

Human Trafficking Research: The Persistence and Movement of Phone Numbers in Escort Ads

James Van Scotter, Louisiana State University; Miriam McGaugh, Oklahoma State University; Denise McManus, University of Alabama; Lauren Agrigento, Louisiana State University, and Tom Kari, Tom Kari Consulting, LTD.

ABSTRACT

The Internet is a great tool for human traffickers. Online classified ad sites have created a “digital red-light district” that allows traffickers to reach more customers while making it easier to avoid being noticed by law enforcement. The contact phone numbers displayed in online sex ads may be the most important single clue for finding the traffickers. However, traffickers can reduce their risks by disposing of phones or changing phone numbers. In addition, previous research suggests that some of the missing phone numbers may have simply moved to other areas. In this paper, we used a sample of nearly 3 million classified ads posted on backpage.com to examine phone numbers from 570 locations in 44 states and the District of Columbia. Our goal was to use the phone number data to understand the traffickers’ behavior and to identify trafficking organizations for future investigation.

INTRODUCTION

It is important for law enforcement to understand how human traffickers conduct their illicit activities. Our research focuses on the phone numbers traffickers and pimps use to stay in contact with customers. By observing their actions and identifying regular patterns of behavior, we can begin to understand them and predict future behavior.

RATIONALE FOR THE STUDY

Online classified ad sites have benefited human traffickers in several ways. Online ads allow traffickers to advertise over a larger geographical area and reach a larger audience. Online classified ad web sites separate the advertisement of sexual services from the delivery of those services making it more difficult to catch the trafficker red-handed. The internet affords them a certain amount of anonymity. Traffickers are not tied to a specific address or neighborhood. They can advertise online and schedule appointments over the phone. In the past, streetwalkers operating out of “red-light” districts were frequent targets for assault and robbery. The internet provides traffickers, their victims, and their customers with a safer environment.

All of this makes gathering evidence on the traffickers and prosecuting them challenging. Law enforcement agencies use the ads to conduct sting operations, but much more can be done. The ads and phone numbers associated with them are potentially a rich source of information about traffickers and their characteristic behavior. We just need to learn to extract it and interpret it. The number of ads, their content, where they are posted, when they are posted and all of the things that link ads to the same source can reveal a lot about the trafficking organizations. Unfortunately, the sheer volume of online ads makes it difficult to exploit this information.

To make law enforcement’s task more difficult, traffickers engage in a variety of deceptive practices. They change phone numbers frequently to avoid notice. This might involve the use of cheap “burner” phones that are discarded after a few months. It may involve changing the sim card in a smartphone or using virtual phone numbers (e.g. Google Voice).

In addition, traffickers post their ads in multiple categories. They hide text in graphic images, use misspellings, slang words and phrases, code words connected with prostitution, abbreviations used in texting, and sexually-oriented emoji's (Van Grove, 2017). They also attempt to disguise phone numbers to make it more difficult for a computer program to decipher them. For example, (504) 353-6789 might be displayed as five-oh-4 3-fity-three 67eight. Despite these obstacles the content of these ads and the especially the phone numbers displayed in them are critical vulnerabilities.

GOALS

This study is intended to be a first step in the systematic study of traffickers' behavior. Our specific goals are to determine the extent to which the specific patterns of behavior described below exist in the data.

1. Persistence. Some phone numbers appear to remain in use for long periods of time, but others are used for a few months and then discarded.
2. Intensity. Some phone numbers may appear in a large number of ads, but others appear in only one or two ads.
3. Geography. Phone numbers only appear in one location, multiple locations, and/or in different parts of the country.
4. Movement. Phone numbers may appear in one (or more) locations for a period of time, and then abandon those locations and show up in new areas.

Investigating the patterns listed above may help to differentiate between trafficking organizations that are small and large; between organizations that are local, regional, or national; and between organizations that are growing or shrinking in size and geographic scope. Law enforcement agencies have limited resources. Understanding these patterns may help them identify and target the most important traffickers.

