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Why We Cannot Identify Human Trafficking from Online Advertisements

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ABSTRACT

Numerous studies have attempted to identify instances of human trafficking through online sex advertisements. In this paper, I critically examine why these studies fall short of their claims, highlighting a paucity of empirical evidence to back their assertions. I identify seven issues in this research area: overstated objectives, a lack of evidence concerning the accuracy of human annotators and trafficking indicators, subjective interpretation of these indicators, an assumption of the veracity of ads as true representations of sex workers, a tendency to conflate human trafficking with sex work, and an oversimplified understanding of the experiences of human trafficking victims. While offering potential solutions to these problems, the paper ultimately concludes that it remains unlikely for research to detect victims of human trafficking based solely on online ads.

KEYWORDS

Online ads; identify human trafficking; sex work; human trafficking indicators



Introduction

Human trafficking is among the most challenging crimes to research due to limited data. Traffickers go to great lengths to conceal their illicit activities, and victims frequently either fear reporting these crimes or do not even recognize themselves as victims (Weitzer, 2015). The sparse data available often come through the lens of law enforcement or other official agencies (e.g., Bjelland, 2017; DiRienzo, 2022; Farrell, 2014; Mancuso, 2014). However, these data are frequently shaped by the agencies' priorities, goals, resources, and pressures (Cockbain et al., 2020).

With the proliferation of online sex advertisements, the landscape shifted (J. L. Musto & Boyd, 2014). The academic community suddenly had access to a vast array of sex worker profiles at their fingertips. From these profiles, researchers could extract information and deduce potential cases of human trafficking. This development, along with a heightened awareness of the harms of human trafficking, coincided with numerous research initiatives in the field, as highlighted by Dimas et al. (2022).

The purpose of this paper is to critically examine this area of research. Specifically, I argue that these articles often fall short of their claims, and their conclusions are less certain than they appear. The primary aim of this work is to temper expectations about the actual evidence these studies offer, and to dispel the exaggerated belief in their ability to identify human trafficking. In conclusion, I emphasize that, despite certain advancements, we will never be able to discern human trafficking from online ads alone.

The rest of the article is organized as follows: first, I provide some background surrounding the criminalization of sex ads. This is followed by an examination of the existing literature and a critique of

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its primary shortcomings. I conclude with a discussion on potential improvements in this research domain and offer recommendations for those engaged in this field.

The Criminalization of Sex Advertisements

Digital technologies have transformed how we buy and sell many goods and services, including sex. Between 2000 and 2010, the internet became the primary medium for advertising sex worker services. This has made it easier for sex workers to find clients (Cunningham & Kendall, 2011; Sanders, Campbell et al., 2018). Some argue it has even made the profession safer (Campbell et al., 2018; Sanders & Platt, 2017), but also more visible to the public (Sanders et al., 2020).

Increased visibility led to greater regulatory scrutiny on platforms promoting sex services (J. Musto et al., 2020). Craigslist, once the main U.S. platform for such ads, first renamed its “Erotic Services” to “Adult Services” before shutting it in 2010 (Dixon, 2013; Latonero, 2012). After the shutdown, sex advertisements shifted to other areas of the same site or migrated to Backpage and similar platforms (Heil & Nichols, 2014). In 2018, the FOSTA (Allow States and Victims to Fight Online Sex Trafficking Act) and SESTA (Stop Enabling Sex Traffickers Act) bills effectively outlawed any sex-related advertisements due to potential ties with sex trafficking or prostitution.

The U.S. was not alone in targeting websites advertising sex workers. In 2022, the UK proposed a clause specifically targeting platforms that were inciting or controlling prostitution for gain. Although Parliament later amended the bill to remove this clause, it underscores the growing concerns about online ads. Campana’s report (2022, p. 33) further reinforces this viewpoint, noting that British authorities regard these advertisements as “the most significant enabler of sexual exploitation linked to human trafficking in the UK.”

Even if not all platforms advertising sex ads are criminalized, they frequently face negative portrayals in popular media by lawmakers and law enforcement. Such portrayals are typically marked by exaggerated claims, a dose of moral panic, and a tendency to conflate human trafficking with the sex market (Brooks-Gordon, 2018; Spencer & Broad, 2012).

The book *Taking Down Backpage* illustrates this vividly (Krell, 2022). Written by prosecutor Maggy Krell, who led the shutdown of Backpage, the book’s subtitle even refers to the platform as “the World’s Largest Sex Trafficker.” In the book’s blurb, Krell portrays Backpage’s owners as “traffickers” profiting “millions of dollars” from the sale of “vulnerable young people.” Yet, despite these claims, they were charged only with facilitating prostitution and money laundering. The many references to child sex trafficking in a case where no one was charged with such a crime led Federal Judge Susan Brnovich to declare a mistrial in the case (Billeaud, 2021).

