross-platform identity theft, a US army veteran claimed that someone on the internet stole his pictures from Facebook and uploaded it to dating sites and social media. The person who stole the photos scammed at least thirty women from different countries in the soldier's name (Das, 2018). This form of identity theft by using another person's photos is also known as Catfishing (Nyam, 2020). In another documented incident, a woman in Hong Kong was catfished by her online boyfriend, who was using fake profile photos to scam her (Lee, 2020). They met on a dating site, and after one month of continuous talking, the boyfriend asked her to transfer some money. Scams can often result in serious monetary losses and are considered crimes (Nyam, 2020).

2.2.2 Harassment, sexual solicitations, exposure to explicit content

Users see dating apps as a common way to communicate or socialize; however, sexual harassment is the primary fact why people are not comfortable in using dating apps (Castro & Barrada, 2020). Online harassment can be defined as cyberbullying and any other negative online interactions that may make the user feel threatened, embarrassed, or unsafe (Wisniewski et al., 2016). In the online dating world, harassment is often sexual in nature. A pew survey found that 28% of online dating application users have been contacted via a dating platform in a sense that would make them feel uncomfortable or harassed (Smith & Duggan, 2013).

Unwanted contact. Concerning unwanted contact, studies found that many young women were contacted by people even when they indicated they did not have any interest in them (Anderson et al., 2020; Vogels, 2020). Women are prone to receive more sexual messages from men who are rejected by women (Thompson, 2018).

Unwanted solicitations can contain sexting or any requests received made that are sexual in nature (Wisniewski et al., 2016). Sending nudes or asking for nudes from someone could be inspired by pornography content (Træen & Kvalem, 2022). Unsolicited images are images that are sent to others without their permission, typically involving nudes (Karasavva et al., 2022). In general, women receive more sexual images without consent as compared to men (March & Wagstaff, 2017).

Exposure to explicit content. Exposure to explicit content can also include voluntary or accidental viewing of pornographic (naked photos or videos of people having sex), extremely violent, or deviant (immoral or disturbing) online content (Wisniewski et al., 2016). A recent survey discovered that one in three dating app users was subjected to online violence that ranged from unwanted sexual content to being threatened (Jurss-Lewis, 2022). A phenomenon called cyber flashing is increasing every day, in which a user sends a video or a picture that may be sexual in nature, also getting popular in dating apps (McGlynn, 2022). For example, a user receives an image or video that may seem fine from the thumbnail. However, as soon as the user clicks on it, it shows sexual content or nudity (Harper et al., 2019).

In addition to this kind of unwanted contact and sexual pictures, harassment on dating apps include sexual violence threats, name calling, sexual invites, and physical threats when meeting in person (Lauckner et al., 2019; PEW Research Center, 2020). Among all the age groups using dating apps, adolescents are at higher risk of receiving, e.g., harassing and sexually unwanted messages (Douglass et al.,2018). Six out of ten women who use dating apps report facing some kind of harassment (Conklin, 2019).

2.3 Crimes related to online dating apps

In the past few years, online romance scams and frauds have been an issue in many western countries (Whitty & Buchanan, 2015). Other crimes associated with dating apps include violent crimes such as rape, kidnapping, and murder. Romance scams hit an all-time high in 2021. Users lost more than 547M, which is the highest number in the last five years (Fletcher, 2022). Dating apps such as Tinder, Bumble, Grinder, etc., are linked to a number of crimes, such as violence or kidnapping (Oldfield, 2022). There are also some risks, such as stalking associated with online dating and youth victimization, that could lead to aggressive behaviours and endanger physical well-being (Kaakinen et al., 2021). Unexpected dangers of online dating could vary from catfishing, scammers asking

for money, blackmailing, and cryptocurrency investment scams MacKay (2022). Further, women receive greater physical threats on dating apps as compared to men. These threats may include the release of sexually explicit photos or offensive messages leading to violence (Phan et al., 2021).

Romance scams. Romance scams are a type of online fraud in which criminals pose as desirable partners on dating sites or apps to lure people into sending them money (Shaari et al., 2019). These scams can take a number of forms, such as asking for money to visit the victim, claiming to be in financial trouble, or needing funds for medical expenses or travel. (Whitty, 2013). They often look for long-term relationships to gain the trust of the victims before attempting any fraud or scams (Huang et al., 2015). Scammers usually start friendly conversation that goes along until trust is established (Shaari et al., 2019). In most cases, after weeks of communication, the scammer might ask the victim to move the communication to another communication channel, which makes it easier for the scammer to strike their target (Huang et al., 2015). The fraudster opens up, e.g., about needing financial assistance that may include small gifts, cash money, or buying something online (Hamsi et al., 2015).

There have been reports of con artists on Tinder using confusing challenges to exploit other users and extort money. These challenges may involve requests for users to send money in order to unlock certain information or features. For example, they write in their bio to send them $10 to see what will happen. Unfortunately, some individuals, particularly young people, have fallen victim to these scams and have sent money only to realize that they have been defrauded (Young, 2019).

One of the big reasons why people fall for online scams is lack of knowledge about cybersecurity as in the US alone, the FBI reported a total sum of more than $80 million was lost due to online scams and romances (Whitty, 2015). After being scammed or fraud, the victims also find it difficult to find necessary support as they are traumatized by the fake promises (Whitty & Buchanan, 2015).

Violent crimes. With online dating enabling easy access to people, violent crimes such as kidnapping and murder are rising (Shetty et al.,2017). In kidnapping or robbery cases, the victims might be asked to visit a specific area or a private meeting point hoping to spend a perfect date night. Instead of dating, they might end up robbed of their belongings, kidnapped or even murdered (Buchanan & Whitty, 2014, Whitty, 2015).Examples of violent crimes reported include a Tinder stalker who stabbed his date 11 times since he could not handle the rejection (Awford, 2017), and a serial killer who used Grindr to hunt down his victims (Clarke & Griggs, 2016). Even if victims escape death, experiences like these can be traumatizing.

Sexual Assault. Dating apps leading to sexual assault have minimum published research. Among the available literature that links sexual assault with dating apps shows the dark side of using online dating. Sexual predators usually use dating apps for hunting down their victims (Valentine et al. (2022). These sexual predators use anonymous or fake dating profiles to engage with their victims (Goldsborough, 2017). Since dating apps do not come with a criminal history record, it is not easier for anyone to spot a criminal based on a general profile (Holt et al., 2015). Another fact about the sexual assaults linked to dating apps is these assaults are more violent, with more victim injuries (Valentine et al. (2022).

Stalking and Harassment. Stalking and harassment are other common dating crimes that lead to endangering dating app users' lives. Usually, the stalker makes conversations that

force the other users to talk about their daily routines (Gillett, 2018). Even they are sometimes not even aware of the fact that this information may be used against them (Phan et al.,2021). Other types of crimes related to harassment are usually when a user receives unwanted messages such as a nude picture or a verbal message that make them feel harassed (Shetty et al., 2021).

2.4 Safety features and functionalities existing in the platform

The following section will discuss the safety features and functionalities that already exist in the dating platforms.

2.4.1 Features

The dating app offers the following functionalities and guidelines to prevent unsafe user interactions. ID verification. Tinder, Bumble, and OKCupid encourage users to verify their profile with a selfie that leaves blue verification marks on their profile (Lyons, 2021). The verification process is easy as the users need to click their picture, and the app verifies if it is fake or real. The use of fake profiles on dating apps is the most common scam on dating apps. With the help of ID verification, dating apps ensure that the profile of the user is real (Metro Tech Reporter, 2021).

Video chat. All major dating applications, including Tinder, come with video chat options with potential matches (Lyons, 2021). Video chat allows both users to ensure they are talking to a real person. To build trust in a relationship, it is necessary to ensure the other person is not using a fake profile (Chisom, 2021).

The safety center in Tinder contains information about all the safety features offered in the app. The safety center provides all the information regarding how to safely meet or chat with a match on Tinder. The safety center also offers a guide section that contains safety quizzes and tips to ensure the user has maximum knowledge of safety features (Badoo, 2018).

Hinge also offers safety features in terms of detailed articles and guidelines. The most important safety feature of Hinge is mental health support via the crisis text line (Hinge, 2022). Hinge has partnered with Crisis text line to seek assistance for any kind of crisis 24/7. A trained counselor will receive the text and respond to the users with a secure platform. Other than that, Hinge also offers support to users with safety dating tips (Hinge, 2022).

Reporting is one of the features that come in every dating app. If the users feel threatened by another user, they can report it to the app's resolution center. Reporting can result in banning other user's accounts and restricting malicious accounts on dating platforms (Badoo, 2018).