PERSISTENCE

A recent study found that consumers are keeping their iPhones longer. Krouse (2018) reported that people are keeping their iPhones for an average of 2.83 years. However, since phone numbers can be transferred to replacement phones, people are expected to keep their phone numbers much longer than that. In comparison, phone numbers used in human trafficking-related activities, such as online classified ads for escorts may have considerably shorter lifespans. How long are phone numbers used before they disappear? This seems like a simple question, but answering it is complicated. Calculating the lifespan of a phone number requires information about when the phone number was first placed in service and when it was used for the last time. Unfortunately, several measurement issues affect collection and interpretation of this data.

1. Some phone numbers were already in use before the data collection started. If a phone number was found the first time data were collected, there is no way to know for certain when it was first used. It could have been at the time data were collected, or, more likely, it may have entered service at an earlier date.
2. Some phone numbers were in use on the last day data were collected. There is no way to know if, or when, their use was discontinued.
3. There is an additional complication. The study's coverage of locations is incomplete. Examination of the data for locations that are included in the sample shows that some of the phone numbers are displayed in ads in one location for a few months and then show up in ads for a different location. However, if the phone number "moved" to a location outside the range of the sample, it would look like

the use of that phone number had been discontinued.

A dataset that spans a longer period of time and a wider geographical area will help to address some of these issues.

INTENSITY

Do phone numbers differ in the number of ads they are associated with? Larger human trafficking organizations are likely to post more ads and post ads more frequently than smaller organizations or independent operators. Phone numbers associated with a large number of ads are more likely to attract the attention of law enforcement, while those with only a few ads may not be worth pursuing. Because they pose a greater risk, phone numbers associated with a larger number of ads are likely to be in service for a shorter period of time.

GEOGRAPHY

Do phone numbers differ in the number of locations they appear in? Phone numbers posted in ads in multiple locations are most likely associated with larger trafficking organizations. The number of locations may suggest connections with a gang or another criminal organization. On the other hand, phone numbers that only appear in ads posted in a single location may be associated with independent operators or small organizations.

MOVEMENT

What percentage of phone numbers “move” to new locations? Traffickers move their operations for several reasons. First, they may move to avoid becoming a target for local law enforcement. Second, they may temporarily move to the location of an event that draws large crowds, such as the Super Bowl (Kuzma, 2012), or Daytona Beach Bike Week. Third, they may move on a regular planned route schedule. Fourth, they may move because of natural disasters, such as Hurricane Harvey that would disrupt their normal business.

In an earlier study, Van Scotter, McGaugh, and McManus (2018), found about 10% of the phones in new locations 8-12 months after the initial data collection. The additional data collected for this study allows us to examine this question in greater detail. The question can be answered by creating a variable to indicate which phone numbers and locations were part of the original sample, and then comparing those locations with the locations found in later months.

METHOD

DATA.

We used a large data set that encompasses multiple locations and multiple occasions. In total, 2,992,069 ads were collected from backpage.com using a custom web-scraping program. The initial data set was collected in early 2016 and covered 28 cities in Louisiana and the southeastern states. The geographic scope increased over time and by May of 2017 the system was collecting ads weekly from approximately 570 locations in 44 states and the District of Columbia.

Meta data for each ad includes the date the ad was first posted. Once posted an ad is displayed for one week. Active ads can be renewed. Renewing an ad moves it back to the top of the list so it will be displayed more prominently. Renewing an ad does not change the posting date. A phone number’s lifespan was calculated as the last month

minus the first month plus one because all ads were displayed for at least part of one month. There were 2,992,069 ads that displayed 338,120 unique phone numbers.

AD CATEGORIES.

In order to promote their “business” traffickers post ads in many different categories such as: “Men seeking women”, “Men seeking men”, “Women seeking men”, “Women seeking women”, “Body rubs”, “Adult jobs”, “Escorts”, “strippers/strip clubs,” and many more. Our primary interest is in ads associated with escorts, spas, and recruiting ads that are posted to attract new people into the adult industry. These three categories are known to be associated with trafficking. In order to find the ads of interest, we collected a larger set of that includes ads for both legal and illicit activities. Approximately twenty-five thousand ads from the initial data collection were manually classified into one of seven categories: Spa/massage parlor, escort, phone sex/webcam, dating, adult entertainment (strippers, shows, etc.), escort reviews, and rescue. There were very few review ads or rescue ads. Rescue ads are posted by organizations such as Children of the Night or Covenant House who offer victims a way to escape and resume a normal life.