In fact, the actual extent of how many victims of human trafficking are advertised online is currently unknown. This was the conclusion of a systematic review by Gezinski and Gonzalez-Pons (2022), aimed at synthesizing the existing empirical evidence on online-facilitated sex trafficking. The authors emphasize the scarcity of empirical studies exploring the relationship between sex trafficking and technology. They could only locate 12 studies where victims were advertised online, and the count of advertisements for exploited sex workers ranged from a mere six to a maximum of 458. Most of these studies rely on small sample sizes and convenience sampling, making it difficult to generalize or determine the true prevalence of the issue.

This is not to deny that victims of human trafficking are exploited online, or that traffickers use advertisements to further profit from these victims. However, the actual scale of this phenomenon remains unclear. While every single victim advertised online deserves utmost attention, making exaggerated claims without evidence does not contribute to a deeper understanding of the complex issue of human trafficking.

Detecting Human Trafficking through Online Advertisements

The narrative linking sex advertising to human trafficking captured the attention of the academic community studying this issue. For the first time, scholars believed they had a vast amount of data at their disposal. These advertisements were believed to provide an insight into a phenomenon that was traditionally elusive and concealed. Scholars with advanced digital and statistical skills could gather and manipulate information from these ads and derive insights about human trafficking.

The studies analyzed in this paper are based on a systematic review by Dimas et al. (2022). This systematic review focused on the aspects of human trafficking being studied by operations research and analytics researchers, as well as the specific methods applied in the anti-human trafficking domain. The review was conducted using the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines. Through this method, Dimas et al. (2022) identified 39 studies that utilized online ads to detect human trafficking for sexual exploitation. The list of studies in this domain, and analyzed in this article, grows even longer when we account for those excluded due to the strict inclusion criteria of the systematic review, such as those by Latonero (2011, 2012), Skidmore et al. (2018), and L'Hoiry et al. (2021).

Methods for “Detecting” Sex Trafficking & Findings

This area of research primarily adopts two main approaches. The first approach involves collecting thousands of online ads and assessing them for pre-identified indicators of human trafficking (Giommoni & Ikwu, 2021; Ibanez & Gazan, 2016; Ibanez & Suthers, 2014; L'Hoiry et al., 2021; Latonero, 2011; Skidmore et al., 2018). Often referred to as “red flags” or “markers,” these variables may suggest that an advertised sex worker is being exploited. The more these indicators are present, the higher the likelihood that the ad could signal human trafficking or at least raise suspicions (Volodko et al., 2020). General indicators of trafficking, relevant to diverse forms of exploitation, include a lack of proficiency in the local language, controlled movements, or originating from areas known as sources of human trafficking (UNODC, 2024). Others, more specific to sexual exploitation, include offers of risky or violent services (for examples unprotected sex or bondage) and exclusive in-call services (i.e., when sex workers offer only the option for clients to visit their location, but do not travel to the client’s venue). These markers indicate potential trafficking either because they reveal vulnerabilities, suggest external control, or hint at limited personal agency.

Results from this research approach vary significantly, largely due to the differing indicators considered and their operationalization. For example, Ibanez and Suthers (2014) analyzed 1,436 advertisements from Hawaii and found that 82% had at least one indicator, while 26% had three or more. Conversely, Giommoni and Ikwu (2021) discovered that, of the 17,362 UK-based ads analyzed, 58% displayed only one out of 10 possible human trafficking indicators. None had five or more indicators, and just 11 had four. Within the same UK context, Skidmore et al. (2018) identified 73 profiles from 795 advertisements sharing the same phone number, considered an indicator that sex workers might be under the control of a single entity exploiting them.

The second approach employs machine learning and various data mining techniques, including natural language processing, to identify potential human trafficking ads (Alvari et al., 2017; Burbano & Hernandez-Alvarez, 2017; Dubrawski et al., 2015; Li et al., 2018; Portnoff et al., 2017; Tong et al., 2017). This advanced method leverages vast datasets of ads, often numbering in the tens of thousands or even millions, filled with unstructured text. Researchers use algorithms – from random forests and logistic regression to Support Vector Machines and deep multimodal models – to differentiate between suspicious and non-suspicious ads based on various information. The challenge, however, is validating the accuracy of these algorithms, which requires a “ground truth” – a known set of ads from exploited sex workers. Sadly, such a database does not exist, so researchers have had to devise creative solutions to establish a baseline.