Safety and well-being support. Bumble offers users safety and Well-being support in terms of detailed articles. For example, when clicking on mental exhaustion, users can read many articles that could help them deal with anxiety, uncertainty, and dating burnout (Klein, 2021). It also offers the option to snooze Bumble for the betterment of the users (Bumble Snooze, 2021). Secondly, the application also offers guidelines for users feeling rejected. They provide professional guidance through articles that state how to get away with the feelings of being ghosted or ignored (Beusman, 2022).

2.4.2 Functionalities

Dating apps such as Tinder and Bumble come with safety guidelines for their users that address users' safety concerns. However, when using dating apps, privacy is always one of the concerns for users. (Farnden et al., 2015). Dating apps such as Tinder, Bumble, and Grindr state all the information that they will collect in their privacy policy. However, these apps usually collect other information, such as users' personal information, that is not mentioned in their policies (Hayes & Snow, 2018). Since these apps are collecting users' personal data, therefore, they are prone to cyber-attacks such as man-in-the-middle or DDoS attacks (Barros et al., 2022).

Dating apps such as Tinder or Bumble require users to verify their identity through email or phone numbers to help ensure that they are whom they claim to be to avoid any kind of scam (Welch & Morgan, 2018). Similarly, all dating apps have a feature that allows users to block or report other users who are posing a threat to them (Kumar et al., 2021). The apps also associated the block features with their security and privacy (Boonchutima et al., 2016). The blocking features can favor every user, especially women, to avoid harassment (Griffin et al., 2018).

These apps provide their users with safety tips and resources to help them stay safe while using the app. This can include advice on how to protect personal information, how to meet up with someone safely, and what to do if something goes wrong (Wu & Trottier, 2022). Tinder claims to offer encrypted messaging features to its users to help protect users' privacy and keep their conversations secure (Kim et al., 2018). Tinder also allows users to set their location settings to only show their profile to users within a certain distance, which can help users feel more secure about meeting up with someone in person (Centelles et al., 2021). Lastly, all dating apps allow users to link their profiles to their social media accounts, which can help provide an additional layer of verification and accountability and make it easier for users to distinguish between fake and real profiles (Degen & Kleeberg-Niepage, 2021).

The following is the list of common safety features based on the guidelines available on the websites of these dating apps.

Identity theft. All dating platforms come with the feature of reporting users. If someone comes across a user's profile which they think is fake or someone is pretending to be a fake profile, the other users can report it by scrolling down to the profile (*Tinder Safety and Policy Center,* 2023).

Scams. To avoid scams, all dating apps provide guidelines to spot a scammer, as a scammer will always ask for money (Al-Rousan et al., 2020). Bumble mentioned that scammers pretend that they are in urgent need of money or tell heartbreaking stories to gain sympathy from other users (Bumble Buzz, 2022). Other factors that assist in pointing out the scammers are they avoid meeting in person, they try to keep it long-distance, they do not answer much about themselves, and they want to move the chat from dating platforms quickly (Bumble Buzz, 2022).

Location sharing. As mentioned in the safety guidelines, dating apps do not recommend their users to share their live location or talk about their whereabouts with the matches (Stoicescu et al., 2019). This will assist the stalkers to know the daily routine of the users, possibly leading to stalking or harassment. If the users feel like someone is stalking them, they can use the feature of reporting profiles (*Tinder Safety and Policy Center* 2023).

Unmatch. The greatest safety feature that is offered by all dating applications is the ability to unmatch with the matched profile (Nelson, 2017). After matching and continuing the conversations with the potential match, if the user feels threatened, they can simply unmatch the dating profile. In this way, they will not see the users' profile anymore. Different dating apps have different ways of unmatching. For example, in Tinder, go to your inbox and slide the person's profile to the left, and you can see the option to unmatch (Unmatching and reporting – Tinder, 2023).

2.5 Safety guidelines offered for the users

Dating apps including Tinder, Bumble, Grindr, Hinge, OKCupid, Match.com and Facebook dating have the following few common safety guidelines for users.

Never send money - Never send any money to anyone, especially if they claim to have some medical emergency. All dating apps discourage users from sending money, especially from wire transfers, because it is irreversible. Another important thing to consider is not to share any information that could lead to financial accounts (*Dating Safety Tips,* 2023).

Protect personal information - Do not share your personal information, such as your social security number, over dating apps. This may also include your home address or daily routine with people you meet online. If you are a parent, try to avoid sharing your children's names on your profile or mentioning them in early communication. It is also necessary to keep your children's school and age private (Bumble - Safety First, 2023).

Use dating platform. Stick to the dating platform while you are still in the phase of getting to know each other. Users with malicious intents try to move the conversations to other platforms by asking for emails or phone numbers (*Safe dating advice – hinge* 2023).

Do not rush. Do not rush to meet someone in person. Take your time before agreeing to meet or chat somewhere else than the dating platform. It is also helpful to use audio or video call to confirm their identity (*Dating Safety Tips,* 2023).

Always meet in public first. Try not to meet in private for the first time, as meeting in public is the safest option. If your date asks you to meet in private for the first time, do not trust them (Bumble - Safety First, 2023).

Don't leave your stuff unattended. It is strongly advised not to leave your bag, phone, or drink unattended. Only drink those drinks that you are sure of coming directly from the bar. If you leave your drink unattended, a person with malicious intent can add an odorless substance that could lead to unconsciousness. Also, keep your phone and wallet to yourself (*Safe dating advice – hinge* 2023).

Protection against STIs. It is always advised to utilize condoms that can reduce the risks of catching STIs such as HIV. Also, be aware of other STIs, such as herpes, that can transmit through skin touch. There is no shame in asking your date about STI vaccination that suppresses the risk of contracting any STI (*Dating Safety Tips,* 2023).

Consent. Consent is important in all sexual activities. Verbal communication can assist in such cases by asking for each other's consent. Do not get yourself involved with someone with whom you are not comfortable carrying out any sexual activity (Bumble - Safety First, 2023).

3. Methodology

In this section, I will introduce the qualitative research approach that will be used in this research. Other approaches, such as quantitative and mixed-method research approaches, will also be discussed to know the differences between all three approaches. Then I will discuss the data collection and data analysis method that will assist in compiling results.

3.1 Qualitative research approach

To achieve appropriate results, every research needs an explicit research approach. Generally, there are three types of research Quantitative, qualitative and mixed-method research.

Quantitative research deals with the collection and analysis of numerical data (Apuke, 2017). Quantitative research involves developing a problem statement followed by a hypothesis, research questions, and analysis of data (Williams, 2011). Quantitative research also aims to collect and analyze data on predetermined instruments in order to extract results (Creswell, 2009).

Qualitative research focuses on interpreting non-numerical data to understand targeted populations' social life (Punch, 2013). According to Gentles et al. (2015), qualitative research assists researchers in observing the participants' opinions and perceptions of an event in natural settings. Since it is focused on words instead of numbers, therefore, interpretations done through this research design assists in decoding peoples' experiences in everyday life (Walia, 2015).

Mixed-method research uses both quantitative and qualitative research approaches (Hussy et al., 2010). Researchers use mixed method research design to develop an in-depth knowledge of the topic (Schoonenboom & Johnson, 2017). The researcher can also use the mixed approach in order to gain the benefit from both qualitative and quantitative research methods (Doyle et al., 2009).

Among the above-mentioned research designs, this research has utilized a qualitative research approach in data collection and analysis. While qualitative research is often the preferred approach for interpreting non-numerical data, mixed method research also allows for the integration of both qualitative and quantitative data, enabling researchers to gain a comprehensive understanding of the research problem (Tashakkori & Creswell, 2007). However, qualitative research is specifically focused on exploring meaningful insights into a certain phenomenon and analyzing peoples' opinions and experiences (Levitt et al., 2017).

3.2 Data collection

To collect data, qualitative research offers methods such as discourse analysis, ethnography, case study analysis, grounded theory, focus group, etc. (López-Varela, 2012). This research uses a strategy called the "Discourses survey," which is best suited to study complicated social actions (Scollon & Scollon, 2004). Discourses survey assists in finding public discourses on a particular topic (Luoma et al., 2016). The advantage of using a discourses survey is to observe data that is gathered without any intervention from

the researcher, which means the data is recorded without any external bias from the researcher (Hartikainen et al., 2016).