With the exception of recruiting ads, which are coded separately, phone numbers are associated with a single category of ads. We extended the category markers to ads from later months that contained the same phone numbers. A total of 7,275 of the 338,210 unique phone numbers (2.15%) had both lifespan data and category data. They were associated with 124,573 ads, about 4.2% of the total of 2,992,069 ads.

RESULTS

Figure 1 shows the percentage of phone numbers in each category. Escort ads account for over 90% of all the phone numbers.

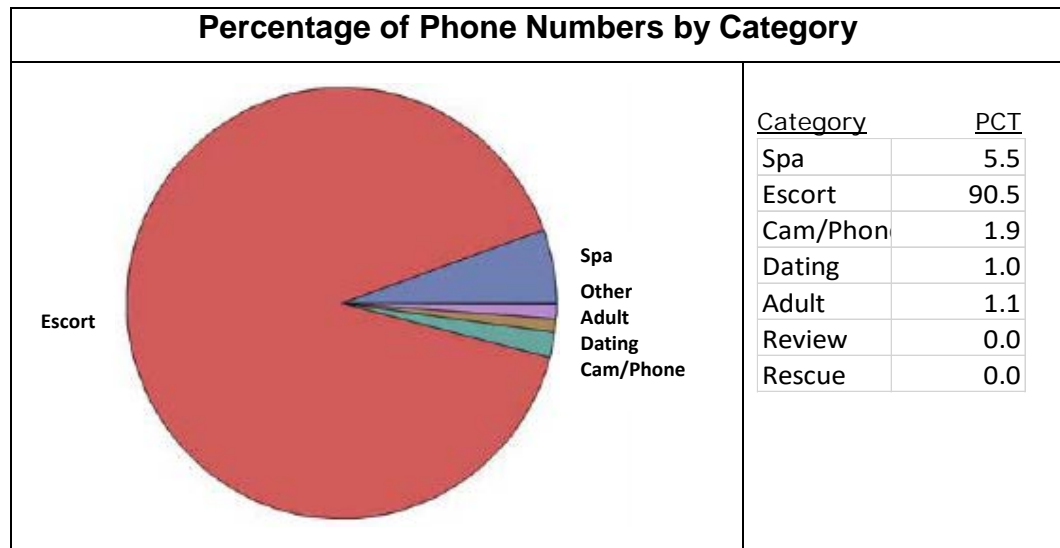


Figure 1. Phone Numbers by Category

Table 1 provides more detailed information on the phone numbers and ads associated with each category. The escort business clearly dominates the others in terms of both ads and associated phone numbers. Figure 2 presents an overview of the distribution of the 124,573 ads across categories. Escort ads are the largest single category accounting for 62.2% of the ads. Spa ads and Webcam/Phone sex ads are the next most frequently

observed, each accounting for over 14% of the ads.

Category	Phone Numbers	PCT of Phone Numbers	Number of Ads	PCT of Total Ads
Spa	402	5.5%	18,339	14.7%
Escort	6,581	90.5%	77,477	62.2%
CamPhone	136	1.9%	18,098	14.5%
Dating	75	1%	1,621	1.3%
Adult Entertainment	78	1.1%	7,764	6.2%
Reviews	1	0.0%	1	0.0%
Rescue	2	0.0%	1,273	1%
Total	7,275	100%	124,573	100%

TABLE 1: Percentage of Phone Numbers and Ads By category

INTENSITY

Figure 2 shows the distribution of ads by frequency for all ad categories. The number of ads that a phone number appears in is an important clue that tells us something about the size and intensity of the underlying organization. Most phone numbers appear in only a few ads.

