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# Gendering cybercrime

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Very few cybercrimes are committed by females. Therefore, there has been a dearth of research on this topic. It is important that we understand the relationships between gender and cybercrime, to inform crime prevention strategies and understand the particular problems female offenders may face. This research draws from extensive data gathered in relation to cybercrime offenders, both male and female. The research explores the types of roles female computer crime offenders take on, and their social experiences, finding that, compared to males, they experience more adverse life events. Reasons for the lack of female involvement in cybercrime include the barriers female face when engaging with the predominantly masculine online communities that are important for learning and sharing information.

Keywords: cybercrime; unauthorized access; hackers; computer fraud; gender

Parker (1998: 170) states "the only common factor among hackers is the use of personal computers and modems connecting them". Despite this, research, including Parker's own, indicates that cybercrime offenders possess some commonalities, and one of the most salient of these is gender, with the majority being men. Understanding why women are not only less likely to commit cybercrime offences, but also why some do, is useful when it comes to comprehending the nature of the overall problem. It is important that our understanding of offenders is based on empirical research, as it is noted that many romantic stereotypes abound, generated by the popular media. Margolis and Fisher (2002: 67) caution against continuing any misconceptions, or "geek mythology", about computer enthusiasts.

Cybercrime incorporates a variety of different types of offences, including gaining unauthorized access to a computer system with or without a further criminal motive, fraud, denial of service attacks, and the development and supply of malware. Offences that are solely of an interpersonal nature, such as online stalking or harassment, accessing child sexual exploitation material, or online grooming, are not included within the scope of this chapter (although we do include compromise of computer systems for these purposes, such as gaining access to a victim's email or social media account). Also excluded are copyright or online piracy offences, the online sale of illicit, counterfeit or stolen products, or offences that have been planned online or where there is online communication. The cybercrimes included within this chapter involve networked computer systems, including the Internet, as well as local networks.

Cybercrime offences may be technical or general in nature. Technical offences require a particular skill set or knowledge about computer systems. For example, 'unauthorized access' or 'hacking' may be achieved through *technical* means, such as malware or code injection. Alternatively, *general* methods include 'shoulder surfing', solely employing social engineering techniques, or misusing legitimate access to a computer system. Commonly known as 'insider abuse of access', the latter occurs when offenders abuse the trust they have been given, such as an employee or contractor accessing or altering an employer's data (Shaw et al. 1998). Furthermore, some scams and online frauds may also depend on the use of social engineering techniques (*general*), while others may be more complicated, including setting up fraudulent websites and distributing spam through the use of botnets (*technical*).

Automated tools may be used to detect vulnerabilities and automate exploits. Examples include vulnerability scanners, remote administration programs, port scanners, sniffers, and password crackers (Furnell 2002). Some tools are freely available to be downloaded online, while others can be purchased from online marketplaces (Chu et al. 2010; Holt and Lampke 2010). 'Script kiddie' is a term used to refer to someone that uses others' programs to obtain unauthorized access rather than developing their own (McQuade 2006). While some may scorn script kiddies, a technical understanding of computer systems is usually required to use automated tools successfully.

Many cybercrimes do not occur in isolation. For instance, unauthorized access may facilitate fraud. For example, compromised web servers may result in compromised credit card details. Web forums provide a marketplace for malware

(malicious software) and stolen data, as well as services such as the distribution of spam, web hosting, and proxy services, which may be used for fraudulent purposes (Chu et al. 2010; Franklin et al. 2007; Holt and Lampke 2010; Motoyama et al. 2011). Similarly, compromised email accounts or social media profiles may be used to disseminate spam promoting fraudulent pharmaceuticals or other products, and for the purposes of advance fee fraud. Furthermore, cybercrimes may be associated with other, more traditional, forms of crime, such as money laundering, handling stolen property, bribery and corruption (Hutchings and Holt 2015).

From all accounts it appears that cybercrime is predominantly conducted by males (Bachmann 2010; Chantler 1995; Jordan and Taylor 1998; Parker 1998; Schell and Dodge 2002; Taylor 1999; Turgeman-Goldschmidt 2005), with Chantler (1995) reporting that female hackers are perceived with either complete distain or with high regard by the general hacker community. Taylor (1999) states that the gender ratio at hacking conferences is approximately one female to every hundred males, and that often females are only transiently involved in the hacker subculture. Hollinger's (1993) study of college students found that 5.2 per cent of males and 1.8 per cent of females admitted to having accessed another's computer account or files without permission.

Interestingly, Skinner and Fream's (1997) research examining music piracy and unauthorized computer access by a student population indicated that 13.6 per cent of females sampled admitted to guessing passwords, 9.5 per cent admitted to accessing a computer account without permission to browse files and 2.3 per cent admitted to adding, deleting, changing or printing information in another's computer file without the owner's knowledge or permission. The percentage of males admitting to the same behaviors was 25.2, 22.7, and 10.5 respectively. However, Skinner and Fream (1997) purposely sampled students from university courses where students were required to have a high level of computer expertise, therefore the high involvement in these activities, particularly by females, may not be generalizable. The gender balance may differ according to cybercrime type, as those who engage in opportunistic crimes may have different characteristics than those that require a high level of skill.