Since this master thesis includes interpretations of interviews from digital media, the discourses survey can serve as an impactful tool to collect and analyze data without any external or internal bias (Luoma et al., 2016). It is also used to collect any information on the topic under consideration from different digital media channels, which in current cases are news websites (Scollon & Scollon, 2004). The data gathered through the discourses survey is then analyzed to shortlist only relevant discourses. I collected already existing data that people shared on digital news websites regarding their unsafe experiences on dating apps. Using the search engine was the logical choice to collect data as the purpose of the study was to examine people's experiences without any external biases.

Selecting news databases to search. Digital media is one of the best sources that collects peoples' past experiences (Liang & Zhu, 2017). According to Majid (2022), *Dailymail* (United Kingdom), *CNN* (United States of America), *The Guardian* (United Kingdom), *Fox News* (United States of America), *BBC* (United Kingdom), and *CNBC* (United States of America) are among the top 50 leading digital news media in the world. Therefore, these digital news media were selected to search for news items concerning unsafe users' interactions with dating apps. The other reason to select these digital news media is because of the free availability of news articles and English as their primary language to cover news articles.

Selecting relevant keywords for the searches. After shortlisting the digital databases, the next step is to finalize the relevant keyword that would be used to run in the search engine. To find relevant news articles, it is necessary to shortlist relevant keywords.

This research will focus on news items concerning Tinder, Bumble, Grindr, OkCupid, Match.com, and Facebook Dating. The reason to shortlist these dating apps is because of their popularity across the globe (Kozuch & Corpuz, 2022). To find relevant news items related to the unsafe interactions and safety issues of these selected dating apps the following keywords were used: scam, threat, crime, risk, and danger.

Example search strings would be e.g., Tinder scam*, Bumble threat*, or Grindr risk*. An asterisk (*) was used as a wildcard in the search, as it is generally used to find word endings. While searching, I entered the root of a search term and replaced the ending with the asterisk (*). For example, typing in scam* would return news articles with the words scam, scams, scammed, scammer etc.

To take into account all of the keyword combinations, a total of 35 searches were carried out in each selected news database:

- Tinder scam*, Tinder threat*, Tinder crime*, Tinder risk*, Tinder danger*,
- Bumble scam*, Bumble threat*, Bumble crime*, Bumble risk*, Bumble danger*,
- Hinge scam*, Hinge threat*, Hinge crime*, Hinge risk*, Hinge danger*,
- Grindr scam*, Grindr threat*, Grindr crime*, Grindr risk*, Grindr danger*
- OkCupid scam*, OkCupid threat*, OkCupid crime*, OkCupid risk*, OkCupid danger*
- Match.com scam*, Match.com threat*, Match.com crime*, Match.com risk*, Match.com danger*
- Facebook dating scam*, Facebook dating threat*, Facebook dating crime*, Facebook dating risk*, Facebook dating danger*.

Search limitations. The search results were limited to news items published during the years (2016 - 2022), which helped in producing meaningful insights concerning the current situation and increased the credibility of the research (Pautasso, 2013).

Search results. Table 1 presents a breakdown of each database's number of hits for all conducted searches and relevant articles. As can be seen, the total number of hits was very large, and the dataset had to be scoped down to a feasible size for qualitative analysis.

- **Inclusion criteria.** News items published in the last 7 years (2016 - 2022) to capture the problems and risks users have been facing in recent times. The news article should somehow be related to Information breaches, harassment, sexual solicitations, exposure to explicit content, and crime under dating platforms. Lastly, the article published in the news media needs to be written in English.
- **Exclusion criteria.** The content outside the specified date range and language. Duplicate results. Any content published that describes a fictional event or a piece of art related to a dating app or online dating site (e.g., book reviews, opinion pieces, movie reviews, song reviews, books, and novellas).

Table 1. Research results

Database	Number of searches	Total number of hits	Number of hits relevant to research criteria
BBC	35	10,150	84
CNBC	35	8,595	7
The Guardian	35	8,232	79
Dailymail	35	4,293	143
FoxNews	35	2,061	65
CNN	35	999	13
Total	**175**	**34,330**	**391**

Figure 1 illustrates the process how the numbers in the above table were reduced to 391.
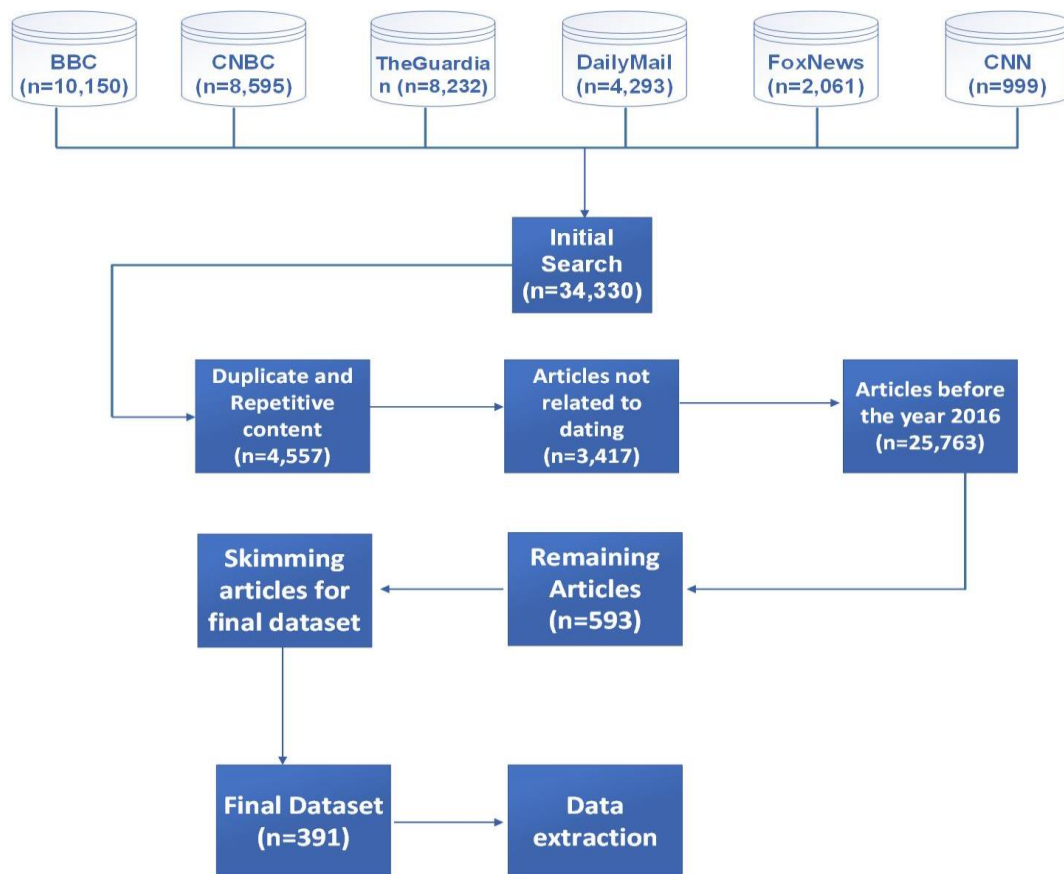
Figure 1: Research results and dataset extraction

I started by searching for articles related to dating and found a total of 34,330 articles. However, after removing duplicates (n=4,557), irrelevant articles (n=3,417), and articles published before 2016 (n=27,763), we were left with 593 articles. To ensure the quality of the dataset, I conducted a thorough review of all 593 articles. I further removed articles related to fictional events, movie reviews, and those not related to our shortlisted dating platforms, resulting in a final dataset of 391 relevant news articles. So, in the end, a total of 391 relevant articles were found that comprised the dataset to be analyzed.

3.3 Data analysis methods

Once the data is collected, the next step was to analyze the data. I used a coding scheme based on previous literature to code the unsafe interactions in dating apps in an Excel file. In addition, I logged app safety features in an excel file. I prepared a narrative summary of the results for the purposes of this thesis.

The data analysis answers questions such as what kind of unsafe user interaction the users go through and what kind of dating apps they use. The unsafe interaction can be of multiple types; for example, the users could face online fraud, extortion, robbery, scam, physical violence, murder, online harassment, online stalking, sexual assault, etc. Based on these unsafe interactions, the data will be separated into a few categories to summarize the research results easily. For example, the unsafe user experiences related to money will be categorized separately from the ones who faced sexual harassment.

The main categories of online risks, Information Breaches, Online harassment, Sexual solicitations, and Exposure to explicit material, were derived from previous research and represented the most common categories of online risk from online safety literature (Wisniewski et al., 2013). I also included Crime in the categorization due to higher rates of crime associated with dating apps in recent times (Oldfield, 2022). The subcodes for the crimes were based on the literature review carried out. All the news articles obtained from the searches were logged into an excel file and coded according to the codebook presented in Table 2.

