The effect of therapeutic and deterrent messages on Internet users attempting to access 'barely legal' pornography

Jeremy Prichard [a,*], Richard Wortley [b], Paul Watters [c], Caroline Spiranovic [a], Joel Scanlan [d]

[a] Law School, University of Tasmania, Australia
[b] Jill Dando Institute of Security & Crime Science, University College London, UK
[c] School of Engineering and Mathematical Sciences, La Trobe University, Australia
[d] College of Business and Economics, University of Tasmania, Australia

ABSTRACT

Online child sexual abuse material (CSAM) is a growing problem. Prevention charities, such as Stop It Now! UK, use online messaging to dissuade users from viewing CSAM and to encourage them to consider anonymous therapeutic interventions. This experiment used a honeypot website that purported to contain barely legal pornography, which we treated as a proxy for CSAM. We examined whether warnings would dissuade males (18–30 years) from visiting the website. Participants ($n = 474$) who attempted to access the site were randomly allocated to one of four conditions. The control group went straight to the landing page (control; $n = 100$). The experimental groups encountered different warning messages: deterrence-themed with an image (D3; $n = 117$); therapeutic-themed (T1; $n = 120$); and therapeutic-themed with an image (T3; $n = 137$). We measured the click through to the site. Three quarters of the control group attempted to enter the pornography site, compared with 35 % to 47 % of the experimental groups. All messages were effective: D3 (odds ratio [OR] = 5.02), T1 (OR = 4.06) and T2 (OR = 3.05). Images did not enhance warning effectiveness. We argue that therapeutic and deterrent warnings are useful for CSAM-prevention.

1. Introduction

Few in the twentieth century might have predicted that the Internet would enable child sexual abuse material (CSAM) to grow in popularity to the extent that it has. In the early 1980s available metrics indicated that the CSAM market was tiny (Wortley & Smallbone, 2012). This supported the view that, as a behaviour, viewing CSAM was limited to and concomitant with paedophilia. However, now that millions of people access CSAM (e.g. WeProtect, 2021), a less rigid – and more complex – view of the aetiology of CSAM use has emerged. Many risk factors may combine to heighten the risk than an individual begins to engage with CSAM (e.g., Merdian et al., 2020). While paedophilic disorder may lead some individuals to commence using CSAM, onset can also be associated with different psychological states, such as hypersexual disorder, or impulsive risk-taking behaviours (Seto & Ahmed, 2014; see also Beech et al., 2008:225; Lanning, 2010; Ly et al., 2018).

Moreover, even in the absence of psychological conditions, numerous factors increase the risk that previously law-abiding people

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* Corresponding author at: Law School, University of Tasmania, Private Bag 89, Hobart 7001, Australia.
  E-mail address: jeremy.prichard@utas.edu.au (J. Prichard).

seek to experiment with CSAM (possibly commencing with less egregious forms of the material). Some of these factors simply relate to the Internet environment. Users can unwittingly encounter CSAM, or find it in a matter of seconds, and then commence viewing it with incredible ease – that is, from their own home with 'a click of a mouse' (Quayle, 2012, p. 110; see also Babchishin et al., 2015), without any cost and with apparent anonymity (Merdian et al., 2009; Wortley & Smallbone, 2012). They can also encounter (a) legal material that explicitly eroticises adult-minor sex (Dines, 2009; Peters et al., 2014) and (b) any number of deviant subcultural norms that excuse CSAM viewing (Prichard et al., 2013).

Other risk factors may be specific to individuals at a point in time – such as if a person is already in a sexually aroused state (Taylor & Quayle, 2008), is intoxicated (Balfe et al., 2015), or is alone (Seto, 2019). Repeated use of CSAM can become problematic for an individual through conditional pairing with masturbation, and escalation in the frequency of use and the seriousness of the content viewed (e.g., Fortin & Proulx, 2019; Paul & Linz, 2008; Quayle & Taylor, 2004; Wortley & Smallbone, 2012:121).