These solutions are human annotators and “hard identifiers.” First, experts in human trafficking are tasked with annotating a subset of sex worker ads. Their annotations can either be binary,

distinguishing ads as “of interest” or “not of interest” (Alvari et al., 2016, 2017), or use a seven-level risk scale ranging from “certainly no” to “certainly yes” (Tong et al., 2017; Wang et al., 2020). The second method involves using “hard identifiers” – definitive evidence within the ad suggesting the sex worker is exploited. The most common identifier is the recurrence of the same phone number across multiple ads (Portnoff et al., 2017). An algorithm is deemed accurate if its classification aligns with those of human annotators or if it correctly identifies recurrent phone numbers.

Beyond merely identifying victims, some studies offer insights into the purported organizations exploiting these sex workers. These insights often arise from geospatial and network analyses, revealing both the trafficking routes and the organizational structure of the exploiting groups. Certain researchers describe these movements as “circuits,” referring to “the systematic movement of providers between cities. . . suggesting a more organized and sophisticated criminal activity” (Ibanez & Gazan, 2016, p. 1557). **Figure 1** shows examples of such circuits as presented by Ibanez and Gazan (2016) and Keskin et al. (2021). This insight into probable movement patterns and the organizational structures aims to assist law enforcement in pinpointing traffickers.

This collection of studies holds significant merit: they introduced new and creative methods to explore human trafficking. In an environment characterized by a lack of data, the authors devised sophisticated and inventive approaches to deepen our understanding of human trafficking and its organization. Most importantly, they serve a noble purpose: supporting and rescuing victims of human trafficking.

Tool Development

A related research application involves tool development by private organizations and law enforcement agencies. The first group includes tools like Spotlight from Thorn, Traffic Jam by Marinus Analytics, and TellFinder currently owned by the company Uncharted Software. Law enforcement authorities in countries like Latvia, Finland, Hungary, Germany, Austria, and Norway also seem to have developed bespoke tools for detecting online human trafficking (Campana, 2022).

These tools, in many respects, echo the methodologies described earlier: they use different computing techniques to identify human trafficking from online advertisements. However, their exact workings are not well-documented, as their methodologies are not published in academic outlets, making them somewhat opaque. They seem effective at pinpointing trafficking victims using phone numbers or images of known exploited individuals. Often, they employ indicators of human trafficking, spatial analysis, and network analysis. Many experts highly regard these tools (L’Hoiry et al., 2021), and notably, there are claims that they have assisted in rescuing thousands of victims (Brewster, 2022).

These tools are included here to provide a comprehensive overview; however, due to their “black-box” nature, future critiques of the methodologies discussed will not specifically address them. This is not because such critiques are irrelevant, but rather because their inner workings remain unknown,

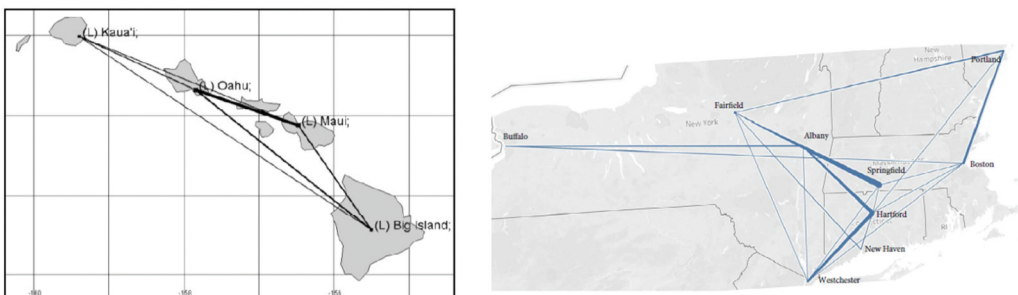


Figure 1. Movement patterns or circuits of suspected victims of human trafficking. Source: Ibanez and Gazan (2016) Source: Keskin et al. (2021)

making it difficult to pinpoint specific limitations. Additionally, it is important to note that the primary purpose of these tools is to support law enforcement investigations, extending beyond their application to sex advertisements.

Limitations of This Research Approach

Despite the commendable intent, many of these studies have several limitations that prevent them from fully achieving their claims. In this section, I discuss seven issues impacting the reliability of using online ads to detect human trafficking. I systematically address and build on some of the critiques previously leveled against this research approach (Bee, 2021; Holt et al., 2021; Kjellgren, 2022; Sanders, Campbell et al., 2018; Sanders, Scoular, et al., 2018). A list of these problems can be found in Table 1, whereas Table SA in the Annex details the studies impacted by the listed problems.

