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THE ROLE OF INTERNET CONSUMPTION ON THE WITNESSING OF ONLINE HARMS

Zhang Hao Goh
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Policy Report
July 2024

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NANYANG TECHNOLOGICAL UNIVERSITY SINGAPORE

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Executive Summary

This policy report investigates how gender, daily Internet activities, and the use of Internet-enabled devices, can impact one's frequency of witnessing online harms. Building on a national survey conducted in Singapore in December 2022 by the Centre for Information Integrity and the Internet, this study suggests that men engage in daily Internet activities and use Internet-enabled devices more frequently than women. This partly explains why men witness more online harms than women. The policy report calls for further studies into the relationship between online harms witnessing and perpetration, along with greater attention to gender-based differences, when studying and drafting policies on online harms and emerging online threats.

Introduction

Digital media platforms are an indispensable part of people's lives, providing resources for an array of daily activities, from information acquisition to entertainment. However, these same mediums also host various types of online harms,[1] such as harassment and scams. With advancements in technology and artificial intelligence, the number of online users and the landscape for online harms are rapidly expanding, as countermeasures strive to keep pace with the developments.

Against this backdrop, we sought to determine whether there were gender-based differences in the daily use of the Internet and Internet-enabled devices, and whether the differences had any influence on the witnessing of online harms.

Online Harms, Device and Internet Use Versus Gender

The increasing dependence on the Internet in daily activities has increased the risk of witnessing online harms, such as falsehoods, cyberbullying, and doxing.[2] The more time users spend browsing and consuming content on social media platforms like TikTok, Facebook, Twitter or Instagram, the more likely they are to encounter advertisements, video clips, images and texts depicting various types of harms.[3]

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[1] We have adopted a broader definition of online harms (compared to the World Economic Forum's typology for online harms) to limit the number of items presented to survey participants. The types of harms included in our survey can be found in Figure 2.

[2] Doxing refers to the action of finding or publishing private information about someone on the Internet without their permission, especially in a way that reveals their name, address, etc. https://dictionary.cambridge.org/dictionary/english/doxing.

[3] P. Calpbinici and F. Tas Arslan, "Virtual behaviors affecting adolescent mental health: The usage of Internet and mobile phone and cyberbullying," *Journal of Child and Adolescent Psychiatric Nursing* 32, no. 3 (2019): 140. https://doi.org/10.1111/jcap.12244; M. A. Park, K. J. Golden, S. Vizcaino-Vickers, D. Jidong, and S. Raj, "Sociocultural values, attitudes and risk factors associated with adolescent cyberbullying in East Asia: A systematic review," *Cyberpsychology: Journal of Psychosocial Research on Cyberspace* 15, no. 1 (2021): 2. https://doi.org/10.5817/CP2021-1-5.

A review of existing literature supports our hypothesis that there are gender-based differences in Internet use,[4] including frequency of Internet usage, device ownership, and types of online activities. For instance, a study involving 13- to 18-year-olds in the United States and United Kingdom revealed that girls invested more time in "smartphones, social media, texting, general computer use, and being online", while boys preferred gaming and using electronic devices.[5] Separately, an early study conducted in Singapore suggested that women used the Internet less frequently and rated their own Internet expertise to be lower than males.[6] Today, the dynamics on Internet usage have changed. In particular, Singapore has been witnessing a rise in information and communications technology (ICT) skills, although a skills gap persists between men and women. According to the Department of Statistics in Singapore, the percentage of females with ICT skills rose from 68.9% in 2020 to 71.9% in 2021, while the increase was from 74% to 77.5% for males.[7] These findings suggest that gender differences in Internet activities could translate to differences in exposure to online harms between men and women.

The growing literature exploring exposure to and experiences of online harms in relation to gender has been concentrated largely on the Western countries.[8] Also, many of the studies on the topic, including those from Singapore, have focused on the witnessing and personal experiences of online harms by the two gender groups (e.g., Vogels, 2021; Sunlight Afa, 2022; SHE, 2023). For instance, according to the study by the Pew Research Center, although more men reported their online harassment experiences than women (43% vs. 38%), experience with severe forms of harassment was at

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[4] P. H. Cheong, "Gender and perceived Internet efficacy: Examining secondary digital divide issues in Singapore." *Women's Studies in Communication* 30, no. 2 (2007): 219. https://doi.org/10.1080/07491409.2007.10162513; J. M. Twenge and G. N. Martin, "Gender differences in associations between digital media use and psychological well-being: Evidence from three large datasets," *Journal of Adolescence* 79 (2020): 94. https://doi.org/10.1016/j.adolescence.2019.12.018; A. Tyers-Chodhury, R. Kashyap, M De Araujo Cunha, R. Al Tamime, and I. Weber, "Evidence briefs — Insights into gender digital divide for girls," UNICEF (2021): 3–4.