This gender imbalance in cybercrime resembles the gender imbalance in offending more generally. It is well-established that the frequencies and severity of crimes committed by females are lower than their male counterparts. This fact holds across self-reported and official data (Gelsthorpe and Wright 2015; Schwartz et al. 2009; Steffensmeier and Allan 1996) and crime types, such as gang violence (Miller

and Decker 2001) and burglary (Decker et al. 1993). In addition to lower frequencies and severity, females tend to play minor roles even when participating in more masculine environments such as drugs markets (Maher and Daly 1996). However, there is a shift away from using traditional theories in understanding the experiences and interactions of female offenders because those theories were criticized to be insufficient to account for the gender imbalance as most of the theories are developed or derived based on male offenders (Smith and Paternoster 1987).

Thus, one approach is to analyze events and experiences of female offenders to understand their pathways into criminal behaviors. Daly (1992), through analyzing the pre-sentence investigation reports of 40 female offenders from a felony court in New Haven, identifies five pathways to crime for females: 1) street women, 2) harmed and harming women, 3) battered women, 4) drug-connected women, and 5) other. Street women refer to pathways that began with women running away from home or engaging in petty offenses, and eventually committing other offenses to support drug addiction. The second category, harmed and harming women, refers to women whose pathway to crime is attributed to abuses and/or neglect experienced during childhood, and inability to cope with current or immediate situations precipitating criminal acts. Battered women included women who committed the offense as a result of being in abusive relationships or recently leaving such kind of relationships. The pathway for drug-connected women involves drug selling via familial or romantic relationships (Daly 1992). The significance of Daly's work on female pathways to felony court is in its illustration of the complexities in the topic, especially with regard to the manifestation of the risk factors in women's lifestyles and experiences.

Later works on the topic provide support and refine the original five pathways. Brennan et al. (2012) identify eight pathways under four categories using a quantitative person-centered approach. Arrays of gender responsive and gender neutral variables are utilized. Gender responsive variables refer to variables that affect specific gender (i.e. childhood abuse) while gender neutral variables apply to both genders (i.e. poverty). Two of the four categories, battered women and antisocial aggressive women offenders, bear resemblance to Daly's (1992) identified pathways. The other two categories are female drug and property offenders who function relatively normally, and poor female offenders who were marginalized socialized in subcultures. In addition, Simpson et al. (2008) find the age of onset in criminal involvement further explains intra-gender variation. Specifically, the findings demonstrate that female offenders with adulthood

onset are less favorable towards using violence but have experienced violent victimization during adulthood. All of these findings point to the influence of gender on the manifestation of life events and experiences into delinquency.

With gender and cybercrime, pathways to crime provide insight on the gender imbalance in cybercrime by addressing two issues. The first issue is the effects of gender on social interactions and experiences, and the influence of such effects on involvement in crime. In their model, Heimer and De Coster (1999) incorporate a cultural definition of gender in addition to structural positions and favorable definitions from differential association theory. Findings suggest that the process through which favorable definitions are learned is structured and influenced by gender. Bottcher (2001) conceptualizes both gender and delinquency in terms of social practices. The overlap in the social practices explains the discrepancies in females' and males' pathway to crime. For example, the males in the interviews were given more freedom to explore outside the house whereas females were more restricted in terms of supervision and chores.

The second issue addressed by pathways to crime is the re-thinking of gender as more than a dichotomous variable. Miller and Mullins (2006) discuss common stereotypes about the differences been males and females. It is important to be aware of these "gender-based assumptions" (Miller and Mullins 2006: 220), which include psychological dichotomies such as rationality/emotionality, aggressiveness/passiveness and instrumental/relational differences between the genders, rather than social differences in the construction of gender. Thus to generate knowledge on why and how females are encouraged to or discouraged from cybercrime, both issues need to be taken into consideration. Currently, there are two possible explanations for the gender imbalance in cybercrime. The first is the accessibility to formal knowledge. The field of computer science has consistently seen lower female students (Cohoon 2001; Wilson 2002). Wilson (2002) suggests that there are two problems at home: recruitment and retention. The issue of recruitment is evident in the generally low number of female students in introductory computer science courses (Cohoon 2001; Wilson 2002). Females can be socialized to view computers as masculine, and thus less interested in choosing computer field. A meta-analysis has shown that gender difference on attitudes toward computers is largest in among high school students (Whitley 1997). This difference, coupled with the conflict between the perceived stereotypes of the field and gender roles for females (Beyer et al. 2003), can discourage female high school students from entering the field.

Such stereotypes can extend beyond knowledge to the physical environments. Cheryan et al. (2009) demonstrate that environments with stereotypical objects such as video games were identified as more masculine by females. Such association affects the female participants' sense of ambient belonging, which is defined as the feeling of fitting into an environment. Across the studies discussed, Cheryan et al. (2009) consistently find ambient belonging as a mediator of the relationship between women and their expressed interest in joining the field.

As for retention, the influence of gender continues to be prominent. Beyer et al. (2003) identify comfort level and math backgrounds as the two most predictive factors towards success in an introductory computer science course. However, both of these factors are highly sensitive to the effect for gender. Comfort level can be affected by numerous departmental-level, factors such as proportion of female students and faculty, attitudes of faculty and mentoring experiences, affect the retention of female students in computer science (Cohoon 2001). Lower number of female students prove challenging for female students because their male colleagues may hold stereotypical views with regard to female students' abilities (Cohoon 2001). In addition, female computer-science students have reported lower level confidence towards computers than their male counterparts even after controlling for mathematics test scores. Thus, the lack of supportive peers can further diminish the confidence level of female students.