Law enforcement agencies are aware of these complexities. Indeed, several years ago the Australian Federal Police (2016, p. 47) concluded that the 'social appetite for [CSAM] is increasing'. And it is becoming clear that over-reliance on the traditional arrest-prosecute-imprison model will not stem the expansion of the CSAM market (Hunn et al., 2020). This is so because, first, police are increasingly having to concentrate their resources on investigating people who are suspected of sexually abusing children and creating CSAM (Child Dignity Alliance, 2018; Seto, 2013). Secondly the traditional approach simply cannot keep pace with the number of CSAM users. Arrests in countries like the United Kingdom number in the thousands annually (Home Affairs Committee, 2018, p. 38), but CSAM users appear to be in the millions (e.g. WeProtect, 2021). A wider array of approaches is needed to address the problem, including prevention strategies.

1.1. Online counselling services

In response, non-government organisations have expanded anonymous therapeutic services for people who are concerned about their use of CSAM. Services can address CSAM-viewing specifically, or as part of a broader examination of clients' thoughts and behaviour towards children. Leading examples are Germany's Prevention Project Dunkelfeld (PPD), and StopItNow! in the USA, UK, Holland, and Australia. These programs offer counselling in different modes (e.g. online, telephone, face-to-face). Critically for this paper, the services cater to (a) individuals who are worried about emerging problems, and (b) those who want to stop viewing CSAM.

Organisations like StopItNow! promulgate their services in many ways, including through online messaging (Scanlan et al., 2024). In addition to telling users how to access counselling, it is quite common for the messages to also contain an aspect of deterrence – even if this is merely to remind users that CSAM is illegal (see e.g., Prichard, Scanlan, Watters, et al., 2022, p. 6).

Analogous therapeutic services are also being trialled for individuals who, rather than being concerned about their use of CSAM, simply perceive that their use of *legal* pornography is problematic in some way (e.g. Böthe et al., 2021) – for example because of its influence on relationships or work performance (Crosby & Twohig, 2016), or because they feel disempowered because their viewing habits are dysregulated (Sniewski et al., 2018).

1.2. Efficacy of online CSAM warnings

Not long ago online CSAM-warnings were derided as a strategy that 'paedophiles will laugh at' (Belfast Telegraph, 2013). However, this sentiment is fading as awareness grows that many new CSAM users are not paedophiles (Bailey et al., 2022; Merdian et al., 2018; Quayle, 2020), and that warnings may prevent offending, or at least disrupt it. A boost to the credibility of CSAM-warnings has been the development of a cogent theoretical explanation as to why they may be effective, provided by situational crime prevention (SCP) theory (Smallbone & Wortley, 2017; Wortley & Smallbone, 2006, 2012; see further Quayle & Koukopoulos, 2019). The theory frames all crime as the result of an interaction between the individual and the situation they are in at any point in time. Its 'pragmatic and modest' aim is to discourage potential offending by altering 'situational dynamics around [any] potential crime scene' (Wortley, 2024: 253). SCP has been applied in many contexts, including to reduce the risk of child sexual assault (Wortley & Smallbone, 2006).

The potential strength of online CSAM-warnings, Wortley argued (Wortley, 2012, p. 193), is their capacity to reach users at the very moment they may be contemplating CSAM offending. In this way warnings can interfere with users' *environment* and burst the cognitive bubbles of anonymity and excusability. The two main forms of messages recommended by Wortley and Smallbone (2012) were those that (a) increased users' perceptions of risk (e.g. eliminating the illusion of sanctuary from police), and (b) removed excuses (e.g. by highlighting the harmfulness of viewing CSAM).

Earlier, Williams (2005) also considered the value of deterrence-themed and harm-themed messages to counter CSAM. She drew on a different theoretical lens to SCP – namely forbidden fruit theory (Bushman & Stack, 1996), which has roots in Brehm's (1966; cited in Bushman & Stack, 1996) cognitive theory of reactance. This posits that individuals may be motivated to react against propositions or regulations (in any form) that they perceive encroach on their autonomy, or limit choice in some way. Williams (2005) argued that for this reason *deterrence-themed* CSAM warnings could be ineffective, or worse actually encourage offending – either because they made CSAM seem exciting, or because users would resent being told what to do. In other words, the warnings could paradoxically increase CSAM-offending in much the same way that Bushman and Stack (1996) had found that violent content warnings increased interest in violent television programs.