[5] J. M. Twenge and G.N. Martin, "Gender differences in associations between digital media use and psychological well-being: Evidence from three large datasets," *Journal of Adolescence* 79 (2020): 94. https://doi.org/10.1016/j.adolescence.2019.12.018

[6] P. H. Cheong (2007): 218, 219, 221, 222, op. cit. https://doi.org/10.1080/07491409.2007.10162513

[7] Statistics Singapore, "Sustainable Development Goals", 8 December 2022. https://www.singstat.gov.sg/find-data/sdg/goal-4.

[8] N. Sambasivan, A. Batool, N. Ahmed, T. Matthews, K. Thomas, L.S. Gaytán-Lugo, D. Nemer, E. Bursztein, E. Churchill, and S. Consolvo, "'They don't leave us alone anywhere we go': Gender and digital abuse in South Asia," *Proceedings of the CHI Conference on Human Factors in Computing Systems* (2019): 2; L. Vitis, "Technology-facilitated violence against women in Singapore: Key considerations," in J. Bailey, A. Flynn, & N. Henry (eds.), *The Emerald International Handbook of Technology Facilitated Violence and Abuse* (2021): 408.

similar levels for both genders.[9] There were also gender-based differences in the types of harassment experienced by men and women and their perceived impacts.[10] Specifically, more men were targeted with offensive name-calling than women (35% vs. 26%), whereas more women reported experiences with sexual harassment (16% vs. 5%) and stalking (13% vs. 9%).[11] Additionally, women participants who have faced online harassment were more likely than men to report being "extremely or very upset" when faced with online harassment (34% vs. 14%),[12] and see gender as the reason for their negative experience (47% vs. 18%).[13]

Singapore is not sheltered from the plague of online harms against women, and findings from two recent studies attest to the prevalence of this problem. The study "Technology-facilitated violence against women in Singapore" uncovered three types of technology-facilitated abuse among frontine workers in Singapore: contact-based harassment, surveillance, and image-based abuse.[14] More recently, a study by the Singapore Together Alliance for Action to Tackle Online Harms (Sunlight AfA) found gender-based differences in direct experiences with online harms. Akin to the Pew Research Center study,[15] men who participated in the study reported higher levels of online harms experience, while women "were more likely to feel unsafe online and targeted by gender-based online harms".[16] The types of harms experienced also varied by participants' gender, with more women experiencing stalking, bullying, "unwanted sexual behaviour", and having unpleasant comments, images and videos of them posted compared to men. [17] The study also presented data on the share of respondents who witnessed or directly experienced gender-based online harms or both. Notably, 11.5% of the participants only witnessed online harms, 7% only had direct experiences with the harms, while 12.3% both witnessed and experienced the harms.[18]

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[9] E. A. Vogels, "The state of online harassment," Pew Research Center (2021): 7. https://www.pewresearch.org/wp-content/uploads/sites/20/2021/01/PI_2021.01.13_Online-Harassment_FINAL-1.pdf

[10] E. A. Vogels, (2021): 7, op. cit.

[11] E. A. Vogels, (2021): 7, op. cit.

[12] E. A. Vogels, (2021): 8–9, op. cit.

[13] E. A. Vogels, (2021): 8–9, op. cit.

[14] L. Vitis, "Technology-facilitated violence against women in Singapore : Key considerations," in J. Bailey, A. Flynn, & N. Henry (eds.), *The Emerald International Handbook of Technology Facilitated Violence and Abuse* (2021): 415. https://www.emerald.com/insight/content/doi/10.1108/978-1-83982-848-520211031/full/html.

[15] E. A. Vogels, (2021), op. cit.

[16] SunlightAfA, "Detailed sensing poll findings and research roadmap," (2022): 7. https://www.mci.gov.sg/files/Press%20Releases%202022/sunlight%20afa%20sensing%20poll%20findings%20and%20research%20roadmap%20(2).pdf

[17] SunlightAfA, (2022): 15, op. cit.