The lack of supportive mentors and guidance can also affect retention. Departments with lower number of female faculty members have lower retention rates for female students (Cohoon 2001). Faculty attitudes and teaching methods also have larger impacts on female students. Female students had reported "unfriendly classes" and "poor teaching" as reasons for leaving the field at significantly higher rates than male students (Biggers et al. 2008). In addition, departments where faculties do not see gender differences in abilities or biased views towards female students' abilities experience lower rate of retention of female students (Cohoon 2001). This finding suggests that in a male-dominated, stereotypical association to masculinity, having neutral attitudes are against the interests of females. Thus, in general, females have restricted opportunities to be formally trained in the knowledge necessary for engagement in technical forms of cybercrime.

The second explanation is with regard to the accessibility to informal knowledge. Informal knowledge is often shared in the virtual space. For example, the hacker communities communicate and share their norms and values often through web

forums (Holt 2007; Vasilescu et al. 2012). However, given the characteristics of the virtual space where physical cues are absent, gender affects individuals' experiences and interactions differently. According to West and Zimmerman (1987), gender is achieved through interactions and these interactions are structured by gender. In addition, doing gender emphasizes the notion of accountability in interactions (West and Zimmerman 2009; West and Zimmerman 1987). Individuals can be punished or rewarded for their actions.

Another approach to gender, Judith Butler (1990; 1988) proposes, is that gender is constructed and actualized through actions and performances done through one's body. Specifically, gender is defined as "an identity instituted through a stylized repetition of acts" (Butler 1988: 519). In other words, gender is conceptualized as a fluid identity that is a result of one's repeated actions. These performances and acts are done through an individual's body, and gender is "always a doing, though not a doing by a subject who might be said to preexist the deed" (Butler 1990: 25). One's body has no meaning until it is put into actions that conform to historical and cultural meaning of being a woman (Butler 1990; Butler 1988). Such conformities through repeated acts and performances subsequently become meaning associated with gender (Butler 1990; Butler 1988).

Both approaches to gender suggest freedom to gender construction when participating in virtual space. Given the absence of biological and visual cues, individual users can choose to perform accordingly to their biological sex or not. For example, males can choose to be females in certain online communities to avoid hostility (Vasilescu et al. 2012). Females, on the other hand, may choose to stay true with their real-life gender as an act to empower oneself and change stereotypes (Eklund 2011). These studies suggest that gender in the online context is more fluid and purposively chosen to suit individuals' needs. However, despite such freedom, the challenges females face while interacting in online communities and spaces remain.

In the field of computer-mediated communication (CMC), theories have been proposed to understand how the lack of visual cues in the online context affects individual and group behaviors, as well as communication styles (Christopherson 2007; Dubrovsky et al. 1991; Spears and Lea 1994). One theory hypothesizes that individuals who have less power in the real world would have higher power in online context due to a reduced number of available social cues such as race and sex (Dubrovsky et al. 1991); however, findings from studies do not support this hypothesis (Christopherson 2007;

Postmes and Spears 2002). An example is a study by Flanagin et al. (2002), who find that men were more likely to self-disclose their gender in CMC in workgroups, while women tend to enjoy the anonymity of CMC. In addition, men tried to change CMC to resemble face-to-face interactions. These online gendered behavior and interactions suggest that despite the lack of physical cues, females' positions on accessing additional knowledge on computer science remain disadvantaged.

The influence of gender is also found to be persistent in other types of online interactions. Rellstab (2007) examines gender plays that occur on three Internet relay chats: chatlounge, Christian channel, and Hip-Hop channel. Three specific gender plays were identified from each channel as cases for analysis. All three gender plays involved incidents of individual user engaging in gender behavior contrary to their online portrayed gender, and the responses of other users' to the incidents. In general, the analysis demonstrates that users are highly conscious of their behaviors being watched and judged by other users; in two cases, specific users felt the need to re-state behaviors that are considered normative for their claimed gender. The findings indicate that despite the freedom of choice with regard to online gender identity, the construction of gender through social interactions persists.

The effects of gendered social interactions are further exacerbated in online communities where gender participation is already biased. Kendall (2000) incorporates the notion of doing gender by studying the conversations among users specifically in an online forum. These users, who are mostly males and part of the fields of computer and engineering, resist against some aspects of hegemonic masculinity, which refers to the prevailing masculinity that legitimizes hierarchical gender relationships between men and women, but also distance themselves from any femininity. Users distanced themselves by referring to women as sexual objects during conversations (Kendall 2000). This suggests that gender-appropriate behaviors are not only reinforced through online communities but exaggerated. This unwelcoming exaggeration can further discouraged females who are interested in beginning or advancing their involvement with computers.

Women who persist and engage in male-dominated online environments can be overly scrutinized, and face greater adversity as a result. An example is the recent GamerGate movement. This began with when a female game developer was accused of trading sex by her ex-boyfriend for positive press coverage of her game "Depression Quest" (Dewey 2014; Hathaway 2014). At first framed as a movement to restore ethics

within gaming journalism (Hathaway 2014), multiple female critics and game developers have been driven out of the industry due to death threats and harassment (Dewey 2014). It was revealed that in released chat logs that the original aim of the movement was to destroy the reputation of the initial target (Hathaway 2014). The majority of those participating in GamerGate are White male gamers (Hathaway 2014). The movement illustrates that the obstacles and challenges females continue to face when trying to enter a male-dominated field. Not only that, the movement serves as a constant reminder for all other females the difficulties and imbalance that remain.