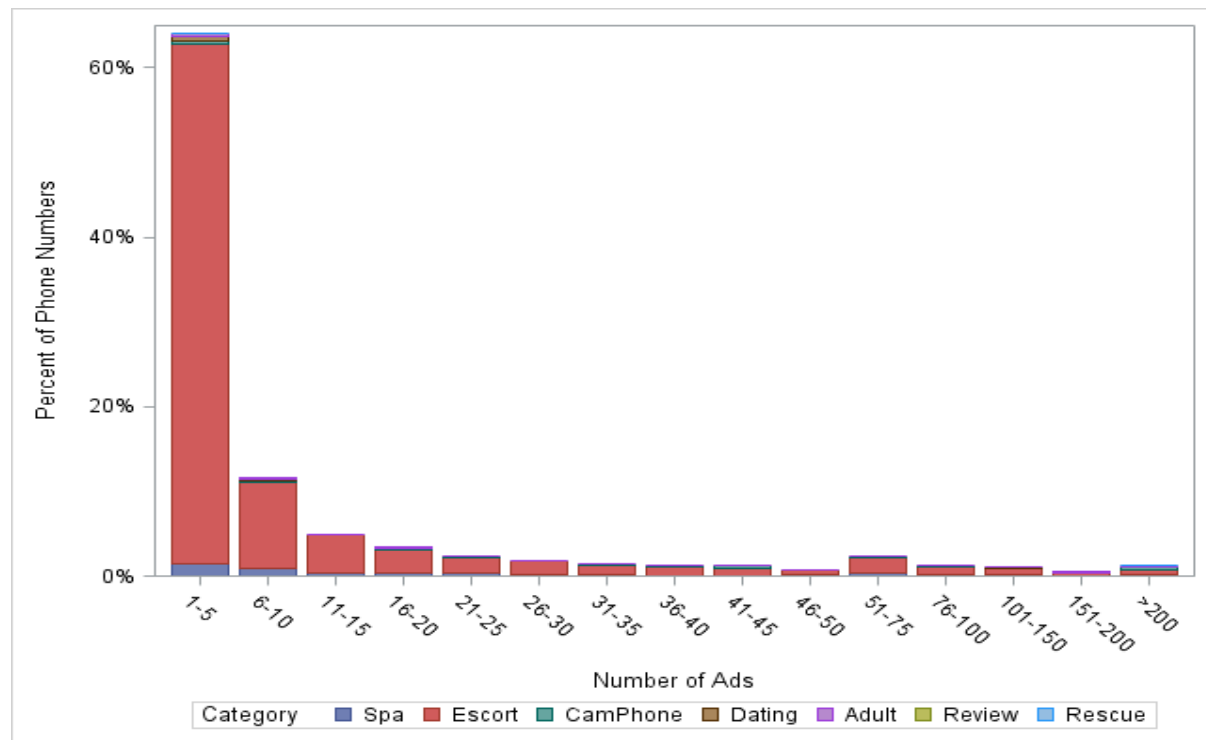


Figure 2: Ads Associated with a Phone Number by Category

GEOGRAPHY

Are some phone numbers posted in many more locations than others? The number of locations in which a phone number is advertised varies across categories. Dating sites and organizations that offer Webcam/Phone sex can conduct business anywhere that an internet connection is available. They tend to advertise over a wide geographical range. In contrast, the spa and escort businesses, which are most often implicated in human trafficking, need a local presence. Escort and spa ads from the same organization (i.e., the same phone number) in locations far apart, suggests that there is one organization with multiple units. Traveling long distances or supporting distant operations is not practical in this context.