Table 2. Risk codes and subcodes

Main risk category	Description
INFO	Information Breaches: Personal information or photos being shared or used online without permission or those shared by the user and later regretted
CYBU	Online Harassment: Cyberbullying and any other or negative online interactions that may make the user feel threatened, embarrassed, or unsafe
SEX	Sexual Solicitations: Sexting or requests received that are sexual in nature
EXPL	Exposure to Explicit Content: Voluntary or accidental viewing of pornographic, violent, or immoral or disturbing online content
CRIM	Crime: The interaction of any kind led to a crime either online or face to face
Risk subcodes	**Subcode descriptions to further categorize the unsafe interaction**
INFO_victim	Someone shared information or a photo the user didn't want them to post
INFO_perp	The user shared personal information or a photo they later regretted sharing
INFO_other	The user has been the victim of what they felt was an improper invasion of privacy or misuse of their information in some other way.
CYBU_victim	The user was treated in a hurtful or nasty way online for a longer time (cyberbullied).
CYBY_comment	Someone made rude or mean comments about the user or threatened them in some way online
CYBU_rumors	Someone tried to spread a mean rumor about the user online
CYBU_other	Other types of negative and unwanted online interactions that hurt the users' feelings, and made them feel embarrassed, or unsafe
SEXT_recipient	Someone sent the user a sexual message, revealing or naked photo
SEXT_solicited	Someone asked the user for a sexual message, revealing, or naked photo
EXPL_porn	User was sent /saw stories, images or videos that were naked or sexual
EXPL_violence	User was sent /saw stories, images or videos that contained violence
EXPL_illegal	User was sent /saw stories, images or videos of illegal or questionable behavior
EXPL_self_harm	User was sent /saw content that promoted self-harm such as eating disorders, cutting, suicide, etc
EXPL_other	User was sent/saw other content that made them feel uncomfortable some way
CRIM_prostitution	User was involved in an online interaction involving prostitution
CRIM_Scam	User was involved in an interaction involving scamming in terms of money or personal information
CRIM_Fraud	User was the victim in an interaction with an intentional perversion of truth to induce the user to part with something of value or to surrender a legal right
CRIM_TheftRobbery	User was involved in an interaction that led to a theft or robbery of money or other property
CRIM_Extortion	User was involved in an interaction that led to extortion
CRIM_sexualassault	User was involved in an interaction that led to sexual assault
CRIM_violence	User was involved in an interaction that led to violence
CRIM_abduction	User was involved in an interaction that led to being abducted/kidnapped
CRIM_murder	User was involved in an interaction that led to someone being killed
CRIM_stalking	User was involved in an interaction that led to someone being stalked
CRIM_Harassment	User was involved in an interaction that led to physical or online harassment

CRIM_Other	User was involved in an interaction that led to some other type of crime, that's not mentioned in the above category.
Risk description	The unsafe interaction described in my own words.
Situation resolved	yes/no
Resolved by	user/platform/local authorities/not resolved
Resolved explanation	Explanation of how the situation was (or was not) resolved
App issues	Explanation if any issues concerning the app or it's safety and security features were identified or discussed in the news article

Once the risks related to categories and sub-categories were defined, the next step was to write summaries of the results. These summaries allowed me to find prevalent unsafe interactions and whether they were usually resolved. For example, the summary included how many news items related to Information Breaches and how they were further divided into sub-categories. These cases were inspected regarding their resolved ratios and who assisted in resolving them.

The data analysis method is summed up in figure 1. First of all, news databases and keywords were shortlisted. These shortlisted keywords were then searched through news databases to find relevant articles. According to the inclusion/exclusion criteria, the total number of news articles shortlisted was 391. In the last step, these news articles were divided into their categories and subcategories.
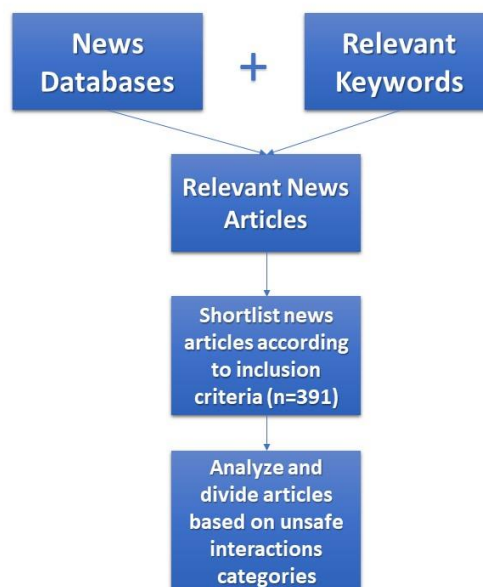

Figure 2. Data collection and analysis

4.   Results

In this results section, the findings from the analysis of data on unsafe interactions will be discussed. The unsafe interactions are divided into four main categories, including Crime, Online Harassment, Sexual Solicitations, and Exposure to Explicit Materials. The section will begin with a discussion of information breaches and its subcategories, followed by a discussion on online harassment and its related subcategories. The results will then move on to sexual solicitations, and finally to crime and its subcategories. Each category will be thoroughly discussed to provide a comprehensive understanding of the results.

A total of 391 relevant articles were found and following is the breakdown of all the results according to risk categories:

Table 3. Unsafe user interactions distribution

Category	Prevalence
Crime (CRIM)	81% of news items (n= 318)
Information breaches (INFO)	2% of news items (n=7)
Online Harassment (CYBU)	17% of news items (n=65)
Sexual solicitations (SEXT)	0% of news items (n= 1)
Exposure to Explicit Content (EXPL)	0% news items (n=0)

To understand it better, the prevalence of different types of unsafe interactions are shown below:
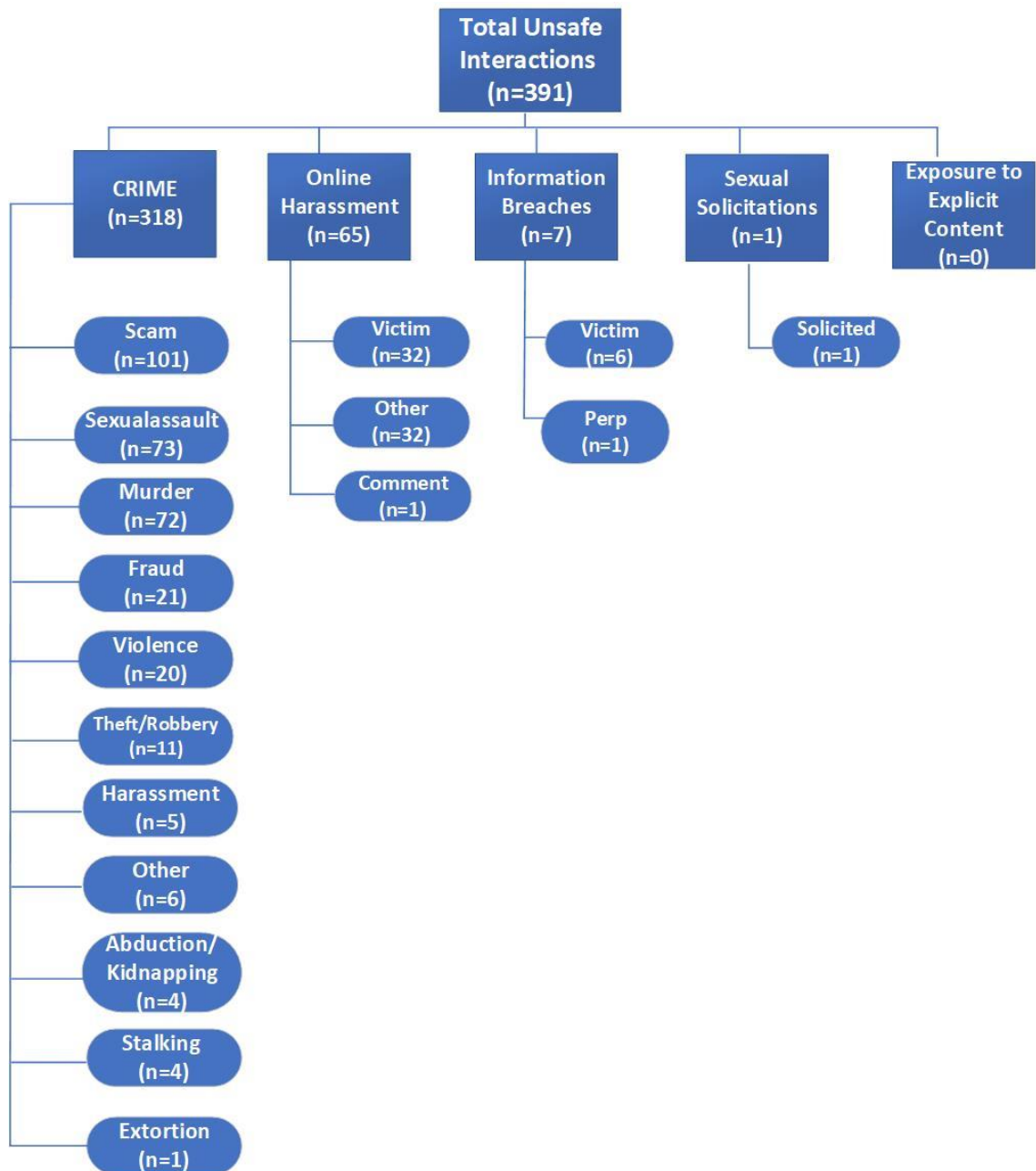