[18] SunlightAfA, (2022): 16, op. cit.

In 2023, an SG Her Empowerment (SHE) survey revealed that 47% of participants had witnessed online harms, while 38% reported personally experiencing them.[19] More men indicated experiencing online harms compared to women.[20] SHE questioned whether this gender difference could be due to women having "a higher threshold for reporting an online harm experience in a survey".[21] According to the survey, the top four online harms witnessed by participants were sexual harassment, cyberbullying, impersonation, and defamation/falsehoods.[22] The survey had focused on nine online harms in total, including image-based abuse, cyberstalking, cancel campaign, hate speech, and doxing.[23] Notably, female youths were "almost twice as likely to experience sexual harassment" compared to males.[24]

The conceptual distinction between direct and vicarious online harms is important. For example, a user may have little or no direct experience with online harms despite witnessing the same on numerous occasions (or vice-versa). There could also be congruence among users with high (vs. low) frequencies of both direct and vicarious experiences of online harms. This is partly demonstrated in the Sunlight AfA study discussed above. It is essential to understand the gender differences in both vicarious and direct experiences with online harms. For instance, in studies by both the Pew Research Center and Sunlight AfA, women had more direct experiences with sexual behaviour/harassment and stalking compared to men. Furthermore, direct and vicarious experiences of online harms can have different impacts on the well-being of Internet users and their likelihood to perpetrate similar behaviours. Existing studies have independently acknowledged both the psychological and behavioral consequences of having direct versus vicarious experiences.[25]

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[19] SG Her Empowerment (SHE), "Study on Online Harms in Singapore 2023 Topline Findings," (2023): 9. https://api2.she.org.sg/uploads/SHE_Report_on_Online_Harms_Study_Final.pdf

[20] SHE, (2023): 9, op. cit.

[21] SHE, (2023): 9, op. cit.

[22] SHE, (2023): 8, 12, op. cit.

[23] SHE, (2023): 8, 12, op. cit.

[24] SHE, (2023): 12, op. cit.

[25] L. A. Anderson, L. Morton, and A. N. Trejo, "To be young, conscious and Black: The cumulative witnessing of racial violence for Black youth and families," *Journal of Family Theory & Review* 14, no. 3 (2022): 415. https://doi.org/10.1111/jftr.12466; M. I. Islam, F. M. Yunus, E. Kabir, and R. Khanam, "Evaluating risk and protective factors for suicidality and self-harm in Australian adolescents with traditional bullying and cyberbullying victimizations," *American Journal of Health Promotion* 36, no. 1 (2022): 79. https://doi.org/10.1177/08901171211034105; S. Wachs, L. Bilz, A. Wettstein, M. F. Wright, J. Kansok-Dusche, N. Krause, and C. Ballaschk, "Associations between witnessing and perpetrating online hate speech among adolescents: Testing moderation effects of moral disengagement and empathy," *Psychology of Violence* 12, no. 6 (2022): 373. https://doi.org/10.1037/vio0000422.

Building on these distinctions established between the witnessing and direct experience of online harms, our current study will be focused on gender difference in the vicarious experiences of these harms.

Methodology

This study draws upon the data collected from a December 2022 survey that is a part of a longitudinal study to track Singaporeans' Internet and news-consumption patterns. The survey participants were Singapore citizens, permanent residents, and non-residents in Singapore. Adhering to the NTU Institutional Review Board (IRB; reference number: IRB-2022-1020) guideline, the eligibility to participate in the survey was limited to those 21 years old and above. Initially, a total of 1,016 eligible participants completed the survey. The participants self-reported their gender identity as "male" or "female", or "others". With only three participants selecting "others", drawing conclusions based on data from three observations would be challenging, so they were excluded from the dataset. The final sample count was 1,013, with males making up 54% and females making up 46% of the dataset.

Participants gave their informed consent to the survey before being screened (based on age and citizenship status) to ensure their suitability for the study. Table 1 summarises the key demographic details of the participants in the current study compared to the general population. Overall, the gender and ethnic profiles of the participants resemble the general population in Singapore, with Singapore citizens forming the majority of the study sample.

Table 1. Demographic Profiles of Participants.