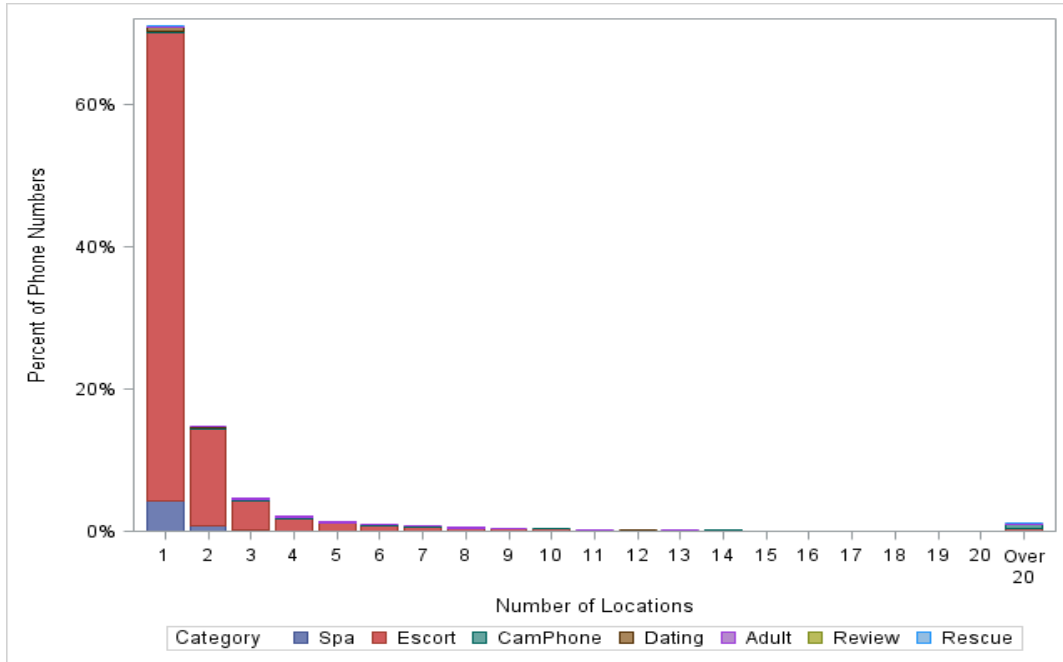


Figure 3: Number of Locations by Ad Type

Over 60% of the escort phone numbers appeared in only one location. The other may be associated with networks, such as the network of escort ads in Figure 4.



Figure 4: A Sample Network

Because these locations are so far apart, local law enforcement agencies may not know they are part of a larger organization

When the frequency of escort ads were examined, there were three phone numbers that had a large number of ads. However, the ads for these numbers were all in the same geographic area. Police are more likely to find these patterns fairly quickly since the large number of ads are in a concentrated area. Unlike ads which are posted in a variety of geographic areas. For example, one phone number was associated with escort ads in 16 different geographic locations (Figure 5).

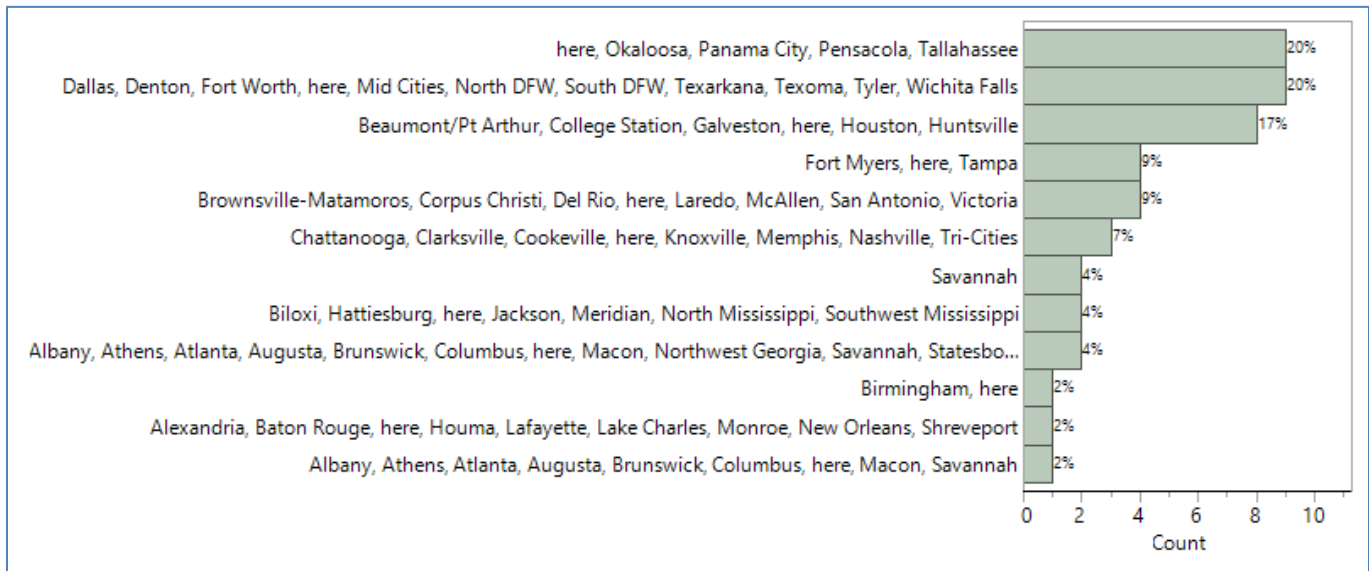


Figure 5: Geographic Posting Locations of One Escort Ad Phone Number

Sometimes the ads that are posted in the different locations are the same text and contact information across all instances of the ad. Sometimes they are not because the poster is marketing different services, which makes it even more difficult for law enforcement to track. Occasionally, you have posters that try multiple marketing techniques to draw customers into one or more services.