But Williams (2005, p. 422) saw value in *harm-themed* messages because they could encourage users to see CSAM as 'tainted fruit' that they would prefer to avoid because of the harm suffered by the children depicted, or the potential harms CSAM might cause to viewers themselves. Christenson (1992, p. 107) coined the term 'tainted fruit effect' to summarise his empirical finding that adolescents were inclined to observe warning labels on music about sexually explicit or offensive content – probably simply because such

content made most adolescents feel 'uncomfortable'.

Recently we published the results of two randomised controlled experiments with naïve participants. These indicated that deterrence-themed warnings dissuaded Internet users from (a) viewing 'barely legal' pornography (Prichard, Wortley, Watters, et al., 2022), and (b) sharing sexual images of women through a 'revenge porn' website (Prichard, Scanlan, Krone, et al., 2022). In the 'viewing' experiment harm-themed warnings had no significant effect. However, that experiment could not advertise faux links to CSAM for obvious legal and ethical reasons, and the (ethically approved) advert we used for our fake pornography website was tame by the standards of the adult entertainment industry. The advert depicted a clothed adult woman in a comparatively muted context. Consequently, we concluded that participants simply did not believe our warning about the harmfulness the pornography – that it harmed the actresses, or could cause viewers to become sexually attracted to children (Prichard, Wortley, Watters, et al., 2022: 118). The disjuncture between the advert's appearance and the supposed harms of the content it led to was too great.

Despite these mixed results we have argued that CSAM-warnings are promising and worth investigating further. First, they are likely to be cost effective. Secondly, warnings can be implemented in a wide variety of ways by organisations at the local, national and international level (see Hunn et al., 2023). Thirdly, CSAM warnings have the potential to reach millions of individuals. At this large scale, even if only a fraction of those exposed to the warnings permanently lose interest in CSAM (perhaps in favour of pornography's vast *legal* archives) the strategy is worthwhile. Fourthly, academic literature is replete with robust examples of the *capacity* of warnings of one form or another to positively influence human behaviour – as demonstrated in the crime context (Blais & Bacher, 2007; Bott et al., 2020; Coleman, 2007; Chainey, 2021; Chernoff, 2021; Kyvsgaard & Sorensen, 2021; Scanlan et al., 2024; Ullman & Silver, 2018) and research from many other disciplines (e.g. Akhawe & Felt, 2013; Anderson et al., 2016; Ginley et al., 2017; Mollen et al., 2017; Rosenblatt et al., 2018; Taylor & Wogalter, 2019). Finally, a lot is known about how to design messages to increase their effectiveness. Messages work best if they attract attention, impart information clearly and concisely (Laughery & Page-Smith, 2006; Lenorovitz et al., 2012), are believable (Riley et al., 2006), come from a credible source (Wogalter & Mayhorn, 2008), and use relevant colours, alert symbols and signal words, such as 'caution' (Kim & Wogalter, 2015).

1.3. Efficacy of online referral messages

Recent research conducted in partnership with Aylo (the owner of Pornhub) has found that online referral messages sent to Pornhub users in the UK who searched for CSAM reduced the search volume on the site, and also increased the numbers of individuals who contacted StopItNow!'s anonymous counselling services (Scanlan et al., 2024). (This counselling addresses individuals' concerns about their sexual attraction to children online, or in the real world.) Though research of this nature is valuable, the way the data are collected usually makes it impossible to control for the influence of external variables, or full traceability of an individual accessing the websites and services of multiple organisations to protect their privacy. This in turn makes it difficult to confidently interpret findings. Surveys have been used to examine how online CSAM referral messages ought to be designed – for instance by gathering the opinions of self-identified CSAM users in interviews (Henry, 2020). Such studies are useful because they yield rich person-centric data. However, two limitations of survey methods are their exposure to selection effects, and the risk that embarrassed participants do not provide accurate (or honest) information about how they might respond to a CSAM referral message.