Key Demographic Detail	Current Study (Sample size = 1,013)	General Population^ (5.92M)
Gender (%)		
Male	54.0	49.4
Female	46.0	50.6
Ethnic Groups (%)		
Chinese	74.3	75.6
Malay	14.3	15.1
Indian	8.0	7.6
Others	3.4	1.7
Citizenship (%)		
Citizens	90.1	61.0
Permanent Residents	8.0	9.12
Non-Residents	1.9	29.9

^ Figures retrieved from the Population in Brief 2023 report.[26]

Key variables such as daily Internet activities and usage of Internet-enabled devices were measured. Participants were asked to indicate the total number of hours spent each day using 13 different devices, on a scale ranging from "0 = zero hours" to "13 = 13 hours or more". Only six devices (laptop, desktop, smartphone, E-book reader, tablet, and gaming consoles) that fit the context of this study were eventually selected.

Using a five-point Likert scale, where "1 = Never" and "5 = Very often", participants indicated how often they would connect to the Internet to engage in five activities. The five daily Internet activities were: for work and school, for entertainment, to stay informed of the latest news, to conduct a search using search engines, and to connect with friends and loved ones. Our findings on device usage and daily activities are represented in Figure 1.

Participants also indicated on a five-point Likert scale how often they witnessed 12 types of online harms, from "1 = Never" to "5 = Very often". Figure 2 captures the types of online harms measured in the current study.

[26] "Population in Brief 2023," https://www.population.gov.sg/files/media-centre/publications/population-in-brief-2023.pdf.

Findings

This study aims to examine the effects of gender on the usage of the Internet and Internet-enabled devices for specific daily activities (see Finding 1). It also explores the impact of gender on the witnessing of online harms (see Finding 2). An understanding these relationships would serve to demonstrate how the use of the Internet and Internet-enabled devices for daily activities can contribute to the witnessing of online harms (see Finding 3).

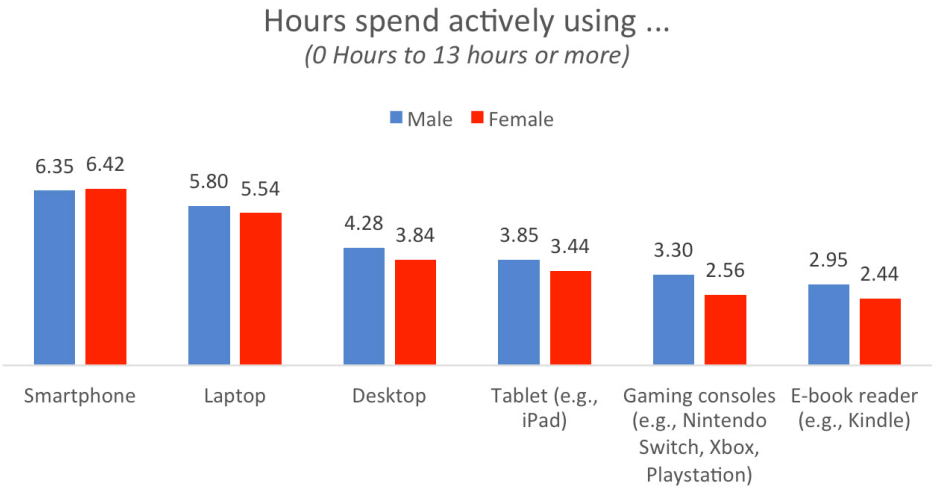
1. Men used the Internet and Internet-enabled devices for daily activities more than women