Overall, the dynamics between gender and cybercrime deserve further examination for several reasons. Firstly, it is uncertain whether if females involved in cybercrime bear any resemblance to females involved in traditional offenses. Secondly, identifying experiences and events that discouraged or encouraged females into cybercrime have policy implications with regard to prevention.

## Research questions

This research examines a sample of cybercrime offenders to investigate gender-related factors, addressing the following research questions:

(1) What is the gender ratio for offenders involved in cybercrime?
(2) Do female offenders commit similar types of offences to male offenders?
(3) Do females offend with others, and what are their roles?
(4) What social factors may explain the lower female involvement in cybercrime?
(5) How do the social experiences of female offenders differ from their male counterparts?

## Method

To address the research questions, data was triangulated from multiple sources. Qualitative data from interviews and court documents provided a rich data source relating to the experiences of both male and female cybercrime offenders. The quantitative data allowed for comparisons to be made between these two groups for quantifiable variables.

### *Qualitative design*

The data for the qualitative research was collected by Hutchings (2013) from three sources. The first source was a qualitative analysis of court documents, in particular sentencing remarks and court judgments relating to prosecutions and extraditions for

cybercrime offenders. Of the 54 cases included in this data source, 12 related to female offenders, while the remaining 42 related to males. As well as outlining the facts of the matter, the nature of the harm caused, and details about the lead up to the offence(s), the documents typically included factors of relevance when sentencing offenders, including mitigating and aggravating circumstances. Within Australia sentencing statutes are applicable in each jurisdiction that set out what these factors may be. These typically include the offender's criminal history, their level of remorse, their attitude and the level to which they cooperated with the criminal justice system, the effect that various punishments may have on the offender and the family, such as the ability to maintain employment (Edney and Bagaric 2007).

The second source was interviews with law enforcement officers within computer crime or fraud specialist units from four policing agencies in Australia, namely the Australian Federal Police, the Queensland Police Service, Western Australia Police, and Victoria Police. These interviews focused on officers' experiences with, and perceptions of, offenders who have been identified by the criminal justice system. The interviews were one-on-one, open-ended, and semi-structured.

Participants were asked about their experiences with offenders within the last five years, including offenders' characteristics and their initiation into, and desistance from, offending. It was expected that recall would be fairly accurate given the limited number of cases available. It was considered appropriate to gather information using law enforcement officers as third parties due to the nature of the offender population, which is generally considered to be hard to access. Gathering data from third parties is consistent with prior research relating to offenders, for example, the Cambridge Study in Delinquent Development, which included interviews with parents and questionnaires completed by teachers (Farrington 1989). The 15 law enforcement officers interviewed included 14 males and one female. The interviews ranged from 32 minutes to one hour and 16 minutes in length, with an average time of 51 minutes.

The third source was face-to-face interviews with active and former offenders. Participants were recruited within Australia using snowball sampling, a non-random, purposive method. Initial recruitment used informal networks. Those known to the researcher who worked and/or studied in the IT industry were encouraged to source participants. The benefit of such an approach is that such recruiters are able to assure potential participants that the researcher is legitimate (Wright et al. 1992). Participants were also encouraged to approach additional potential participants. Recruitment

consisted of advising potential participants about the research and what it entailed and providing the contact details of the researcher. In this way, participants self-identified as being members of the target population and because the participants had to contact the researcher, they were in control of the amount of personal information that they provided. Participants were offered a gift voucher for a national chain of electronic gaming stores as a thank you for being interviewed.

Participants were asked if they identified themselves as current or former offenders, which allowed the remainder of the interview to be tailored to the participant. For example, former offenders were asked additional questions about why they ceased offending, as well as what their situation was at the time that they were offending. The interviews were one-on-one, open-ended, and semi-structured, based on a modified version of McAdams' (2008) *Life Story Interview*. Additional questions enquired about additional topics, including the age they had commenced offending, how the decision to start offending was reached, their perceptions of being caught and the penalties, how skills were obtained and improved, and, for former offenders, why they stopped offending.

It is possible that the data obtained are not an accurate depiction, i.e. that the information provided is not truthful. This may occur because the participant had trouble with recollection, misinterpreted the question, or preferred not to give an honest answer. It may be asked how the researcher can believe the accounts of those who, due to the subject matter, may be untrustworthy. However, Wright and Bennett (1990) have examined the literature relating to the truthfulness of accounts given by offenders during qualitative interviews. They conclude that much information provided during interviews is consistent with official records, and that, after agreeing to be interviewed, offenders perceive lying to be pointless as they may as well not have consented at all. In addition, during the interviews with active and former offenders, time was spent checking for distortions and exploring the participants' responses with them to seek clarification. Some questions were also asked in more than one way in order to compare the responses.

The researcher determined an appropriate course of action if faced with information concerning offences that were in progress, offences that were intended to be committed, or if court ordered or subpoenaed to provide evidence about participants. While the research involved people that had engaged in illegal behavior, it did not relate to the specifics of individual events, nor was it intended to expose criminal behavior.