1.4. Imagery

Incorporating images into warning messages can increase their effectiveness by, among other things, attracting attention and conveying information (Laughery & Wogalter, 2006). Experimental research from the health sector shows that warnings about the risks of tobacco can be more effective if they combine text with images than if they rely on text alone (Hall et al., 2020; Kees et al., 2010; Noar et al., 2016). Similar effects have been recorded for warnings relating to sugary drinks, and alcohol (Hall et al., 2020). Explicitness may be an important factor. For example, Kees et al. (2010) found that warnings that contained graphic images of disease appeared to work better than warnings with less confronting pictures. To date, the question as to whether images improve the effectiveness of crime prevention warnings has received modest empirical attention. Studies have indicated that images of human eyes can reduce offending behaviour (e.g. Ayal et al., 2021; cf. Haddad et al., 2020). However, in the 'sharing' experiment we found that adding a cartoon-like moving infographic made no difference to the effectiveness of pop-up messages that were designed to dissuade users from sharing sexual images of women (Prichard, Scanlan, Krone, et al., 2022).

1.5. The current study

The current study extended the original 'viewing' experiment (Prichard, Wortley, Watters, et al., 2022). It sought to examine two main research questions through an online experiment with naïve participants using fake ('honeypot') adverts that offered participants the opportunity to view a (non-existent) 'barely legal' pornography website, called '*Just Barely Legal*' (*JBL*). We used the barely legal genre as a proxy for CSAM. Though barely legal is popular (e.g. Pornhub, 2019) and generally legal, it encompasses some material that has a higher deviant status because of the strategies it uses to enhance the fantasy that an adult actress is a minor – such as apparent vaginal bleeding, child-like behaviour (e.g. crying), and child abuse themes (e.g. with teachers, stepfathers) (Peters et al., 2014). Barely legal has been described as 'pseudo-child pornography' (Dines, 2009: 124).

First, we sought to test whether 'therapeutic' referral messages – similar to those employed by StopItNow! – might dissuade individuals from attempting to access *JBL*. With a theoretical framework that combined tainted fruit theory (Christenson, 1992; Williams, 2005) and SCP theory (Wortley & Smallbone, 2012), we anticipated that a message that referred Internet users to services that

help with problematic pornography use might work to (a) 'taint' users' perception of *JBL*, and (b) question the excusability of accessing it. At root, our aim with this new approach was to provide a message about potential harms (i.e. those relating to self-identified problematic pornography use) that was more subtle and believable than the bald assertions that were contained in the harm-themed messages of our first experiment (i.e. that the conservative-looking *JBL* content harmed actresses, or could lead users to be sexually attracted to children) (see Prichard, Wortley, Watters, et al., 2022).

Our second objective was to test whether adding images to warnings influenced participants' cognition. Following Laughery and Wogalter (2006), we predicted that, compared against text-only warnings, text-plus-image warnings would be more effective because they would be better at attracting attention and conveying information. Still images were not tested in our first two experiments.

For clarity, the new features of this experiment were (a) a new type of message with a therapeutic focus (as a better harm-themed message), tested both with and without an image, and (b) adding an image to one of the text-only deterrent messages that we tested in our first experiment (see further *Design and procedure, below)*.

2. Method

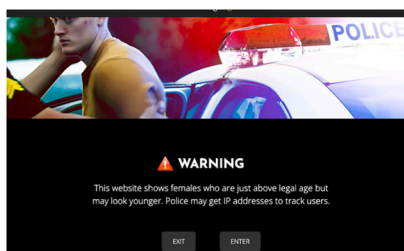### 2.1. Design and procedure

As with previous experiments (Prichard, Scanlan, Krone, et al., 2022; Prichard, Wortley, Watters, et al., 2022), this study utilised a fully functioning male fitness website (called "*GetFit*" for the purpose of this article), which was created and maintained by a contracted website design and advertising company. *GetFit* mimicked the look and feel of www.menshealth.com and related websites, with continually updated articles on fitness, diet, sport, and some articles on sex. Real adverts were hosted on *GetFit* for a range of products, including dating websites and gym clothing.

The fake *JBL* adverts, designed by our commercial partner, first appeared on *GetFit* on 27 November 2017. Visitors to *GetFit* who chose to click on the *JBL* advert were allocated using a randomisation algorithm (Mersenne Twister) to experimental conditions, who received different types of warning messages, and a control group, who did not. The control group arrived immediately at the (fake) official website of *JBL*, where they could click 'enter' or navigate away. Instead of arriving immediately at the *JBL* website, the experimental groups could navigate away when they received their warning, or they could ignore the warning and proceed to the *JBL* website and then decide whether to click 'enter'. Participants who clicked 'enter' received an error message from *JBL*; "Sorry! We're undergoing routine maintenance. Please check back shortly."