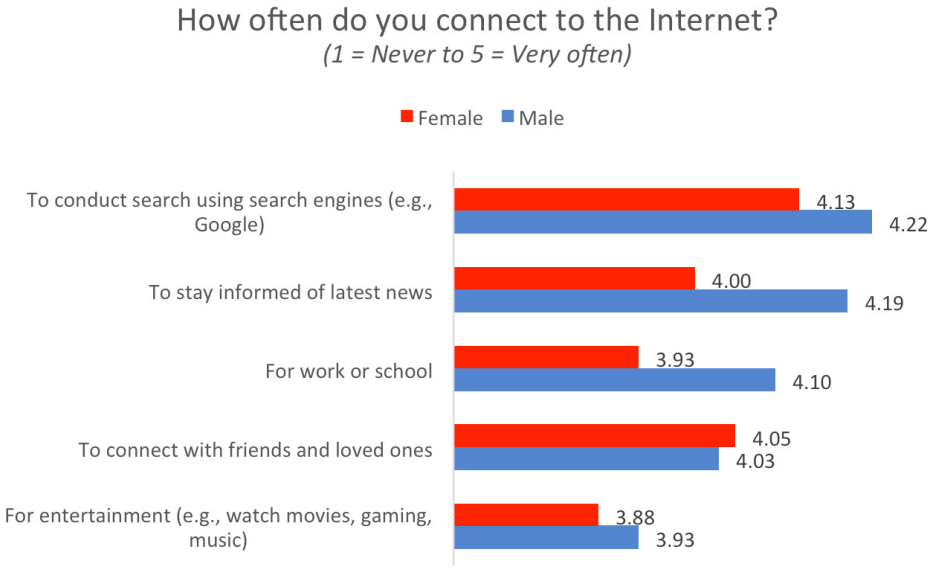
A multivariate analysis of covariance (MANCOVA) procedure was conducted using SPSS (version 20), to find out if there are gender differences in daily Internet activities and the usage of Internet-enabled devices. Controlling for participants' age and education level, the effect of gender was statistically insignificant on the daily Internet activities: F (5, 1005) = 2.01, p = .074, partial η^2 = .010; but significant on the time spent using Internet-enabled devices: F (6, 1004) = 3.60, p = .002, partial η^2 = .021.

Overall, the results suggested that the frequencies with which both gender groups used the Internet for their daily activities were largely similar. Nonetheless, Internet use for specific activities such as for work or school, [27] or to stay informed of latest news, were higher among men than women (see Figure 1). This calls for further investigation into the behavioural orientations of men and women in their engagement of specific online activities. Moreover, men used significantly more Internet-enabled devices (e.g. laptops, desktops, E-book readers, and gaming devices) compared to women. On the other hand, women reported higher frequencies of smartphone use compared to men. While there were some parallels with earlier research, this finding calls for a deeper look into the activities carried out via smartphone and the risk of exposure to online harms through this device compared with Internet use on a desktop computer or laptop. More research is needed to examine the nuances and frequencies in usage of specific Internet devices in relation to gender.

[27] The difference between the gender groups is marginal with p-value = .074

Figure 1. Gender differences in the use of Internet and Internet-enabled devices for daily activities.

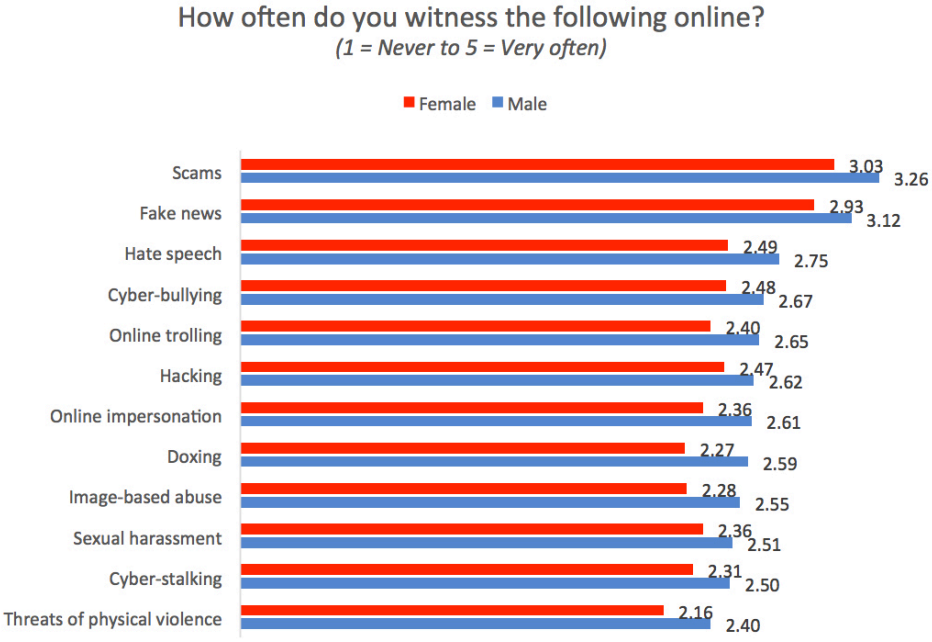




2. Men witnessed more online harms than women

The MANCOVA procedure was also used to examine gender differences in witnessing the 12 types of online harms. Controlling for participants' education and age, the effect of gender on online harms was statistically significant: F (12, 998) = 2.58, p = .002, partial η^2 = .03. The overall results revealed that men witnessed more online harms than women (see Figure 2), with the trend remaining consistent across the 12 types of online harms.