Overclaiming Detection Capabilities

First, some studies exaggerate their scope by claiming they can identify instances of human trafficking. These studies cover a wide range. A few are quite overt in their claims, evident from their titles: “Detection and Characterization of Human Trafficking Networks Using Unsupervised Scalable Text Template Matching” (Li et al., 2018, p. 3111), “Semi-supervised Learning for Detecting Human Trafficking” (Alvari et al., 2017, p. 1), and “Ensemble Sentiment Analysis to Identify Human Trafficking in Web Data” (Mensikova & Mattmann, 2018, p. 5). Others are more understated, but their titles still suggest advancements in identifying human trafficking victims. For example: “Cracking Sex Trafficking: Data Analysis, Pattern Recognition, and Path Prediction” (Keskin et al., 2021, p. 1110), “Backpage and Bitcoin: Uncovering Human Traffickers” (Portnoff et al., 2017, p. 1595), and “An Entity Resolution Approach to Isolate Instances of Human Trafficking Online” (Nagpal et al., 2017, p. 77).

Leaning toward caution, some studies issue warnings about how their results should be interpreted, despite having titles that may seem overly optimistic. This ranges from acknowledgments of issues such as the absence of a ground truth – “Due to the lack of ground truth, we relied on human analysts for hand-labeling a small portion of the filtered data” (Alvari et al., 2016, p. 133),—to explicit concerns about data reliability: “we need to be cautious about interpreting the results and their implications” (Li et al., 2018, p. 3113). In a minority of cases, authors explicitly acknowledge that the study can, at best, highlight potentially suspicious advertisements but cannot definitively identify human trafficking (Volodko et al., 2020).

Despite their claims, no study can confidently assert its ability to identify human trafficking. For such assertions, they would need to delineate their percentages of true positives (genuine cases of exploitation correctly identified by the algorithm), true negatives (independent sex workers not involved in

Table 1. Overview of Challenges and Solutions in Human Trafficking Research via Online Ads.

#	Problem	Why it matters	Mitigation Strategy
1	Overclaiming detection capabilities	Create hype about study capabilities	Focus on flagging <i>suspicious</i> ads without overstatements
2	Inaccurate annotator judgments	Mislabels sex workers as trafficking victims, and vice versa	Validate and ensure annotator consistency
3	No empirical basis for trafficking indicators	Misidentifies sex workers as trafficking victims, and vice versa	Evaluate indicators sensitivity and specificity
4	Subjective operationalization of indicators	Makes indicators non-reproducible and undermines study reliability	Set clear, objective criteria for indicator operationalization
5	Assuming ads truthfully represent sex workers	Ad content might not reflect the actual situation	Recognise the inferential nature of the analysis over direct observation
6	Mixing up trafficking with sex work	Blurs the distinction between independent sex work and trafficking	Emphasize the distinct characteristics of trafficking and independent sex work
7	Binary view of victimization	Overlooks the nuanced experiences of victims	Integrate nuanced understandings of victim experiences, avoiding binary classifications

trafficking), false positives (cases incorrectly classified as human trafficking victims when they are actually independent sex workers), and false negatives (cases wrongly labeled as independent sex workers when they are, in fact, victims of human trafficking). Most crucially, these classifications should be anchored by definitive evidence of human trafficking in the ads – evidence that is then substantiated through police investigations and validated in a criminal court. It should not rely solely on assumptions made from specific identifiers or human annotators. Since no studies have empirically demonstrated this level of verification, claiming that they can identify human trafficking is baseless.

Inaccurate Annotator Judgments

Secondly, the accuracy of human annotators in labeling cases of human trafficking remains uncertain. Determining if someone is being exploited typically necessitates extensive police investigations, which involve speaking to witnesses and informants, tracing illicit money flows, executing search warrants, and more (Bales & Lize, 2007; Farrell et al., 2008, 2014). However, experts are tasked with labeling potential human trafficking cases based solely on the limited information within an ad. While some subject matter expertise might assist in this task, confidently making such judgments based purely on scant information is challenging. Unless the authors can verify the accuracy of human annotators, their labeling might only be marginally more reliable than random guessing.

No Empirical Basis for Trafficking Indicators

Thirdly, the selection of indicators used in these studies often seems arbitrary, rooted more in the authors' assumptions than in empirical evidence. For instance, Ibanez and Suther regard “references to ethnicity or nationality” (2014, p. 1559) within advertisements as a sex trafficking indicator. However, they offer no explanation as to how a mere mention of nationality, regardless of the specific country, would help in identifying victims of human trafficking. Other studies imply that originating from certain countries is indicative of human trafficking, as migrants might be more susceptible to exploitation (L’Hoiry et al., 2021). Such an approach leans heavily on stereotypical perceptions of human trafficking victims: envisioning a naive, desperate young woman from Eastern Europe who, after a series of misfortunes, finds herself exploited in a brothel (Zhang, 2009).