The original *JBL* experiment tested four experimental conditions: the two harm messages discussed above; and two deterrence-themed messages (Prichard, Wortley, Watters, et al., 2022). When sufficient data were collected for this first phase and we had a certainty about our sample size, we repurposed the original control group and launched a second phase with three new experimental conditions. These were launched on 29/11/2018 and withdrawn 15/05/2019. During this period participants were randomly assigned to one of the three new messages, but they could not be assigned to the control group ($n = 100$), which we 'closed'.

To comply with legal and ethical requirements, the new messages began with the same stem: "This website shows females who are

(a). Deterrence text + image (D3)   (b). Therapeutic text only (T1)
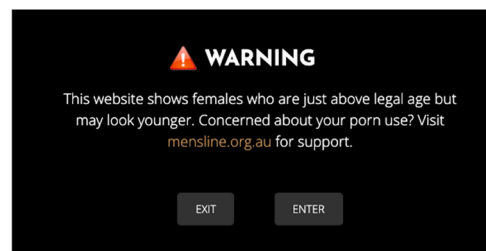
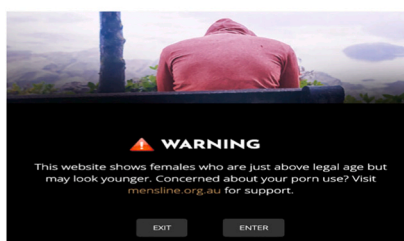(c). Therapeutic text + image (T2)

Fig. 1. Visual appearance of additional message conditions.

just above legal age, but may look younger".

- The first message repeated the text-only deterrence warning from our first experiment (see Prichard, Wortley, Watters, et al., 2022:116) – *"Police may obtain IP addresses to track users"* – and added an image of a young man being arrested (deterrence text+image) (see below, Fig. 1(a)).
- The second stated *"Concerned about your porn use? Visit mensline.org.au for support"* (therapeutic text) (Fig. 1(b)).
- The third message combined the therapeutic message with an image of a young man on a park bench looking isolated (therapeutic text+image) (Fig. 1(c)).

We attempted to comply with the evidence base on message-design by ensuring our messages were clear, concise and believable, and contained an alert symbol (!) and a signal word ('warning'). The messages contained the *GetFit* logo which provided a credible explanation to users as to their origin. Additionally, the messages covered participants' entire browser screen regardless of the type of device used. We also designed the messages so that participants had to take action to remove them (eg by clicking 'exit', or navigating away).

2.2. Authenticity

One of the key objectives of honeypot studies is to create an online environment where participants behave naturally and are unaware that some of their activities are being recorded for research purposes. Consequently, we took great care to ensure that everything that the participants encountered – the *GetFit* and *JBL* websites, and the messages – appeared authentic, even for tech-savvy participants. Our commercial partner ensured that the visual interface had an authentic 'look and feel' for the participants. The partner also maintained *GetFit* on Australian servers. However, the researchers maintained the *JBL* adverts and the *JBL* website on two different U.S. servers. Adopting this approach ensured that metadata for *GetFit* and *JBL* were unrelated, sidestepping any suspicions about the relationship between the sites. To increase the apparent legitimacy of *GitFit* and *JBL*, we: registered and paid for their domain names; virtualised server hosting with anonymised email addresses from an independent third party without any connection to the researchers; and made sure that the sites were accessible only using Secure Sockets Layer (SSL) from certificates issued by trusted third parties.

2.3. Recruitment

This study covertly observed participants' behaviour without their consent; further, participants were naïve and did not know the *GetFit* website and the *JBL* material were generated for research purposes. Although Internet users could arrive at the *GetFit* website through various routes, such as organic searches, we recruited English-speaking Australian males aged 18 to 30 years to *GetFit* using social media advertising. This was implemented by our commercial partner and specifically targeted the cohort based on the information individuals listed on their social media profiles. Since men are more likely than women to use pornography (Rissel et al., 2017), we determined that targeting males would increase the chances that our limited advertising budget would achieve an adequate sample size.