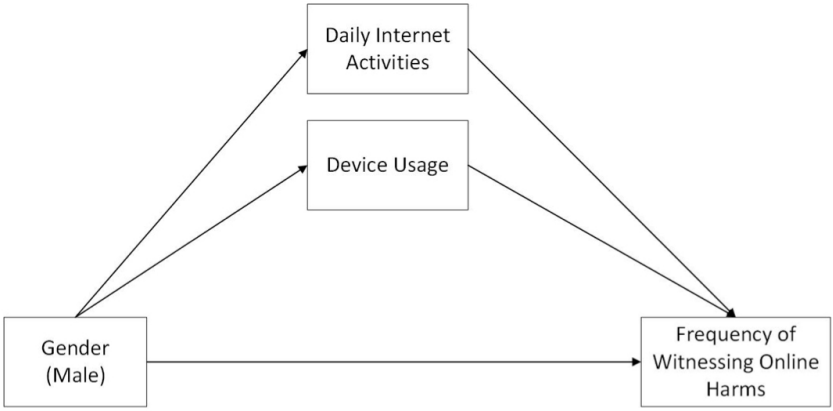
Figure 2. Gender differences in the witnessing of online harms.



3. Internet consumption can explain the gender differences in the witnessing of online harms

Mediation analysis (see Figure 3) was conducted using PROCESS[28] macro (version 3.5) to examine whether daily Internet activities and the usage of Internet-enabled devices can explain the gender differences in the witnessing of online harms. Indirect effects were found in the mediation model (see Figure 1). Prior to the main analysis, we had computed the composite scores by averaging the scores from the six Internet-enabled devices (M = 2.57 hours, SD = 2.51, α[29]= .88), five daily Internet activities (M = 4.05, SD = .70, α = .75), and 12 online harms (M = 2.58, SD = .92, α = .95). Overall, the results from our analyses[30] suggested that men witnessed more online harms than women due to their daily Internet activities and usage of Internet-enabled devices. ($\beta^{\text{daily internet use}}$ = .009, SE = .006, 95% CI [.0002, .0214]; $\beta^{\text{device use}}$ = .057, SE = .025, 95% CI [.009, .109]).

Figure 3. Daily Internet activities and usage of Internet-enabled devices in explaining gender differences in the witnessing of online harms.



[28] A. F. Hayes, *Introduction to Mediation, Moderation, and Conditional Process Analysis* (Third ed.), (New York: Guildford Press, 2022).

[29] Cronbach alpha (α) indicates reliability in the measurement scale. In this case, the α value is above the conventional threshold of 0.60, indicating sufficient reliability in measuring this construct.

[30] A direct effect between gender and the frequency of witnessing online harms was found (β = .158, SE = .052, p = .002, 95% CI [.057, .259]). Once again, this suggested that men were witnessing online harms on a higher frequency than women in this study. In addition, the positive and significant effects of gender on both daily Internet use (β = .097, SE = .044, p =

Implications

Online harms have garnered the attention of government legislators and policymakers in recent years. The topic has also sparked growing research, with scholars exploring various dimensions such as the link between witnessing and perpertrating online harms, gender differences in perpetrating online harms, and gender-based variances in experiencing online harms (see Findings 2 and 3). The current study expands the existing literature by examining how gender differences affect the witnessing of online harms in relation to daily Internet activities and the frequency of device usage.

We found that men used Internet-enabled devices like laptops, tablets, e-books, and gaming consoles more frequently than women. This suggests that even in countries with high Internet penetration rates (at 92% in Singapore; International Telecommunication Union, 2020) and high Internet accessibility, the effect of gender differences on device use remains relevant and impactful.

This, in turn, has crucial implications on gender-based differences in the witnessing of online harms. Our survey revealed that male participants not only used Internet-enabled devices more frequently, they also witnessed more online harms than women. This aligns with some existing studies on the experience of online harms in relation to gender.[31] It is important to note the conceptual differences between witnessing the online harms and personally experiencing them, as their implications could be different. Besides, different online harms may have varying impacts on those who witness or experience them.