The example give in Figure 5 is one example of this multi-market technique. The poster using the same phone across 16 geographic areas had one ad that marketed multiple escorts:

“3 girls Come see me and I promise you wont regret it! Promise it will be worth it. I’m here waiting, new to town.baby call now for more info On rates and scheduling.334-###-#### *No law inforcement *Serious inquiries only PS u are paying for my time whatever happens then happens we are two consenting adults. *cash only Incall only in local area”

They also had two other ads that offered similar services for free:

“Looking for no-strings-attached sexy hookups in Savannah? Want to hook up? On our website what you see is what you get: REAL profiles, REAL photos, REAL local people looking for no-strings sex. We specialize in arranging discreet sexual encounters between consenting adults as well as nude cam chat and adult personals. Over 40 MILLION members! Create your free profile, verify your email, start searching, and GET LAID tonight, FREE!”

While their last post which occurred 43 times went the route of recruitment:

“Unemployed like to travel Have bills to pay need money fast I can help you. I have been helping Females get back on their feet towards financial gain for years helping make good safe discreet money. No Experience is needed, Must be 18 + motivated and Open-Minded. Please send name age location three up to date pictures one face picture two full body Picture.< For a faster response text information 334##### to start today.please txt me if you don't get no answer”

PERSISTENCE

How long are phone numbers used before they disappear? Compared with the average 2.83 years consumers keep their iphones (Krouse, 2018), the phones used in sexually-oriented online classified ads have very short lifespans. Table 2 shows that adult entertainment is the category of phones with the largest percentage (3.8%) still in service in the 25-27 month range. Just 3.4% of the phones used in escort ads were still in service.

Category	Percentage of Phone Numbers In Service						Total
	< 9 Months	9-12 Months	13-16 Months	17-20 Months	21-24 Months	25-27 Month	
Spa	30.3	40.8	11.7	4.7	8.7	3.7	402
Escort	66.8	15.7	4.2	2.9	6.9	3.4	6581
Webcam/Phone	19.9	55.1	23.5	1.5	0.0	0.0	135
Dating	66.7	22.7	6.7	1.3	2.7	0.0	75
Adult Entertainment	20.5	44.9	17.9	5.1	7.7	3.8	78
Reviews	100.0	0.0	0.0	0.0	0.0	0.0	1
Rescues	50.0	0.0	50.0	0.0	0.0	0.0	2
Overall PCT	63.4	18.2	5.2	3.0	6.8	3.3	7275

Table 2. Percentage of Phone Numbers in Service

The number of months in which escort phone numbers are used drops off rapidly. The “Total” column in Table 2 contains the total number of phones that were used to calculate the percentages. The overall evidence suggests that the phone numbers associated with escort ads have shorter lifespans than other categories of ads. After 12 months, the number of phone numbers in all of the categories drops off, possibly because of the use of annual contracts.

MOVEMENT

Do trafficking organizations move to new locations? When a phone number disappears from ads in one area, is it really discarded, or does it “move” to another area? Table 3 shows the results.

Persistence and Movement of Escort Phone Numbers			
Months	PCT Found in the Same Location(s)	PCT Found in Different Location(s)	PCT Not Found Anywhere
< 9	58.6	8.2	33.2
9-12	9.3	6.5	84.3
13-16	1.9	2.4	95.8
17-20	0.6	2.4	97.1
21-24	1.9	5.0	93.1
25-26	0.7	2.7	96.6

Note: N= 6581 phone numbers from February 2016 and earlier.