Empirical data challenge this oversimplified notion, presenting a far more diverse and intricate reality. For example, in the UK, the National Referral Mechanism statistics from 2014 to 2022 indicate that British nationals were the predominant group identified in modern slavery cases, comprising nearly 25% of the total. Given these data, being a UK native should be seen as a greater risk factor than being a migrant.

The use of phone numbers as an indicator of human trafficking warrants particular attention. Often, the use of a shared phone number is viewed as a strong indicator of human trafficking, suggesting that multiple sex workers using the same number might be under the control or management of a single entity exploiting them (Dubrawski et al., 2015; Giommoni & Ikwu, 2021; Keskin et al., 2021; Portnoff et al., 2017). While this is a valid concern, there are alternative explanations. For instance, independent sex workers might choose to collaborate and share a phone number for various reasons. Additionally, escort agencies and massage parlors could use a common number to promote the services of multiple sex workers (Kjellgren, 2022; Sanders, Scoular, et al., 2018). It is then crucial to note that the reliability of this as a definitive indicator is uncertain. How many sex workers advertising under a shared number are, in fact, victims of trafficking? Empirical evidence to answer this question does not exist. Therefore, it should not be automatically deemed a definitive identifier.

There is a parallel argument regarding the use of third- or first-person plural pronouns, which are often cited as common indicators of human trafficking. It is challenging to understand how traffickers, often depicted as sophisticated groups employing advanced methods to evade law enforcement (Alvari et al., 2016; Dubrawski et al., 2015; Zhu et al., 2019), could simultaneously lack the foresight to realize that referring to victims using pronouns like “she” or “they” might make them easily identifiable. Moreover, using third-person references when advertising someone’s services is commonplace. This

style of self-presentation is popular among various professions, suggesting that sex workers might adopt this tone to project a more professional image.

Subjective Operationalisation of Indicators

Fourth, the operationalization of some indicators seems discretionary and arbitrary. For example, Skidmore et al. (2018) identified a low level of English proficiency as an indicator of human trafficking. Similarly, L'Hoiry et al. (2021) point to poor grammar and misspellings as indicators. But what exactly defines low proficiency in English or poor grammar? Regrettably, there is no quantifiable or objective standard for assessing the readability of these advertisements, especially given their frequent use of slang and colloquialisms. As a result, these indicators are largely based on the subjective judgments of researchers, rendering them not easily reproducible.

Assuming Ads Truthfully Represent Sex Workers

Fifth, these studies assume that advertisements offer a truthful representation of sex workers. However, there is a plausible, if not high likelihood, of discrepancies between these advertisements and the actual realities (Bee, 2021; Holt et al., 2021; Kjellgren, 2022; Sanders, Campbell et al., 2018; Sanders, Scoular et al., 2018). For example, sex workers from Eastern Europe might present themselves as being from Italy to sidestep racial biases. They might claim to be in their late 20s when they're in their late 30s. Or, they might advertise risky and unprotected sex, only to decline them upon request. It is essential to remember that the primary aim of advertising is to attract clientele, not necessarily to provide an accurate account. In regulated markets, there are rules in place to prevent misleading clients about a product's nature. However, in criminalized and heavily stigmatized markets, advertisers have the liberty to present as they see fit. Just as someone purchasing heroin cannot make a formal complaint about the drug's impurity, clients of sex workers cannot formally complain if a 40-year-old is advertised as being 20. As Kjellgren's analysis (Kjellgren, 2024) of the UK off-street sex markets shows, "marketing strategies are not necessarily truthful." This is reminiscent of what Letizia Paoli describes as the consequences of operating "without the state" (Paoli, 2002, p. 64).

Mixing Up Trafficking with Sex Work

Sixth, there is a tendency in some studies to conflate human trafficking with sex work. This is illustrated by Keskin et al.'s (2021) observation:

the documented stories suggest that the site [SkipTheGames.com] does facilitate sex trafficking. Moreover, prostitution is illegal in almost all U.S. states [...]. Thus, the majority of the activity on the site is viewed as criminal activity from the perspective of law enforcement, even if it is not sex trafficking. (p. 1112)

While this claim is technically accurate, shifting the focus from human trafficking to sex work is not analytically sound. In human trafficking, a person is forced or coerced into sexual acts and has little control over their choices, including clients, working conditions, and work hours. The literature on sex work is broad, with various perspectives (Weitzer, 2009). Generally, the distinction is that in sex work, individuals willingly provide services and maintain some control over their life and work (Weitzer, 2022). In short, sex work and human trafficking are distinct phenomena that require different research methods and policy approaches. Authors must clearly specify whether their research investigates human trafficking or sex work. Merging these concepts muddies the waters, leaving readers no clearer on either issue.