Furthermore, the frequency of witnessing online harms may increase the risk of engaging in online misbehaviour. Several studies have demonstrated that increased exposure to online harms is directly associated with misconduct. For example, Muhid et al. (2019) found that Indonesian Muslim teenagers who frequently witnessed hate speech and fake news on social media exhibited higher levels of religious intolerance

.029, 95% *CI* [.0098, .183]) and Internet-enabled devices (β = .381, *SE* = .168, *p* = .023, 95% *CI* [.0524, .710]) suggested that, in general, men have a higher frequency of daily Internet activities compared to women. Consistent with our literature review, the high frequency of daily Internet activities (β = .0893, *SE* = .037, *p* = .015, 95% *CI* [.0173, .161]) and Internet-enabled device usage (β = .150, S*E* = .0097, *p* < .001, 95% *CI* [.130, 168]) is positively associated with the frequency of witnessing online harms.

[31] E. A. Vogels, (2021): 10, op. cit.; and Sunlight AfA, (2022): 7, op. cit.

and prejudice.[32] Likewise, in South Korea, Kim et al. (2022) found that social media users frequently exposed to hate speech towards specific social groups were more likely to engage in online anti-social behaviours such as unfriending and blocking contacts on social media platforms.[33] There are additional studies suggesting a link between witnessing online harms and perpetrating them.[34] Our findings provide a baseline for other scholars to consider device usage and daily Internet activities as factors when exploring online harms perpetration.

[32] A. Muhid, Moch Hadi, Aris Fanani, Ahmad Arifin, and Ahmad Hanif, "The Effect of Hate Speech Exposure on Religious Intolerance among Indonesian Muslim Teenagers," Paper presented at the Ahmad Dahlan International Conference Series on Education & Learning, Social Science and Humanities, (2019):150. https://doi.org/10.2991/adics-elssh-19.2019.31

[33] Bumsoo Kim, Yi Wang, Janggeun Lee, and Yonghwan Kim, "Unfriending Effects: Testing Contrasting Indirect-Effects Relationships between Exposure to Hate Speech on Political Talk Via Social Media Unfriending," *Computers in Human Behavior* 137 (2022): 5. https://doi.org/10.1016/j.chb.2022.107414.

[34] C. P. Barlett, "Cyberbullying as a Learned Behavior: Theoretical and Applied Implications," *Children* 10, no. 2, (2023): 7. https://doi.org/10.3390/children10020325; Chun-Yin Hou, Ru Rutherford, Hsi Chang, Fong-Ching Chang, Liu Shumei, Chiung-Hui Chiu, Ping-Hung Chen, et al., "Children's Mobile-Gaming Preferences, Online Risks, and Mental Health," *PLOS ONE* 17, no. 12 (2022): 9. https://doi.org/10.1371/journal.pone.0278290.

Future Considerations

Singapore has multiple laws in place to address online threats such as harassment and misinformation. These include the Protection from Online Falsehoods and Manipulation Act (POFMA), Protection from Online Harassment Act (POHA), and Code of Practice for Online Safety. While these laws may promote some degree of deterrence against perpetrating online harms, they are primarily post-action measures, taking effect and imposing penalties only after an offense has been committed. While the fear of penalties may deter potential offenders, these laws may fail to deter when offenders are anonymous, outside Singapore's jurisdiction, or beyond the reach of Singapore's law enforcement. As such, it may not be feasible to block all harmful content.

In addition to laws, there is growing attention to online harms in academic, government, and civil society circles. This is evident from the numerous conferences on the topic and the establishment of organisations like SG Her Empowerment.[35,36] As the countermeasures evolve, it is essential to observe how the threat landscape changes and how the existing levers respond to emerging threats. Thus, research into this area should continue with increased attention to gender-based differences.

Based on the findings of this study, experts and scholars should further investigate the potential relationship between witnessing and perpetration of online harms, and move beyond male-female binaries for a more inclusive approach to gender. The relationship between witnessing online harms, Internet use for daily activities, and Internet-enabled device usage, underscores the need to equip netizens with the skills and knowledge to protect themselves. It is equally important to continue exploring the psychological consequences of witnessing and personally experiencing online harms, and how witnessing online harms can lead to perpetration. The findings on the latter may inform the development of new policies addressing these issues.

[35] See "Online Harms Symposium", an SMU symposium organised in collaboration with the Ministry of Law. https://site.smu.edu.sg/online-harms-symposium-2023.

[36] For SG Her Empowerment events, see https://she.org.sg.

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