2.4. Ethics

The University of Tasmania Human Research Ethics Committee (HREC) approved this experiment (#H0012409) following accepted international principles of human research. Key factors underpinning the HREC's decision were that the research: (a) aimed to promote the public benefit; (b) did not observe illegal behaviour; (c) adequately protected participants' anonymity; (d) entailed a low risk of causing participants distress; and (e) did not display pornography.

Australian legal definitions of CSAM encompass images of people who reasonably appear to be under the age of consent. This meant that the images used for *JBL* had to depict actual adults who appeared to be adults. Relatedly, *JBL* did not pretend to provide access to CSAM; if it had any participant who clicked on a link might have committed an offence of attempting to access CSAM.

Participants' IP addresses were recorded, but no other identifying information. The HREC were satisfied that, due to the low probative value of the IP addresses, law enforcement agencies would see no value, for example, in mapping their geographic location. To ensure that our commercial partner was unable to access sensitive information, participants' experimental data were stored on the *JBL* website, which was controlled by the researchers. Participants' data were further protected through: strong password protection on servers and databases; blocking of incoming firewall ports (bar ports 80 and 443); deletion on the servers of any guest or non-authenticated accounts; encrypted transportation of data to and from the servers; and monitoring IP address server logs to make sure that unauthorised access had not occurred.

2.5. Outcome measures

Metrics about users' pathways to the *GetFit* website, the numbers of visitors the site received, and the behaviour of users at the site were collected from Google Analytics. The core measurement through which we tested our hypotheses was whether – after clicking on an advert for *JBL* – participants clicked "enter" at the *JBL* website landing page. With this information we created a dichotomous dependent variable: *desistance*.

We manually checked IP addresses and deleted records that were identified as bots (non-human agents). This step ensured that each IP address represented a person. We also deleted repetitions of IP addresses to control for double-counting. This measure will not have prevented double-counting if the same participant clicked on the *JBL* advert from different IP addresses, such as from home and from work. The corollary is equally important; given that multiple users can access the Internet from one IP address, it is feasible that we deleted some unique participants from the study.

3. Results

We determined, using data from Google Analytics, that during the time period of this experiment (November 2018 – May 2019) GetFit was visited by 29,670 users. This is a similar number of visitors as we reported in our first experiment (Prichard, Wortley, Watters, et al., 2022: 114) as an identical 'ad buy' was undertaken for both experiments from the social media platform. That is, since our advertising budget was costed on click-through numbers, a very similar number of total referrals from social media to the fitness website occurred.

We expect that most of these 'user sessions' probably related to individual people, although it is not possible to calculate how many individuals visited the site more than once from different IP addresses. Like our other experiments, the bulk of *GetFit's* traffic originated from paid social media advertising (87 %), followed by organic searches (10.5 %), and miscellaneous routes (e.g., referrals by social networks) (2.5 %).

During the period of this experiment the *JBL* advert received a total of 3451 clicks, including a very large number of hits from social media bots.[1] Once the data were cleaned to exclude bots and repeat entries of IP addresses, we determined that 374 clicks had been made on *JBL* adverts from unique IP addresses. This represents approximately 1.26 % of *GetFit* visitors, which is a better click-through rate than the average of 0.46 % for web-based display adverts (i.e., adverts for things people have not specifically searched for; Irvine, 2024). (The 100 participants in the control group were allocated to that condition in the first stage of the *JBL* experiment (see Prichard, Wortley, Watters, et al., 2022).)

3.1. Desistance

Fig. 2 shows the behaviour of the 474 participants who entered the study by clicking on one of the *JBL* adverts. Of the 100 participants in the control group from the first experiment, three quarters (73 %) attempted to enter the *JBL* landing page, making their desistance rate 27 %.

A total of 374 participants entered the new phase of the *JBL* experiment.[2] They were randomly allocated to one of the three experimental groups. The desistance rates for all experimental groups were higher than for the control group. Many participants in the experimental groups desisted by navigating away immediately after receiving their warning message. Others continued to the *JBL* landing page before navigating away (i.e. choosing not to click "enter"). For instance, after the T1 group ($n = 120$) received their warning message, 64 decided not to visit the *JBL* landing page. A further eight participants in the T1 group arrived at the *JBL* site but decided not to enter, meaning that this group's desistance rate was 60 %. The desistance rate for T2 was 53 %. As explained above, D3 repeated a text-only deterrent message employed in our first experiment (D1), which had a desistance rate of 49 % (Prichard, Wortley, Watters, et al., 2022:116). By contrast D3, which combined the same text with an image, had a desistance rate of 65 %.