Binary View of Victimization

Seventh, some studies (Alvari et al., 2016, 2017; Dubrawski et al., 2015; Portnoff et al., 2017; Zhu et al., 2019) tend to perceive human trafficking in binary terms: individuals are either innocent victims subjected to severe exploitation, abuse, and oppression, or they are independent sex workers. However, evidence suggests that victim experiences span a broad spectrum (Weitzer, 2015). On one end of this spectrum are women who are abducted and forced into the sex industry, lacking freedom of movement, receiving little to no compensation, enduring physical or sexual assault, and working

under extremely hazardous conditions. On the opposite end, there are those who face none of these adversities. Falling in between are various levels of mistreatment (Weitzer, 2015). Some might be unaware of their actual working conditions, earn less than promised, or work longer hours than agreed upon. Others might have their passports confiscated yet still enjoy some freedom outside working hours. Still, others might endure verbal abuse, demeaning tasks, or arbitrary fines, but not physical or sexual assault (Volodko et al., 2020; Weitzer, 2014, 2020; Zhang, 2009). As Kjellgren's (2024) research illustrates, the sex market operates along a continuum of organization, complexity, and varying levels of vulnerability and exploitation.

The dynamics between sex workers and their managers (often referred to as pimps) are also more nuanced than commonly depicted. For example, in studies conducted by Morselli and Savoie-Gargiso (2014) in Montreal, and Marcus et al. (2014) in New York and Atlantic City, there were multiple cases where a sex worker actively sought out a pimp. Furthermore, in many of these cases, there was scant evidence of deceit or coercion.

Studies that claim to pinpoint human trafficking often promote a narrative favored by the media – that of innocent victims fleeing desperate situations, only to be exploited, abused, unpaid, and confined in deplorable conditions (Kjellgren, 2022; Sanders, Scoular et al., 2018). While this portrayal effectively elicits an emotional response from readers, evidence suggests that the reality of victimhood is more diverse and multifaceted.

Improving Research on Human Trafficking and Online Advertisements

This section outlines how the research on human trafficking and online advertisements can be improved (Table 1 lists the primary issues, explains their significance, and suggests ways scholars can address them). Firstly, researchers must refrain from either directly or indirectly asserting that they can identify human trafficking. At most, such studies can highlight advertisements that, based on certain methodologies and assumptions, appear suspicious and warrant further scrutiny (Bounds et al., 2020; Volodko et al., 2020). Asserting the ability to definitively pinpoint human trafficking not only misrepresents the true scope of these studies, but also generates a false sense of confidence in the capabilities of these studies.

To address the second and third challenges, we must gain clearer insights into the validity of these studies. Specifically, future research should provide evidence regarding their sensitivity and specificity (Swift et al., 2020). Sensitivity refers to the capability to accurately identify victims of human trafficking (i.e., true positives), while specificity pertains to its ability to correctly recognize independent sex workers (true negatives). This validation is a major challenge in this research domain, a challenge also faced by screening tools service providers use for identifying victims of human trafficking (Hainaut et al., 2022; Macy et al., 2023).

A preliminary step, though not conclusive proof of validity, would involve compiling a list of empirically-tested indicators related to human trafficking. By doing this, we could determine if, for example, sex workers who frequently change locations are at a heightened risk of exploitation. More crucially, we could ascertain if sex workers sharing phone numbers are genuinely victims of human trafficking or merely pooling their resources. Through this process, it becomes possible to discern which variables truly indicate human trafficking and which ones merely reflect stereotypical or preconceived notions about human trafficking and sex work.

Similarly, and also not as proof of validity, authors should always demonstrate both intercoder and intracoder reliability. Intercoder reliability measures how much annotators agree when coding the same dataset, while intra-coder reliability checks the consistency of coding within a single annotator over time (O'Connor & Joffe, 2020). For example, if an annotator labels an advertisement as "of interest" and then changes that label two weeks later, the annotator's reliability is questionable. Likewise, the reliability of annotators should be considered suspect if they label the same advertisements differently. In reality, these checks are common in many studies (Alvari et al., 2016; Tong et al.,

2017), though reliability can vary. For instance, Tong et al. (2017) found that experts agreed on 62% of their choices when evaluating the same dataset.