Figure 3. Prevalence of different types of unsafe interactions reported

As can be seen, the most common unsafe interactions reported in the news items in our dataset were related to different Crimes (81%, n=318), such as scam, sexual assault, murder, etc. The second most common unsafe interactions were related to online harassment (17%, n=65), that involved all the cases related to cyberbullying and other negative online interactions, followed by information breaches (2%, n=7) that involved photos or information being shared online without the user's permission and sexual solicitations (0%, n=1). The breakdown of the risks into subcategories will be further discussed in the following sections based, with the exception of Exposure to explicit content, as it was a category of unsafe interactions that were not present in our data.

4.1 Information breaches

News items were coded as Information Breaches, if they involved personal information or photos were being shared or used online without the users' permission or those shared by the user and later regretted it. Table 4 shows the distribution of news items in this category.

Table 4. News items coded as Information breaches

Sub-category	% of news items under Crimes	% of cases resolved
Victim	86% (n=6)	14% (n=1)
Perp	14% (n=1)	0% (n=0)
Other	0%	0% (n=0)
TOTAL	100 % (n=7)	14% (n=1)

Information breaches consisted of 2% (n=7) news items in our dataset. Among the 7 unsafe interactions related to Information Security in our dataset, 14% (n=1) of news items report the cases were resolved while 86% (n=6) cases remained unresolved.

Victim. News items were coded as "Victim of information breaches (86%, n=6) if they reported on someone else sharing the users' information or a photo that they didn't want them to post. One news item mentions the increasing number of cases where users share their photos online before they are blackmailed by these photos. In this case, a male had fallen victim to a scammer from the Philippines. He was matched with a dating profile that had an address in Manchester. After exchanging their Facebook and WeChat information, she asked him to share nude videos and pictures. The victim later regretted sharing them as she asked him to send her money or his videos would be sent to his Facebook friends (Beck, 2021). In another incident, thousands of user pictures were stolen from Tinder and made available for the public on the web. Users were furious and regretted sharing it on Tinder (Baraniuk, 2017). In another case where pictures of a famous DJ were used on the dating platform OkCupid. The DJ regretted sharing his personal pictures online as his pictures were used in catfishing (Ruiz, 2017). In another example, soldiers belonging to Poland and Lithuania shared photos on Tinder. However, these photos were shared on Twitter, which led to other people judging them for their duties on borders (Wight, 2021). And it is not only other users that participate in information breaches: The decision of Grindr to share its users' HIV status with companies made their users regret sharing the information (Jones, 2018).

Among reported cases (n=6), only 16.67% (n=1) cases were resolved, while 83.33% (n=5) were unresolved. The only resolved case was resolved by Bumble support. It was related to Bumble's political filter. Users revealed they identified Trump supporters using the filter and then catfished those supporters who participated in the capitol riots to get them to send pictures of themselves at the U.S. Capitol. These photos were shared with the FBI without users' permission. Bumble removed the political filter and re-introduced it with some safety measures to protect both sides of users (Mulraney, 2021). The unresolved cases related to people stealing other people's pictures without their consent and putting them on dating platforms.

Perp. News items were coded as Perpetrator of information breaches (14%, n=1) if the reported interactions involving dating apps where the user had shared personal information or a photo of themselves that he/she later regretted sharing. The only news item coded here reports users being tricked into sending nude photos, which they regret later as they were being blackmailed. Online predators created false identities to trick others into sending them nude photos. Once the victims shared the pictures, the predators threatened to share the pictures with their families unless they paid money. The users could not do anything but regret later to share such pictures (Australian Associated Press, 2018).

4.2 Online Harassment

News items were coded as Online Harassment if they included Cyberbullying and any other or negative online interactions that may make the user feel threatened, embarrassed, or unsafe. Table 5 shows the distribution of news items in this category.

Table 5. News items coded as online harassment

Sub-category	% of news items under online harassment	% of cases resolved
Victim	49% (n=32)	56% (n=18)
Other	48% (n=31)	34% (n=11)
Comment	2% (n=1)	0% (n=0)
Rumors	0%	0%
TOTAL	100% (n=64)	45% (n=29)

Online harassment cases consisted of 17% (n=65) of news items in our dataset. Among all 65 unsafe interactions related to online harassment, 45% (n=29) of news items report the cases were resolved, while in the remaining 51% (n=33), cases remained unresolved. Courts and police were the leading authorities that helped the victims in resolving the case in 48% (n=14) of the resolved cases. In two cases associated with Facebook dating, Facebook support also interferes with resolving the cases. There were multiple reasons why a few of the cases are not resolved so far. For example, in a case reported by Fox News, a TikTok star shared a video of herself being matched with her brother on a dating app. The incident made them feel embarrassed and also questioned the algorithms of dating apps (Moore, 2020). In another incident, after being rejected on Tinder, a man contacted their former match on LinkedIn. The woman expressed her concerns regarding online privacy and why cannot people take no for an answer (Cunningham, 2019).

Victim. News items were coded as Victim of online harassment (50%, n=32) if they reported on interactions related to dating apps where the user had been treated in a hurtful or nasty way online for a longer time (in other words, they had been cyberbullied). If we break down 49% (n=32) of news items that were coded here, 22% (n=7) reported cases related to people creating fake profiles to steal someone's identity and harass other people. For example, in one of the cases, gay marriage activists have been accused of creating fake profiles on Grindr and Tinder for MPs who were not in favor of same-sex relationships (Spencer, 2017). In another incident, a police officer was found guilty of creating a fake dating profile to contact his ex-partner (BBC, 2021[1]). Of the rest of the news items, 78% (n=31) were also related to stalking or threatening the Victim's life. For

example, in one incident, a woman posed as a man on a gay dating app (Grindr) launched a stalking campaign against the Victim and his boyfriend and threatened him over his life (Tingle, 2020). In another case, a man stalked a woman he met online and threatened to smash her face. He also had a history of such incidents where he used to stalk other people on dating apps (BBC, 2019 [2]).

Other. News items were coded here as Other (48%, n=31) if they reported on other types of negative and unwanted online interactions that hurt the users' feelings and made them feel embarrassed or unsafe. 49% (n=32) of the articles reported online harassment that resulted from using dating apps. The incidents included contact with strangers and receiving unwanted messages. A woman shared her experience of what she learned from Tinder after dating. The comedian Lane Moore added that most men want casual sex from dating, but they are not ready to admit it yet. She also mentioned that good men do not exist on dating apps, and her time was wasted on dating platforms (Moore, 2018). In one incident Tinder app was being used by party activists for political purposes – young users who thought they were swiping for romance were receiving messages to win their vote. (Glinka, 2018). In another incident, a student was stunned to see the exact same responses of two women on Tinder he matched with. Both started the conversations in exactly the same manner, which could be a sign of scammers or fraudsters (Devine, 2019).

Comment. News items were coded as "Comment" (2%, n=1) if they reported on interactions related to dating apps where someone made rude or mean comments about the user or threatened them in some way (more random than cyber bullying). The case reported here was related to an allegedly married Tinder user that was roasted by people on Twitter for seeking companionship which resulted in cyberbullying (Puhak, 2018).

4.3 Sexual Solicitations

News items were coded Sexual Solicitations if they involved Sexting or any requests received or made that were sexual in nature. Table 6 shows the distribution of news items in this category.