However, there was the potential for the researcher to be told about current illegal activities or those that involve serious harm. While the researcher was not under any contractual, professional, or legal obligation to disclose illegal behavior, there was a moral question to consider relating to elective disclosure. To mitigate this risk to participants, they were informed at the beginning of the interview that they should not divulge any current activities, and they would be reminded of this if they began to do so.

There was a possibility that the researcher may be compelled by law enforcement or a court to disclose information. However, as the data were not collected in an identified form and remained anonymous the researcher could not disclose any identifiable information about any participants if such a circumstance arose. This means that it would have been difficult for a law enforcement or other agency to identify that data with an individual. This technique is consistent with other research relating to self-reported criminal behavior (Israel 2004).

Of the seven offenders who participated, five were active offenders and two identified themselves as former offenders. All participants were male. The interviews ranged in length from 45 minutes to two hours and 18 minutes, with a mean time of one hour and 39 minutes. With the researcher vouched for, the participants were cooperative and obliging. They appeared to be truthful and forthcoming during the interviews. All the interviews were conducted in public places chosen by the participant, typically a coffee shop.

***Quantitative design***

Quantitative data was sourced from the Cambridge Computer Crime Database (CCCD), a database of computer crime events where an offender or alleged offender has been arrested, charged, and/or prosecuted in the United Kingdom (Hutchings 2016). There were 412 entries for the period 1 January 2010 to 31 December 2015 (13 cases were removed as they had been discontinued, or had an acquittal recorded). Some of the cases in the database are allegations, as not all of the cases have been finalized, with 155 (37.6%) either ongoing, or the outcome is unknown. Cases included in the CCCD are broadly classified as high tech offences, including those that fall under the Computer Misuse Act 1990 (UK). The database also includes offences that involve the use of computers that fall under other legislation. This includes fraud, conspiracy,

misconduct in public office, data protection, and money laundering offences where there is a link to cybercrime, as defined in this chapter.

Variables captured in the CCCD that were used for this analysis include gender, age at time of arrest or most recent court appearance, overview of the offence, and whether there were co-offenders involved. Additional variables were created using the overview of the offence, including categorizing the offence was being 'general' or 'technical' in nature. One dichotomous variable (yes/no) captured whether the offence had taken place in the course of employment, whether it be against an employer, or another individual or business, such as a competitor (this does not include setting up a business for criminal purposes). Another dichotomous variable captured whether the alleged offender had a peripheral or primary role. The default value was primary, with peripheral roles including tasks such as money laundering, or otherwise aiding or assisting an offence, without taking a major role.

**Results**

***Question One: What is the gender ratio for offenders involved in cybercrime?***

Over three quarters of cases included in the CCCD were male ($n$ = 324, 78.6%). There were 50 (12.1%) females, while the gender for 38 (9.2%) was unknown. The percentage of females (22.2%) included in the court documents for the first qualitative data source was slightly higher, however this is a small sample ($n$ = 54), making percentages prone to fluctuations.

All participants interviewed for the third qualitative data source were male. During the interviews with these active and former offenders, as well as during the interviews with law enforcement officers, participants were asked how many females they had reason to believe were involved in cybercrime. Both offenders and law enforcement officers agreed that the number of female offenders was low:

> I wouldn't imagine there would be many, I've only known one girl that has been involved in it.
>
> (Interview #3, male, aged 22)

> You know, I really have wracked my brain to try and think of females that have been, you know, targets of investigations and I don't think I can think of one. I'm sure there might be one, but it would be a rarity. It would be, you know, it wouldn't even make up five per cent.
>
> (Law Enforcement Officer #8)

A minority of participants pointed out that when interacting with someone in cyberspace it could be hard to identify their gender or verify whether they were misrepresenting who they were:

> The Internet is a big place I suppose, so everybody's anonymous on the Internet, so it is quite hard to tell who is who really.
>
> (Law Enforcement Officer #14)

> Of course, a lot of the ones we're, which come from overseas, it is difficult to tell what the internet, what gender they are, you know. But it's very common to have people impersonate females because it's a lot easier to get a male victim to respond and part with money.
>
> (Law Enforcement Officer #2)

The age for those included in the CCCD was positively skewed, therefore a Mann-Whitney U test was used to compare the age at time of arrest or most recent court appearance for males and females. There was no significant difference in age for males ($M$ = 30.91, $SD$ = 11.11, *range* = 14-68) and females ($M$ = 32.24, $SD$ = 10.65, *range* = 16-60; $U$ = 5961.00, $p$ = .324).

***Question Two: Do female offenders commit similar types of offences to male offenders?***

The cases included in the CCCD were categorized as to whether they required technical skills, or were general in nature. Of the 412 cases, 166 (40.3%) were categorized as 'general', and 229 (55.6%) were categorized as 'technical'. The remaining 17 cases (4.1%) did not contain sufficient information to enable categorization. A chi-square test of independence was performed to examine the relation between gender and offence type (general or technical). The relationship between these variables was significant ($X^2$(1, N = 361) = 26.918, $p$ < .001). Females were less likely to commit, or be suspected of committing, technical offences compared to males.