Analyses compared each of the three experimental groups separately with the controls. The statistical significance of the differences in the proportion of participants from each group who did not click 'enter', that is, who 'desisted', was determined with Fisher's exact test (1-sided). A more stringent alpha level of 0.01 was adopted to establish statistical significance in order to reduce the possibility of Type 1 error from conducting multiple comparisons.

The difference between the control group and D3 ($p < .0001$, OR = 5.02 [95 % CI OR = 2.75, 9.18) was statistically significant and practically meaningful (see Ferguson (2009)) for guidelines on interpreting effect sizes in the social sciences). Similar results were obtained when comparing the therapeutic messages (i.e. T1 and T2) with the control group. Individual comparisons found that the differences between the control group and T1 ($p < .0001$, OR = 4.06 [95 % CI OR = 2.24, 7.36) and T2 ($p < .0001$, OR = 3.05 [95 % CI OR = 1.69, 5.50) were also statistically significant and practically meaningful.

The effect sizes, as indicated by odds ratios (OR), were moderate to large – and interestingly the largest effect sizes we have encountered in our experimental work to date. For completeness, we conducted additional analyses to examine the relationships between the new messages (D3, T1, T2) and also their relationship with D1. None of the six pairwise comparisons approached significance at $p < .01$.

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[1] This is many times higher than the number of total clicks recorded in our first JBL experiment (Prichard et al., 2022a), or our experiment on sharing images (Prichard et al., 2022c). This is probably reflective of an increase in the use of web crawler bots by various large companies, including social media and search engines. Crawler bots were easy to detect and remove from the raw data.

[2] We have not conducted a power analysis for this experiment. Nonetheless we have confidence in the robustness of the findings because: (a) the methodology and sample sizes were intended to be consistent with the original 'viewing' study where power analyses were performed; and (b) the effect sizes, combined with the fact that the observed differences were statistically significant, indicate that the sample size was adequate.
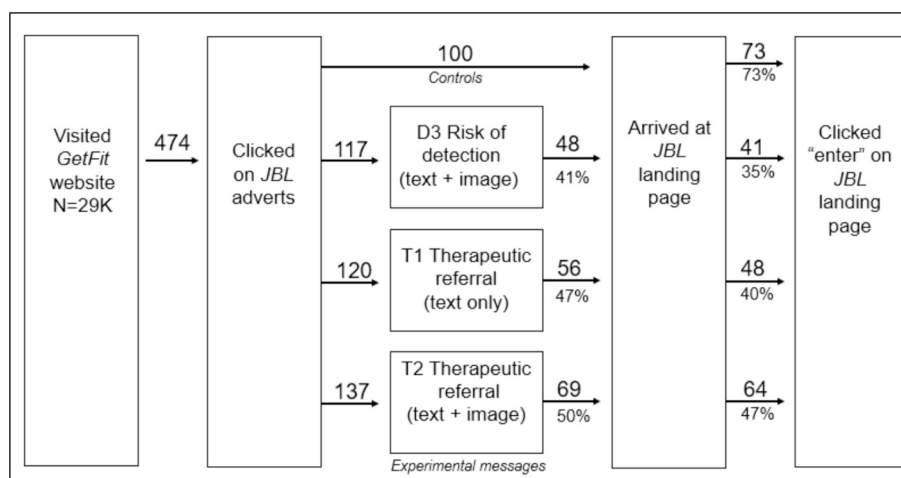
Fig. 2. Number of participants who arrived at the *JBL* landing page and clicked "enter" by condition type. Note: D1 Risk of detection (text only) had a desistance rate of 49 % (Prichard, Wortley, Watters, et al., 2022).

4. Discussion

We investigated whether (a) therapeutic referral messages influence the behaviour of users attempting to access barely legal pornography, and (b) images change users' reactions to deterrence messages and therapeutic messages.