Table 6. News items coded as sexual solicitation

Sub-category	% of news items under sexual solicitations	% of cases resolved
Solicited	100% (n=1)	100% (n=1)
Recipient	0% (n=0)	0%
TOTAL	100% (n=1)	100% (n=1)

Under Sexual Solicitations, news items were coded as "solicited" (100%, n=1) if Someone asked the user to send them a sexual message, revealing or naked photo. Only one news item in our dataset was recorded as sexual solicitation, and it was resolved successfully by the court. This unsafe interaction was about a former police officer who illegally recorded himself with seven women he met on Match.com. He used to take videos of his victims without their knowledge of being filmed. The court found him guilty of voyeurism and sentenced him to prison (Hull & Tozer, 2017).

4.4 Crimes

A news item was coded under crime if the interaction of any kind related to online dating apps has led to a crime either online or face to face. Table 7 shows the distribution of news items in this category.

Table 7. News items coded as crime

Subcategories	% of news items under crime	% of cases resolved
Scam	32% (n=101)	34% (n=34)
Sexual assault	23% (n=73)	82% (n=60)
Murder	22% (n=72)	82% (n=59)
Fraud	7% (n=21)	24% (n=5)
Violence	6% (n=19)	85% (n=16)
Theft or robbery	3% (n=11)	82% (n=9)
Harassment	2% (n=5)	80% (n=4)
Other	2% (n=6)	83% (n=5)
Abduction	2% (n=5)	60% (n=3)
Stalking	1% (n=4)	50% (n=2)
Extortion	0% (n=1)	100% (n=1)
Prostitution	0	0%
TOTAL	100 % (n=318)	61% (n=196)

Out of all news items coded in the dataset, A total of 81% (n=318) items were related to different crimes. Among all unsafe interactions reported under Crime, 61% (n=196) were resolved, while the remaining 39% (n=124) of cases remained unresolved. Among cases that were resolved, 65% (n=182) were solved by law enforcement. In an example incident, two men and a woman were arrested over a dating scam in Manchester (Manchester Police, 2020). In another incident, a rapist who met his victim via Tinder was sentenced to jail for five years (Halliday, 2018). Besides police officers and law officials, other parties reportedly involved in solving the issues were the FBI and the users themselves.

Among 39% (n=124) of cases that were not resolved, most were related to different scams (53%, n=67), fraud (13%, n=16), sexual assaults (10%, n=13), or murder (10%, n=13). A common reason why a crime was coded unresolved is because the police were not able to track down the perpetrator. In an example incident, a 40-year-old woman was abducted after an OKCupid date; the police could not collect any evidence of the disappearance of the victim (Colton, 2021). Another reason why the cases were not resolved is because of using fake profiles on dating apps. In such cases, the perpetrator usually does not reveal his real ID and talks to the victim with fake profile pictures. For example, in one incident reported by Fox News, an individual who was searching for love online was defrauded of $273,000 by a supposed suitor who claimed to be a U.S. Marine (Bartiromo, 2019).

The following are the details of all the cases reported in crime.

Scams. News items under Crime were coded as Scam (32%, n=101) if they reported on the user being involved in an interaction involving scamming in terms of money or personal information. All reported scams were related to money. People were scammed with fake promises over the internet, unaware of the fact that these profiles were mostly fake. In an example incident, a woman was conned out of 9,000 pounds by a fake dating profile. The victim mentioned that she was aware of the red flags and transferred the money since she was lonely and wanted to be loved (Devereux-Evans, 2022). In another incident, a woman was scammed of her life saving of 92,000 dollars by a conman she met on a dating site. The conman sent her messages every day to establish trust, and then one day, he sent a photo of himself in the hospital and asked for money for his surgery. The victim transferred the money, but once it was received, he never texted her again (Oliveira, 2022). Another scam involved cryptocurrency, the victim who met the scammer on Grindr was convinced to invest more than £20,000 in cryptos. In an elaborate scam, the victim handed the money over to the scammer (Osborne, 2021). In another incident, a woman lost $300,000 in a crypto scam by a man whom she met on the dating app Hinge. The victim and scammer talked for more than a month on WhatsApp to develop trust, and the scammer introduced her to crypto and how it could benefit both of their future (Talbot, 2022).

The resolved rate for cases related to scams was 34% (n=34). The law enforcement court officials were most instrumental in solving these cases (82%, n=28). FBI was also involved (6%, n=2) as well as the victims themselves (6%, (n=2). The unresolved cases remained high at 66% (n=67). The reason for the low number of resolve rates is that as most scammers do not reveal their location or real names, it becomes next to impossible for law enforcement to track their footprints (Povich, 2022).

Sexual assault. News items under Crime were coded as Sexual assault (23%, n=73) if they reported on the user being involved in an interaction that led to sexual assault. Among all the sexual assaults reported, most victims were women. In an incident, a 19-year-old man was arrested for sexually assaulting a 14-year-old after they matched on Bumble (Court, 2020). In another incident, a man aged 22 was sentenced to prison for raping a woman aged 21 he met on Bumble (Stieglitz, 2021). Similarly, a police officer was involved in raping one woman and sexually assaulting another he met on match.com (Thrower, 2021). Most male victims were reported in connection with the Grindr dating app, like in a case where an IT teacher had sex with a 15-year-old boy he met on Grindr (Baker, 2021). In another incident, a 19-year-old tried to kill a man he met on Grindr to keep his body parts as mementos (Court, 2021).

Sexual assaults had one of the best-resolved rates among all crimes reported in the dataset, with an 82% (n=63) resolved rate. Among these cases, 92% (n=58) were resolved with the assistance of the court and the police. Only 18% (n=13) of reported cases remained unresolved, e.g., because they were still pending hearing or on trial. One news item also points to an error on the court's side as the judge freed the attacker for an unknown reason despite evidence against him (Prentice, 2021).

Murder. News items under Crime were coded as "Murder (23%, n=72) if they reported on the user being involved in an interaction that led to somebody being killed. For example, a news item reported of a "tinder sex cult killer" that murdered a 24-year-old woman he and his wife had met on Tinder (Smith, 2021). In another incident, a 17-year-old shot and killed a man and wounded two others after they matched on Grindr (Farberov, 2020). In one incident, the killer and his girlfriend searched for victims to scam over Grindr, one of which the news item explains they drugged and killed (Howard, 2020). In one murder incident, a man killed a backpacker and abused two others he met

on Tinder. The victim was visiting New Zealand for tourism purposes, where she matched the killer on a dating platform (Hollingsworth, 2020). Lastly, a teenager who was found guilty of murdering a civil servant aged 52 met via the dating app Grindr (The Guardian Press Association, 2016).

This subcategory had a resolved rate of 82% (n=59). Among these cases, the court and police assisted in resolving 97% (n=57). The unresolved case rate was 18% (n=13). Among the cases not resolved, in most of the cases, criminals were on the run from the police or still unknown. The victims' families might not always feel that the police are doing their best to solve the cases either. For example, one of the cases reported a case ruled as an overdose. However, the family of the victim says she never used drugs and was instead murdered by her Bumble date. However, the police did not take this seriously and closed the investigation. Her family wonders if racism had played a part in this and feels they have not been treated fairly and police were not on their side (Sales, 2022).

Violence. News items under crime were coded as violence (6%, n=20) if they reported on the user being involved in an interaction that led to violence. Most incidents involved one person beating the other. In one incident, a 48-year-old man stabbed his friend for going on a date with another man (Terry, 2022). In one incident, a model from New York conned hundreds of men into a date. Upon arriving at the scene, she told everyone to fight and that the winner could take her on a date (Wolfson, 2018). A man from Dallas was sentenced to jail after he was found guilty of targeting violence crimes with the dating app Grindr. He was sentenced 26 years in prison over hate crimes, kidnapping, and sexual assault (Holcombe, 2021).

Violence-related cases had the best-resolved rate (85%, n=17) of news items coded crimes. In the successfully resolved cases, the court and police were able to resolve 100% (n=17). The rest of the cases (15%, n=3) were unresolved, e.g., due to the laws against homosexuality in some countries: Egypt and Kenya were two countries where two people were jailed over involvement in homosexuality (Jankowicz, 2017). The last unresolved case remains the New York model that set them against each other. The woman was still not convicted to any charges (Wolfson, 2018).