To obtain concrete evidence of the validity of these instruments, it is necessary to compile a database of sex worker advertisements. Within this database, some ads should be from independent workers while others from confirmed exploited individuals. It should be emphasized that confirmed cases of exploitation must be established either by a court or through validated human trafficking identification tools. With these data, we could train a machine learning algorithm and then evaluate their ability to accurately distinguish between victims of human trafficking and independent sex workers. Without such a process, we can never truly ascertain the precision of these studies.

To tackle the fourth issue, researchers need to use methods that are both reproducible and objectively verifiable. For instance, if evidence proves that a low level of English proficiency is an indicator, researchers can use it to differentiate between victims and independent sex workers. However, they need to clarify their criteria for categorizing ads as either “low-level” or “high-level” English proficiency and demonstrate consistent results. In this way authors can guarantee a study’s consistency and reproducibility.

Addressing the fifth issue requires acknowledging the potential discrepancy between what advertisements portray and the actual reality (Sanders, Campbell et al., 2018; Sanders, Scoular et al., 2018). What is observed are not direct indicators of human trafficking but inferred ones, based on the content of ads. Sex workers are under no obligation to present factual details in their advertisements. Though it might not align with the highest ethical standards, such misrepresentation is not in itself proof of exploitation. It is essential to understand that genuine transparency in advertisements is typically expected in legal and regulated markets, but not in stigmatized and criminalized sectors.

Sixth, these studies must distinguish between human trafficking and sex work. While there is some overlap—i.e., a portion of sex workers may be victims of human trafficking – the two are distinct phenomena. Research must emphasize the differences between sex work and human trafficking, even where sex work is criminalized. For instance, an increase in sex worker advertisements during specific events, such as the Super Bowl, should not be interpreted as indicating a rise in human trafficking (Latonero, 2011; Miller et al., 2016).

Finally, studies must move beyond the oversimplified dichotomy of the stereotypical victim versus the independent sex worker. Exploitation exists on a spectrum, and the reality of victimization is far more nuanced, heterogeneous, and multifaceted than often portrayed (Volodko et al., 2020; Weitzer, 2015, 2020; Zhang, 2009). An ostensibly independent sex worker who refrains from offering risky services might still be under some form of exploitation. Conversely, a sex worker who shares a phone number with others or operates under an agency could very well be independent. A database of confirmed human trafficking cases could provide empirical evidence that exploitation does not follow a single typology.

To better grasp this complexity, I suggest integrating the firsthand experiences of human trafficking victims and sex workers into the research. This will provide a richer and more nuanced understanding of both phenomena. Much of the current research in this area is spearheaded by academics in computer science, operations research, and analytics. While they possess advanced technical skills, many lack a deep understanding of the subject matter. Involving both victims and independent sex workers can challenge prevailing assumptions and stereotypes, offering a more authentic representation of human trafficking and sex work.

Conclusions

By adopting the recommendations outlined above, researchers can significantly enhance this line of research. This approach will present a more balanced understanding of what these studies can truly achieve, offering insights into their validity (or lack thereof). Moreover, it will emphasize the distinction between advertising content and the actual services on offer, differentiate between voluntary sex work and exploitation, and provide an analysis that goes beyond preconceived notions and

stereotypes. Ultimately, these improvements will offer readers a clearer understanding of the studies' methodologies, implications, and inherent limitations.

However, even with these advancements, I predict that no study will ever accurately identify victims of human trafficking from online ads alone with full scientific credibility. The only exceptions might be cases where there is prior knowledge – for instance, when certainty exists that someone is a trafficking victim and their photos are located online, or when a specific phone number is known to belong to a trafficker and is traced to some sex worker profiles. Otherwise, relying solely on the information provided in the advertisements, such as writing patterns, services offered, movements, prices, etc., will never be sufficient to determine with scientific validity whether someone is being exploited.

A foundational fallacy underpins these studies: the notion that ads from exploited sex workers differ from those of independent ones. Yet, there is no evidence or reasoning to back this up. Both exploiters and independent sex workers are driven by the same incentive – to expand their customer base. Therefore, employing tactics like advertising risky sexual services, quoting lower prices, using emoticons extensively, or referencing youthful features will not aid in distinguishing between exploited and independent sex workers. Both groups have incentives to draw in maximum clients. Moreover, research suggests that in some instances, trafficking victims themselves write and post their ads, further blurring the lines between exploited and independent workers (Dank et al., 2015; Holger-Ambrose et al., 2013).

This does not imply that these studies are entirely without value. They can still serve to identify advertisements that appear suspicious, aiding in the rapid prioritization of cases that merit further attention. Practitioners must then employ more comprehensive and precise methods to confirm whether human trafficking is actually taking place. Indeed, these studies can contribute, as long as their limitations are fully acknowledged.