Table 3: Persistence and Movement of Phone Numbers

An initial list of locations and escort phone numbers that were available in February, 2016 and earlier was created. Then those phone numbers were tracked through the remaining months. Phone numbers that never departed from the initial set of locations were coded as “Found in the same cities.” Phone numbers that showed up anywhere outside of the initial area were counted as “Found in different cities.”

About 15.8% of the phone numbers found in the initial stage of our analysis were found to be active 9-12 months later. 9.3% were in the same locations and 6.5% showed up in at least one new location, and 84.3% could not be found. Since the latter part of the data collection covered 44 states and Washington, D.C., for 26-27 months, these results seem fairly conclusive.

DISCUSSION

The number of ads for escort services posted on classified ad websites, such as backpage.com, is a testimony to the size of the escort industry and to the importance of the internet as a platform for monetizing human trafficking. Escort ads accounted for 62% of the total ads in this dataset and 90.5% of the phone numbers shown in sexually-oriented ads were associated with escorts (Table 1). Results suggest the pattern of use for escort ads is different from the patterns exhibited by legal businesses. Compared with other categories, phone numbers used in escort ads are more likely to disappear after a few months of service. By the 12th month only 25% of the phone numbers associated with escort ads still remain in service. The rapid drop in the first few months suggests that some traffickers may be using temporary phones or phone numbers that can be dropped without a large penalty. Another drop in phone numbers, which occurs around the 12th month is consistent with the use of premium phones with one year contracts.

The short term use of phones suggests that traffickers understand that the phone numbers are a significant source of vulnerability. It is possible that some traffickers may move periodically to avoid attracting too much attention from law enforcement in one area. With a dataset that encompasses 44 states and the District of Columbia, it is doubtful that we missed too many traffickers based in the southern U.S.

CONCLUSIONS AND RECOMMENDATIONS

Our study is an initial response to the Louisiana State Police, Special Investigations Division’s request for help. Although this research provides some information about the

use and life expectancy of phone numbers, there is much more work to be done.

Trafficking organizations may continue to operate for many years. Given the evidence that they change phone numbers frequently, it would be very useful to find ways to link the new phone numbers to the underlying organization. The present study focused on the use of meta-data to try to understand how the phones are used. The next step is to use the content of the ads to identify similarities that two sets of ads with different phone numbers share a common source.

REFERENCES

- Krouse, S. (2018). Upgrade? No Thanks. Americans are sticking with their old phones: contract changes, pricier smartphones lead consumers to keep their devices longer. *The Wall Street Journal*. October 29, 2018. https://www.wsj.com/articles/upgrade-no-thanks-americans-are-sticking-with-their-old-phones-1540818000?mod=rss_Technology. Accessed 3/28/2019.
- Kuzma, A. L. (2012). Game Plan to Fight Human Trafficking: Lessons from Super Bowl XLVI. *DePaul Journal of Women, Gender, and the Law*. 2, 2, 129-172.
- Van Grove, J. (2017). Emojis and Sex-Trafficking: SDSU researchers crack the code. *The San Diego Union-Tribune*, May 26, 2017. <http://www.sandiegouniontribune.com/business/technology/sd-fi-emojis-trafficking-20170526-story.html>. Accessed 3/28/2019.
- Van Scotter, J., McGaugh, M., & McManus, D. (2018). The life expectancy of phone numbers in escort ads. Proceedings of the SAS® Global Forum 2018 Conference, Denver, CO. SGF2018-2309.

ACKNOWLEDGEMENTS

This research was supported by: Louisiana State University, the Sneha Bhandari Memorial Fund, and SAS®. Special thanks to Bit Hasheminezhad, Dr. Peter Leong, Rohan Kotwani, Camille DeMars, Srividhya Naraharirao, and David Witchurch for their help in collecting the data and preparing it for analysis. Finally, thanks to Tom Sabo of SAS® for answering our many questions about SAS® Viya and Visual Text Analytics and helping us learn how to use them.

SAS and all other SAS Institute Inc. product or service names are registered trademarks or trademarks of SAS Institute Inc. in the USA and other countries. ® indicates USA registration.

Other brand and product names are trademarks of their respective companies.

CONTACT INFORMATION

Your comments and questions are valued and encouraged. Contact the author at:

James R. Van Scotter

Louisiana State University 225-578-4792

jvanscot@lsu.edu