The qualitative data also found differences in the nature of offending for males and females. When females are involved in unauthorized access, their offences are described as being not as serious and less technical, or they play peripheral roles in the offending behavior. While overall there are few female offenders, law enforcement interviewees confirm female offenders tend to be involved in fraud, repeatedly so:

> Well there's a big difference. We don't see too many females. I haven't seen too many females whilst at this unit. There have been a few, and those that

> have come to our attention have been, um, recidivist offenders. So they're, um, they're basically full on. And they haven't had any female hackers, they've just been online auction fraud type offenders.
>
> (Law Enforcement Officer #10)

***Question Three: Do females offend with others, and what are their roles?***

The CCCD includes a variable which records alleged co-offenders. This variable was dichotomized (yes/no). Of the 412 cases, 237 (57.55) were recorded as having at least one alleged co-offender, and 175 (42.5%) had no recorded co-offenders. A chi-square test of independence was performed to examine the relation between gender and co-offending. While females are slightly more likely to offend with others compared to males, the relationship between these variables is not significant ($X^2(1, N = 374) = 2.443, p = .113$).

The cases included in the CCCD were categorized as to whether the alleged offence had taken place during the course of employment or not. Of the 412 cases, 67 (16.3%) were alleged to have taken place during the course of employment, 303 (73.5%) did not, and the remaining 42 cases (10.2%) did not contain sufficient information to enable categorization. A chi-square test of independence was performed to examine the relation between gender and offending in the course of employment (yes/no). The relationship between these variables was significant ($X^2(1, N = 361) = 11.734, p < .01$). Although males are more likely to commit, or be suspected of committing, offences that occurred during the course of employment compared to females, females are more likely to offend in the workplace than outside. The contingency table presented in Table 1 presents the distribution of workplace offending according to gender.

Table 1

*Contingency table for alleged offending in the workplace and gender (expected frequencies are shown in parentheses)*

| | Alleged offence took place during course of employment | | |
|---|---|---|---|
| Gender | Yes | No | Total |
| Male | 49 (58.1) | 164 (254.9) | 313 |
| Female | 18 (8.9) | 30 (39.1) | 48 |
| Total | 67 | 294 | 361 |

Another variable was created within the CCCD data that captured whether the alleged offender had a peripheral or primary role, such as money laundering, or otherwise aiding or assisting an offence. Of the 412 cases, 342 (83.0%) were classified as 'primary' roles, 45 (10.9%) were classified as 'peripheral' roles, and 25 cases (6.1%) did not contain sufficient information to enable categorization. A chi-square test of independence was performed to examine the relation between gender and role type. The relationship between these variables was significant ($X^2(1, N = 373) = 17.282$, $p <$ .001). Females are more likely to have, or alleged to have, a peripheral roles compared to males.

***Question Four: What social factors may explain the lower female involvement in cybercrime?***

Four main themes emerged from the qualitative data that provided some indication as to why males mainly commit these types of offences. These themes, namely: societal factors; that the ratio reflects the lack of interest females have in computer related areas; that females are less accepted by the hacker community; and that females commit fewer crimes than males in general, are explored below.

Societal factors, including aspects such as sexual stereotyping, was a popular theme that emerged in the data:

> Honestly, social upbringing and society's perceived roles. And how they are basically ingrained. So often what you will see is a girl that is out and guys are busy, they're hanging with their mates, they're doing something. Girls

are either reading a book or out with their friends, doing makeup, doing all those things during those years, you know.

(Interview #1, male, aged 27)

Oh, I think that um, the entire kind of computer industry is quite male, I am not sure why that is, um, it could be simply because, my first interest in computers was through gaming, as was a lot of people's. And I think that the entire gaming culture is very anti-feminist. Which I think is a severe problem with it, but it has always been like that.

(Interview #6, male, aged 18)

Many participants stated that females are simply not interested in computers or technology, or that females are more socially inclined:

Um, well I see in general that it's mostly looked at as being male orientated, like there's not many females working in that area. I mean, especially at my university, there's not that many girls in the IT classes. If you go over to the business classes most of the girls are in the business classes.

(Interview #3, male, aged 22)

I think computers are typically just geeky blokes. Um, I think that's right across it IT side of it, it's more male dominated I would have thought… I think, it's probably just a blokey thing, like motor mechanics, it's the pulling apart side of it, and I'd say that's, it's just that mindset of tinkering, I suppose.

(Law Enforcement Officer #4)

Maybe a lot of females don't have the same passion for IT as blokes do. Maybe it's that a lot of them have got lives. They don't just spend their lives self obsessed with computers. Male offenders get totally obsessed by their life online. Women seem to have that separation where they have a life in the real world as well. Whereas guys substitute the real world life with the cyber life.

(Law Enforcement Officer #9)

Yeah, I suppose. I mean, it can be pretty solitary. When they sit there in front of their computers and stuff. Yeah, I think, you know, I'm no gender psychiatrist, but I think, you know, men might take more to be able to spend

> eight hours of the day, seven days a week in front of their computers not talking to anyone else. Maybe what women prefer is the social aspect of life, I mean, that's a really broad generalisation, you know what I mean, like a, you know, a 19-year-old guy's pretty, won't think twice about sitting in front of his computer all night. Maybe women will, yeah, I do think they have better things to do with their time.
>
> (Law Enforcement Officer #14)

Another theme that arose was that females might feel threatened or uncomfortable in such a masculine environment, as well as the different opportunity structure for males and females to develop peer relationships with other offenders. The research found that there are well-developed online communities, which are used for learning and sharing information. A number of sources noted that females are treated differently than males in these communities, and that this may discourage them from continuing:

> So what happens is that when you get a girl that says she can do these things, she gets scrutinised more, people will work against her, because they hold such prejudices against her. So it's just not worth it. So the girl can either crack the shits or say nah, this isn't worth it, or she'll just have to keep slugging it out. And she'll have to be better than the boys. It's probably why a lot of them just go no… It's way harder. They have to work. Like, to be a girl doing that sort of stuff, not only do you have to deal with dickheads that are constantly hitting on you, dickheads that think you're a dickhead, or just ragingly rude people that make grossly inappropriate statements that it's just not, ok, eventually you'd just have to say it would probably have been easier to pretend to be a guy, and then say that. And it's just weird.
>
> (Interview #5, male, aged 22)

> Well the thing is with online forums because it's such a male dominated, you know, sphere it's generally, once a girl gets on, you know, she attracts a lot of interest and because a lot of these guys are underachievers, you know I dare say that initially the girls will probably get a lot of, you know, sexist comments about them and so forth on these forums, so it's really be the ones that are absolutely dedicated who will generally stay on. And online forums are probably the primary way, there may be people who go to school

> together and so forth, but generally it's the online forums because you have got that added anonymity.
>
> (Law Enforcement Officer #12)

Participants also picked up on fact that that the gender bias is not unique to cybercrime, for example:

> Yeah, but it just always seems to be the way, more males commit offences than females.
>
> (Law Enforcement Officer #6)

An additional theme was identified by one law enforcement officer, which appeared to tie into the gender based assumptions relating to emotionality of females. This theory was that females may be less inclined to be removed from the feelings associated with harming others online compared to males:

> I think they tend to be a lot more sensitive and in touch with feelings and I think they, because they're in touch with that they respect other people's feelings more. Whereas because men aren't necessarily in touch with their, the whole touchy feely feeling side of things, they don't think of the effect on the victims, whereas I think women have that connection to emotion, which then automatically leads to consideration of other people's feelings, because you consider your own, whereas men can disconnect from their feelings, so it makes them easier to disconnect from the repercussions that are caused to the victim.
>
> (Law Enforcement Officer #8)

***Question Five: How do the social experiences of female offenders differ from their male counterparts?***

The qualitative data also reveal gender differences in the social experiences of female offenders, compared to male offenders. These social experiences relate to adverse life events, family backgrounds, intimate relationships, criminal histories and drug and financial problems. Some law enforcement officers advised that the few female offenders they have come across have generally suffered, or were experiencing, adverse life events:

> Ah, as I said, the females that we've come across, the ones that we've done, have been, um, they tend to be, what's the term for it, it's low value, high volume. And the ones, again, the ones we've seen have been, I think have

> had drug habits or have been, um, in financial dire straights. And, and others have also been, they've been offended against. Like, they have been in financial troubles themselves, they've been offended against in the past and no one's helped them.
>
> (Law Enforcement Officer #10)

> Um, there's been a few. I think that I've dealt with, there might be one that I recall, was exactly that opportunistic thing, there'd been a, I think a relationship breakdown, she was struggling to pay the rent and it was just opportunistic. Um, she, a young, single mother, that kind of thing.
>
> (Law Enforcement Officer #11)

When gender was not accounted for, it appeared at first that there were no common themes arising from the qualitative data relating to offenders' family backgrounds. Offenders were found to come from a combination of both happy and stable as well as disruptive families. However, on closer examination it is apparent that many who were involved in highly technical crimes enjoyed a closer relationship with their families compared to those engaging in general crimes, and that female offenders, who are more likely to be engaged in the latter, generally endure harsher childhood and familial conditions than their male counterparts. For example, in relation to males who committed technical crimes:

> Very close to my family, I talk to them every day, to my mum every day usually. Or at least five times a week. I usually call her in the morning on the way to work. Because the time difference is perfect.
>
> (Interview #1, male, aged 27)

> Yes, I have a good relationship with my parents. I speak with them once or twice a week, so, it would be more if my mum could help it.
>
> (Interview #3, male, aged 22)

Contrastingly, in many of the cases involving female offenders, the judiciary noted the adverse conditions that they had been exposed to growing up, for example:

> There was much physical violence in the family and, from an early age, she had to care both for herself and her sister who was two years younger. Because of her parents' alcoholism and chaotic lifestyle, there were always financial problems within the family and there were repeated parental separations.

(Case #3, female, aged 27 at time of offence)

The pattern for offenders' intimate relationships was similar to what was found in relation to their upbringing and family life. While some of the males were too young to have established strong interpersonal relationships, the older ones tended to be in stable family environments, whether married or de facto. While offenders engaging in general crimes were often in a relationship, typically these were considered to be less stable when compared with technical offenders, and difficulties in intimate relationships are particularly pronounced for female offenders:

> You left your husband in January 2008, and spent four weeks with your younger children in a women's shelter, but felt obliged to return to him because you could not stay where you were and could not find any other accommodation. You would like to leave him and make a new life for yourself in another State. You still have two dependent children.
>
> (Case #43, female, aged 45 at time of court appearance)

Evidence of extensive criminal histories, particularly in relation to dishonesty, was identified for three of the 12 female offenders that went before the courts. In one case, the offender had a significant record spanning ten years, including burglary and stealing, making off without payment, unlawful possession of property, selling and possession of a controlled drug, obtaining goods by a false pretense, forgery, uttering, receiving stolen property, and breaching bail conditions (Case #39, female, aged 28 at time of offence).