The use of these approaches must be managed to avoid the risk of unjustly increasing police scrutiny on sex workers and criminalizing platforms (J. Musto, 2020). If misused, such studies could trigger police raids on brothels, leading to arrests and, in some cases, deportation of independent workers (Bee, 2021; Holt et al., 2021). Several studies agree that the internet has had an overall positive impact on the sex market (Scott Cunningham & Kendall, 2011; Sanders & Platt, 2017; Sanders et al., 2019; Sanders, Campbell et al., 2018). Online platforms have helped sex workers reach large numbers of clients, build their reputation, avoid risks associated with street sex work, and aid them in performing preliminary checks on clients (Cunningham & Kendall, 2011; Cunningham et al., 2018). Shutting down advertisement websites can further marginalize legitimate sex workers who lose out on the benefits of these platforms and push them into more risky settings.

This article is not meant to point arbitrarily criticize researchers tackling this topic. Their objectives in pursuing such research are commendable: to combat human trafficking. I too once harbored optimism for this research avenue (Giommoni & Ikwu, 2021). However, the empirical hurdles in identifying trafficking victims are more challenging than anticipated. It is time for an honest reflection on what these studies can truly achieve and, more importantly, what they cannot.

In conclusion, my goal is not to dismantle this field of research; that is not the purpose of this article. Rather, it modestly seeks to highlight some of the weaknesses in studies that claim to identify human trafficking purely through advertisements. Despite my skepticism, I would genuinely welcome a study that nails down trafficking identification through advertisement analysis alone. If such a study were to emerge, I would be more than happy to be proven wrong.

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Appendix Annex 1

Table SA. Problems and Affected Studies in Research Using Online Sex Advertisements.

#	Problem	Affected Studies
1	Overclaiming detection capabilities	Alvari et al. (2016, 2017); Ardakani (2020); Chen, De Arteaga, and Herlands (2015); Dubrawski et al. (2015); Miller et al. (2016); Shahrokh Esfahani et al. (2019); Hultgren et al. (2018); Kennedy (2012); Keskin et al. (2021); Li et al. (2018); Mensikova and Mattmann (2018); Nagpal et al. (2017); Tong et al. (2017); Wang et al. (2020); Whitney et al. (2020); Zhu et al. (2019)
2	Inaccurate annotator judgments	Alvari et al. (2016, 2017); Kejrival and Kapoor (2019); Kejrival et al. (2017); Kejrival, Szekeley, and Knoblock (2018); Rabbany, Bayani, and Dubrawski (2018); Tong et al. (2017); Wang et al. (2020); Wiriyakun and Kurutach (2021)
3	No empirical basis for trafficking indicators	Ardakani (2020); Chen, De Arteaga, and Herlands (2015); Dubrawski et al. (2015); Hultgren et al. (2018); Ibanez and Suthers (2014); Kennedy (2012); Keskin et al. (2021); Li et al. (2018); Nagpal et al. (2017); Portnoff et al. (2017); Rabbany, Bayani, and Dubrawski (2018); Tong et al. (2017); Giommoni and Ikwu (2021); Skidmore et al. (2018); L'Hoiry et al. (2021)
4	Subjective operationalization of indicators	Skidmore et al. (2018); L'Hoiry et al. (2021); Diba, Antonopoulos, and Papanicolaou (2017); Latonero (2011)
5	Assuming ads truthfully represent sex workers	Alvari et al. (2016, 2017); Ardakani (2020); Chen, De Arteaga, and Herlands (2015); Dubrawski et al. (2015); Miller et al. (2016); Shahrokh Esfahani et al. (2019); Hultgren et al. (2018); Kennedy (2012); Keskin et al. (2021); Li et al. (2018); Mensikova and Mattmann (2018); Nagpal et al. (2017); Tong et al. (2017); Wang et al. (2020); Whitney et al. (2020); Zhu et al. (2019); Giommoni and Ikwu (2021); Skidmore et al. (2018); L'Hoiry et al. (2021); Ibanez and Suthers (2014); Ibanez and Gazan (2016); Portnoff et al. (2017); Wiriyakun and Kurutach (2021)
6	Mixing up trafficking with sex work	Latonero (2011); Miller et al. (2016); Keskin et al. (2021); Huang et al. (2022); Coxen (2021)
7	Binary view of victimization	Alvari et al. (2016, 2017); Dubrawski et al. (2015); Portnoff et al. (2017); Zhu et al. (2019); Shahrokh Esfahani et al. (2019); Mensikova and Mattmann (2018); Nagpal et al. (2017); Tong et al. (2017); Wang et al. (2020)