Frauds. News items under crime were coded as Fraud (7%, n=21) if they reported on the user being the victim in an interaction with an intentional perversion of truth in order to induce the user to part with something of value or to surrender a legal right. The difference between fraud and scam is that in fraud, the victim is not aware of the suspicious transactions in the account, while in scams, the victim authorizes the transfer of the amount to other accounts with their consent without realizing they are being conned by someone (HSBC UK, 2022). Some frauds circulating in society include urging people to invest their money into cryptocurrency or fake DHL parcel that was not delivered on time (Tapper, 2021). One news item reports a man who used to fraud his dates by going to a restaurant and walking out without paying bills (Vercammen, 2018). The article mentioned some of the frauds circulating in society, such as urging people to invest their money into cryptocurrency or fake DHL parcel that was not delivered on time (Tapper, 2021). Another Tinder fraud reported a man who used photos of a well-known cage fighter to con out 8 women for more than £15,000 (BBC, 2019 [3]). Similarly, two dating fraudsters posed as WHO workers stuck in Syria conned several women out of money on dating sites (BBC, 2020 [4]).

The resolved rate for cases related to fraud was 24% (n=5). Among the resolved cases, 80% (n=4) were resolved by the police and the court, and 20% (n=1) by the victim herself. However, the cases that were not resolved were on the higher side (76%, n=16). The

reason why most cases related to fraud were not resolved included fraudsters using remote connections or not leaving online traces behind, which make it impossible for authorities to track them. For example, when a woman in her late 50s was scammed out of money over a dating fraud, they never met the fraudster in real life but only talked on the phone. Later she found out that everything related to the man was fake (Cernik, 2022).

Theft or robbery. News items under crime were coded as Theft or Robbery (3%, n=11) if they reported the user being involved in an interaction that led to theft or robbery of money or other property. Most incidents are related to the stolen money. For example, two teenagers were charged with robbery after they tried to set up people on Grindr (BBC, 2019 [5]). In another incident, a man from South California was reported to rob more than 20 people he met online, with one robbery ending with him stabbing a victim in the chest (Casiano, 2022). In one case, 5 teens lured at least 11 men with the help of fake Tinder profiles to rob them at gunpoint (Rambaran, 2019). Lastly, a woman robbed a man she had met on a dating platform at gunpoint and stole 100 dollars (Givas, 2020).

Among cases related to theft or robbery, 82% (n=9) were resolved, among which all (100%, n=9) by the collective effort of the court and the police. 18% (n=2) were left unresolved. In one case, the police were not able to track robbers (Norman, 2021). In the second case, the police are still looking for a man who stole his fiancée's ring to propose to a woman he met on OKCupid (Dailymail, 2021).

Harassment. News items under Crime were coded as "Harassment (2%, n=5) if they reported on the user being involved in an interaction that led to harassment, either physical or online. In one case, an ex-NYPD sergeant was sent to prison after he sexually harassed a victim (Karasin, 2017). Similarly, a police officer harassed his ex-girlfriend by hiring an actress to pose as an MI6 spy in a desperate attempt to win her back (Gordon, 2017). In another incident, an army sergeant already seeking a new woman on Tinder harassed and tried to kill his wife (Morris, 2018).

Among cases related to Harassment, 80% (n=4) were resolved, all by the police and court (100%, n=4). The percentage of not resolved harassment cases was 20% (n=1). The unresolved case was related to a campaigner whose arrest photo became a symbol of the Sarah Everard vigil, who felt harassed when approximately 50 police officers liked her Tinder profile. The victim named, Patsy Stevenson, perceives their actions as threatening due to her fear of the police after being forcibly taken down for no reason (Dodd, 2021). The metropolitan police say they will conduct an inquiry on the following issue; however, no inquiry is being done yet.

This sub-category is, however, different from the category "Online harassment ."As mentioned above, in this sub-category, the user was involved in an interaction that led to harassment, either physically or online. However, the main category, "Online Harassment," counted as cyber bullying and any other negative online interactions that may make the user feel threatened, embarrassed, or unsafe."

Abduction/Kidnapping. News items under crime were coded as Abduction or Kidnapping (2%, n=5) if they reported on the user being involved in an interaction that led to someone getting taken without their will. In an incident, a woman headed to meet her OKCupid date and vanished without a trace. (Newman, 2022). In another incident, a woman was allegedly held captive by her Tinder date before she was rescued by a neighboring resident (Colton, 2021). In another incident, a Grindr user kidnaped his date and locked him in his car (Poposki, 2019).

Among cases reported related to Abduction/kidnapping, 40% (n=2) were resolved, among which police resolved 100% (n=2). The percentage for not resolved was 60% (n=3). In all three cases that were not resolved, the police were still looking for the offenders.

Stalking. News items under crime were coded as Stalking (1%=n=4), if they reported on the user being involved in an interaction that led to Stalking. One news item reported a woman posing as a man on a gay dating app for the purpose of Stalking men (PA Media - Guardian News and Media, 2020). In another stalking incident, a woman from Arizona used to send more than 500 texts per day and a total of 65,000 texts to her date with the intention of Stalking (Joyce, 2018). In another incident, a police officer was found guilty of using police records to stalk a girl he met on Bumble. He accessed restricted data and spent more than 30 minutes to view confidential information about his date (Australian Associated Press, 2021, June 22).

Among cases related to Stalking, 50% (n=2) were resolved, among which 100% (n=2) were resolved by court and police. The percentage of not resolved was 50% (n=2). In one of the cases that were not resolved, the victim mentioned approximately 50 police officers contacted her on Tinder, leaving her terrified (BBC, 2021 [6]). The police officers knew it was the same woman who got arrested and went viral recently, yet they stalked her anyways. The case has not been resolved yet, as the Police Commissioner said to set up an inquiry into the incident, but no further information has been disclosed regarding it. In the other unresolved incident, a policeman has not sentenced any punishment despite the fact he was caught stalking her bumble date with restricted police data. Instead, he was given a chance due to his good behavior as a police officer in the past (Australian Associated Press, 2021, June 22).

Extortion. News items under Crime were coded as "Extortion (0%, n=1) if they reported on the user being involved in an interaction that led to Extortion. In the case only reported in one incident reported by BBC, an Australian reality tv show contestant was arrested for assaulting and extorting money from her Tinder date. The case was resolved by law enforcement and the court. (BBC, 2019 [7]).

Other. News items under Crime were coded as Other (2%, n=6) if they reported on the user being involved in an interaction that led to some other type of Crime not covered by the above categories. Out of the news items here, 67% (n=4) were related racism and hate speech. For example, a gay dating app with a racist ad was available on Apple's app store (Lee, 2017). In another incident, four men from North Texas were arrested based on hate comments against a gay man on Grindr (Fox News, 2017). In one case, an extremist, who claimed he was traveling to meet a date from Match.com, has been sentenced to six years in jail for emailing threats to Downing Street and threatening the judge during his sentencing hearing. (Gardham, 2017). The last case related to identity theft where a man claimed to be another missing man for 2 years, also making dating accounts on the missing person's name (Casiano, 2020).

83% (n=5) of the cases coded other were resolved, assisted mainly by police and court officials (80%, n=4), and 20% (n=1) by match.com. Match.com apologized for their advertising campaigns after facing criticism for calling freckles imperfections (Witherow, 2016). The ratio for not resolved cases was 17% (n=1). The unresolved case features the dating app that was still reported to be available on Apple's app store with a racist ad and an income filter (Lee, 2017).

5.   Discussion

In this section of the thesis, the research questions are answered. The primary focus of the study was to observe user experience in dating apps and report what kind of unsafe interactions they reported.

5.1 RQ1: What kind of unsafe interactions users report facing in dating apps?

Based on the collective data, the most unsafe interactions included in our dataset fell into the Crime category (81%). This can be because of the reason that news channels like to highlight the issues related to crime more than any other category (Stalans & Finn, 2016). As Filice et al. (2022) mentioned in their study, also I found out that different kinds of crimes such as Scam, Fraud, and Harassment are the leading unsafe interactions reported worldwide. Nyam (2020) mentioned the increasing number of scams related to dating apps in the world, and I have also found in the discourse survey that most recorded cases of crimes were related to online scams.

Other unsafe interactions recorded as crimes that were prevalent in my dataset included scams (32%) and sexual assault (23%). From the results, it is also clear that most often, the victims of sexual assault or harassment were women, which is consistent with findings by Gillett (2020) that in dating apps, the number of women being sexually assaulted is more than men. The results of Anderson et al. (2020) also suggest that most young women on dating apps have received sexually explicit messages and threats. In some instances, male individuals also fell victim to crimes. The most frequently reported crimes against male victims were under "Murder." A significant number of individuals lost their lives as a result of being matched and lured for a date through the Grindr dating app.

After different crimes, the second largest category of unsafe interactions present in our data was Online harassment, for example, cyberbullying, followed by Information breaches such as personal information and photos being shared online and Sexual Solicitation requests received that are sexual in nature.