Addictions to gambling and drugs were common themes that arose in the qualitative data, regardless of gender, particularly in relation to general crimes. These were identified as causal factors, in that they offended in order to fund their compulsion. One law enforcement officer advised that female offenders are particularly likely to be using drugs:

> Ah, as I said, the females that we've come across, the ones that we've done, have been, um, they tend to be, what's the term for it, it's low value, high volume. And the ones, again, the ones we've seen have been, I think have had drug habits or have been, um, in financial dire straits.
>
> (Law Enforcement Officer #10)

This was supported by a relatively high number of females identified by the judiciary as having a problematic drug addiction:

> The appellant had been using amphetamines on a daily basis and was dependent on them. As so often happens with addicts, that led to her committing crimes of dishonesty to sustain her addiction… A psychological assessment of the appellant was also tendered which recounted a history of substance abuse confirmed by her conviction in 2004 for two drug related offences.
>
> (Case #39, female, aged 28 at time of offence)

> You began using amphetamines, initially orally, but later as a daily intravenous user. At one stage you were into smoking crystal amphetamine, or "ice". Your heaviest use of amphetamines was around 2007 to 2008. You spiralled down in 2007 as the result of the breakdown of your five year relationship with your partner. You then moved to yet another relationship and were introduced, or re-introduced, to the intravenous use of drugs, particularly amphetamine.
>
> (Case #45, female, aged 32 at time of court appearance)

Financial problems was another commonly occurring theme that arose in the data in relation to general crimes, but not for those involved in technical offences. In total, four of the 42 males in from the first qualitative data source (9.5%) were reported to have suffered financial problems, compared to four of the 12 females (33.3%):

> It appears that she had a long history of compulsive spending which was based on a chaotic early childhood. Some four or five years ago she took out a loan from a finance company without her husband being aware of it. Thereafter, she was always in debt. She had not been able to manage money for family needs because of her inability to control spending, especially in recent years. Only in those more recent years did the impulse to spend become really uncontrollable.
>
> (Case #3, female, aged 27 at time of offence)

> Your counsel told me that your husband never lets you have any money at all – even money that you have inherited and money that you are entitled to receive from [welfare payments]. The Crown prosecutor told me that your husband does not trust you with any money because he believes you have a gambling problem. I am not in a position to decide whether that is correct.

> However it seems clear that you committed these crimes because you were unable to get any money from any other sources.
>
> (Case #43, female, aged 45 at time of court appearance)

**Discussion and conclusion**

A data triangulation framework was selected for its ability to provide a deep understanding of the offending behavior, while mitigating certain limitations inherent in both the qualitative and quantitative aspects. The qualitative aspect to the research captures nuances and provides richness to data that may not otherwise be quantifiable (Berg 2007). In addition, as qualitative research can be undertaken when the ability to meet the quantitative requirements in relation to obtaining a large, randomly selected sample size are less than ideal (Berg 2007), it includes findings from active offenders who have not been detected by the criminal justice system. Cases brought before the courts are unlikely to be representative of the larger population of offenders who are not apprehended or prosecuted (Sutherland and Cressey 1974). Interviewing active and former offenders mitigated this limitation. While these participants were all male, due to the scarcity of female offenders, they provided frank and open insights into the gender relations within their online communities. Furthermore, data on women offenders were available through the additional data sources. The quantitative design, with the larger sample size, provides more generalizable findings. However, due to the hidden nature of the offender population, the generalizability is limited to offenders who have been detected.

This chapter demonstrates that cybercrime is a male-dominated offence category. However, variations do exist by type of cybercrime, with females committing more general crimes than technical crimes. When females are involved in crimes that require a high level of technical skill, it appears that they typically are not the primary offender, engage in less serious activities than males and are only transiently involved. Reasons for the lack of female involvement in highly technical crimes appear to be a combination of lack of female involvement in crime in general, compounded with the gender gap found in the computer sciences. Research participants indicated that females have different social roles and expectations than males; and that females faced barriers when seeking to become accepted by the hacking community, which is important for learning and information sharing. There was some indication that offenders misrepresented their gender when this was advantageous for the actual commission of

an offence, however there was no evidence that this misrepresentation carried over to general online engagement.

Female offenders were found to have faced greater adversity compared to male offenders, which they may have been a contributing factor to their offending. Although females were involved in less serious, less technical and peripheral roles they were often prolific offenders. Females were also more likely to have been raised in adverse family environments and have less stable relationships, aspects that indicate that these individuals had an absence of social bonds. There were also more indications that female offenders were experiencing strain, particularly in relation to drug and gambling addictions, and female offenders were more likely to have prolific offending histories than males. Therefore, while overall female involvement is low, females that do offend tend to have greater exposure to factors that are theorized to lead to crime. In addition, these findings indicate that females involved in cybercrimes shared similar pathways and roles as females involved in traditional crimes.

There are many initiatives to combat the gender inequalities evident in different facets of life, including employment and economic conditions. As this gender/digital divide decreases it may allow females greater access to work and income potential, as well as increase exposure to illegal online behaviors, both as victims and as potential offenders.

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