On the other hand, the least reported categories of unsafe interactions present in our data included Sexual solicitations with only one case and exposure to explicit content with zero cases.

5.2 RQ2: How have the reported unsafe interactions been solved?

The most number of cases resolved were recorded in the Crime section (n=191), followed by online harassment (n=29). However, the least number of resolved cases were recorded in information breaches (n=1) and sexual solicitations (n=1). However, the category crime was also on the higher side when it comes to unresolved cases (n=121), followed by online harassment (n=33) and information breaches (n=6). Based on these statistics, we can say that while most of the cases in the crime and online harassment categories were resolved, the cases in the categories of information breaches and sexual solicitations were relatively less resolved. At the same time, there were a significant number of unresolved cases in the crime and online harassment categories, while the number of unresolved cases in the information breaches category was also significant.

Among the cases that have been solved, police and court collectively resolved 50.12% (n=197) of cases. The reported cases were proceeded by the police, and after making an arrest, they presented the victims in the courts. Since dating incidents are associated with the digital world, therefore, the courts have to rely on digital evidence. For example, if a person is involved in a dating scam, the court may see either the conversations between two parties or police reports to decide the fate of the victim. The same can be said about other subcategories, such as sexual assaults and violence, subjected to the availability of digital evidence.

Some of the cases were also resolved by the dating platforms (n=9), for example, by blocking the users permanently or adding a new feature such as a panic button to protect its users. A few cases (n=10) were also resolved by the user themselves, for example, by realizing they were being scammed and stopping it before it was too late. Based on the results, it appears that there is room for improvement in terms of support and tools offered to users by dating apps. The low number of resolved cases in the categories of information breaches and sexual solicitations suggests that these issues are not being effectively addressed by dating apps. Furthermore, the high number of unresolved cases in the categories of crime and online harassment indicates that these issues are still prevalent on dating apps, and more needs to be done to mitigate them. The dating apps are not offering enough support and tools to their users to report and resolve these issues. For example, the apps are lacking a robust reporting mechanism or adequate resources to investigate and address reported incidents. The apps may also need to invest in technology and security measures to prevent such incidents from occurring in the first place.

Overall, the statistics highlight the need for dating apps to take a closer look at the support and tools they offer to their users and to find ways to improve in this area. This will not only help to resolve existing issues but also to create a safer and more secure environment for users on the platform.

5.3 Recommendations for improvements in dating apps

After analyzing the data regarding the prevalent types of unsafe user interactions on dating applications reported in the news and how they are solved, as well as going through the safety features and guidelines that these dating apps offer, here are a few recommendations that the apps can consider improving user interaction. Apart from user verification features, all other features mentioned in this section are not currently present in any dating apps. These are all this research's new vision based on the results.

Feedback forum. Introduce a feedback forum in the apps so that users can directly send their valuable opinions or details about dating interactions with customer service. Currently, no app offers a direct feedback forum; however, apps like Tinder and Bumble offer contact us forums. However, I believe in improving, they also need to integrate feedback forums. By collecting user feedback and reporting incidents, dating apps can take action to resolve issues, create a safer environment, and increase transparency and trust with their users. Overall, the feedback forum can be a valuable tool for dating apps to enhance safety and security on their platform, leading to increased user engagement and satisfaction.

User Verification. Dating apps need to ensure the identity of every user so that there are no fake profiles. All dating apps can introduce this feature of user verification, where the users will record a selfie in the registration process. After looking at the details and submitting photos, the customer service of dating apps may or may not approve the

account. They can further introduce bluetick verification on the users' profiles, just like Tinder, Bumble, and OkCupid are offering.

Currently, the dating apps such as Tinder, Bumble, Grindr, etc., offer user verification features. However, there is still no guarantee of scams even after verification of photos; people can verify their profiles with the selfie first, and then later, they can change the pictures to be someone else. To address this issue, dating platforms can ask users to prove their identity once a month to ensure the same user is using the platform all the time.

Review Section. To find out if dating profile users lie about themselves or not, there should be a review section in every profile. Currently, no dating apps offer this feature; however, I believe they need to offer a review section to improve their functionalities. This review section will entail reviews from potential matches, which will provide a brief about how the chat went or if they met in real life and their overall experience. To remain biased in the review section, the dating profile users will also get the opportunity to defend themselves. In this way, it will be easier for other people to see whether the user has the right information on the profile or not.

Add potential match percentage. No dating apps are offering this feature; however, integrating this feature can save users' time. Based on people's interests, dating profiles can add a feature of potential match percentages between two users. This will save time for both users to see how many interests they have in common. The users will have a final call to match with them or not; however, this will be important for safe user interaction.

Ban suspicious profiles. To avoid scams and fraud, introduce improved algorithms that can ban dating profiles based on conversations. Sometimes, the user cannot spot a scammer; that's where algorithms and machine learning can play their role. For example, if a user talks about sending money or any sexual message, including sexual images, then their profile should immediately be banned. The case should even be important for people aged 50+ as they can be tricked by scammers easily.

Control Cyber Flashing. To control cyber-flashing in dating apps, Tinder does not allow its users to share photos with each other. Other dating apps can learn from Tinder to not allow the users in the start to share pictures with each other or at least ask the user permission before someone can send a picture.

6.   Conclusions, limitations and further research

This thesis discussed unsafe interactions in dating apps. The first research question considered in this thesis was: what were the unsafe interactions in dating apps reported by the users? The second research question was about how these reported unsafe interactions were resolved.

To collect data in this study, discourses survey was used. The unique perspective of this research, as compared to the existing research, is it relies on discourse analysis to collect data and people's opinions about their interactions with dating apps. The analysis assists the researcher in studying the research data that has already existed without the influence of any external biased. The research also offers the data categorization for all the reported incidents that make it easier for the reader to understand the unsafe interactions and which area in the dating app needs more improvement. Based on the discussion section of this research, dating apps need improvements in the areas of safety measures, reporting mechanisms, user support, and technology and security to provide a safer environment for their users. The low number of resolved cases in information breaches and sexual solicitations highlights the need for better safety measures, while the high number of unresolved cases in crime and online harassment suggests the need for improved reporting mechanisms and user support. Additionally, investment in technology and security measures is crucial to prevent incidents and ensure a secure environment for users. By addressing these areas, dating apps can increase user trust and engagement while creating a safer and more secure platform. With the help of a discourses survey, the research has uncovered unsafe interactions reported in the news in the past few years (2016-2022) concerning the following leading dating apps: Tinder, Bumble, Hinge, Grindr, Match.com, OKCupid, and Facebook dating. A total of 6 databases, including CNN, BBC, CNBC, DailyMail, FoxNews, and TheGuardian were used to collect data as a result of which a total of 391 relevant news articles were found and coded into different unsafe interactions with the help of a predefined codebook.

The data was then divided into different categories of unsafe interactions according to which crimes were the most common type of unsafe interaction recorded in the dataset. After crimes, the second largest category of unsafe interactions was online harassment, followed by information breaches. On the other hand, sexual solicitations and exposure to explicit content are the least reported categories of unsafe interactions, with only one case each.

Research on unsafe interactions in dating apps serves practical implications for both individuals and society. First, this research can help in raising awareness about the potential risks associated with dating platforms. This means users can make more informed decisions and take necessary precautions before using dating apps. Another important practical implication is for law enforcement agencies to understand better and respond to crimes committed through these platforms. For example, from our dataset, most unsafe interactions reported in the news are related to people getting scammed. Lastly, this research can be used as a practical tool for education and to provide information to parents and young people about the potential risks associated with dating apps and how to use them safely.

There are also limitations to this study. For example, only 6 news databases were considered to study unsafe interactions reported in dating apps. Further, three of the news databases were related to the United Kingdom (BBC, DailyMail, TheGuardian), while the other three were to the United States of America (Foxnews, CNBC, CNN).

Similarly, the research only considered 7 leading apps. Based on the results, the research opens doors for possible future research. While this research only dealt with data collected from selected news databases concerning selected apps, also other methods would be needed to study unsafe user interactions in online dating apps, such as qualitative interviews with users, focus groups, and surveys. These methods can provide in-depth insights into the experiences and perspectives of users, including the challenges and limitations they face when using dating apps. Important future research could be related to examine the user's behavior that may influence the likelihood of unsafe interactions, such as how users are presenting themselves, how they are communicating with others, and how they are managing their expectations and boundaries from their potential matches. Future research could also delve deeper into evaluating the effectiveness of safety measures that have been implemented on dating apps, such as background checks of the users to identify criminals. Lastly, to investigate the policies and practices of dating apps and how they can work together to resolve unsafe interactions.

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