4.1. Therapeutic referral messages

We found that therapeutic referral messages significantly reduced the click-through rate to the barely legal pornography website. We are not suggesting that *all* of the participants in the experimental groups who chose not to enter the pornography website did so solely because of the warning they received. Some may have, for example, decided that the *JBL* website looked dull – given the necessary ethical constraints that prevented *JBL* from mirroring pornography industry 'standards'. Indeed, exactly the same issue may also have explained why 27 % of the control group also chose not to enter the site. Our point is that in the controlled experimental environment, only one variable differentiated the control group from the experimental groups: the warning messages. It is on this basis that we assert that, given the statistically meaningful differences observed, it was the messages that reduced the click-through rate.

In our view this finding broadly supports Williams' (2005) recommendation that Internet users can be dissuaded from viewing CSAM by pop-up messages that focus on the harm associated with that material. While T1 and T2 did not explicitly mention any harms, their text – "Concerned about your porn use? Visit mensline.org.au for support" – prompted the participants to question whether they really wanted to visit *JBL,* and arguably implied that *JBL's* content would be off-putting, perhaps even disturbing, because of its deviancy. In other words, T1 and T2 portrayed JBL as a 'tainted fruit' that participants might prefer to avoid because it could induce emotional harm, even if that was mild and temporary, in much the same way as Christenson's (1992, p. 107) adolescent participants eschewed music with sexually explicit or offensive content that might make them feel 'uncomfortable'.

We can arrive at substantially the same conclusion through SCP theory. From that framework we could argue that T1 and T2 influenced participants' cognition by removing 'excuses' (Wortley & Smallbone, 2012). For example, it is likely that the very place-ment of the *JBL* adverts on a mainstream fitness website (*GetFit*) normalised *JBL* content, and *created* an excuse that other users were just as likely to visit *JBL* as they were to click on other (real) adverts for green tea or gym gear. T1 and T2 challenged this 'excuse' with a message, ostensibly from the administrators of *GetFit*, asking participants if they needed help – thereby implying a level of abnormality for anyone contemplating a visit to JBL.

Another explanation for the effectiveness of T1 and T2 connects to the growing research on individuals who perceive that their use of legal pornography is problematic (Bőthe et al., 2021; Crosby & Twohig, 2016; Sniewski et al., 2018). This explanation forwards that – instead of doing a good job to paint *JBL* as deviant – the messages struck a chord with some participants by questioning whether their routines for viewing legal pornography were problematic in some way. From this perspective it is highly pertinent that *none* of the participants had arrived at *JBL* by searching for pornography. Regardless of whether they found *GetFit* through social media, organic searches, or other routes, the point is that all participants originally intended to visit a fitness website. At this website they were distracted by the unexpected presence of a pornography advert, and then decided to view that pornography. So, T1 and T2 may have caused some participants to reflect whether they wished to have greater capacity to regulate their pornography-viewing routines – to have more control over when and where they chose sexual entertainment. Linking these scenarios to our theoretical lenses, it could be concluded that T1 and T2: (a) portrayed pornography as a 'tainted fruit' when it is dysregulated; and (b) removed 'excuses' relating to dysregulated viewing.

While questions remain as to the exact way T1 and T2 influenced participants' cognition, our findings should be of interest to philanthropic agencies, like StopItNow!. In terms of their capacity to dissuade users from viewing barely legal pornography, the

therapeutic messages were comparable to the deterrent messages we tested in this study (D3) and our earlier *JBL* experiment (D1, D2) (Prichard, Wortley, Watters, et al., 2022). Unlike the unconvincing and ineffective harm messages we trialled earlier (Prichard, Wortley, Watters, et al., 2022), T1 and T2 provide good evidence that therapeutic messages could be appealing to users who are searching for CSAM. In part, our confidence is based on the fact that, due to our honeypot method, our participants exhibited real-life behaviours. Additionally, the random allocation of participants to the experimental conditions probably excluded the possibility that the observed differences were due to selection bias or other factors. Finally, there were no indications that any visitors to *GetFit* or JBL were suspicious about their authenticity (e.g. as indicated by hacking attempts, or complaints to the *GetFit* website email address).

To be clear, we are not proposing that just because an individual receives a therapeutic-themed message (or a deterrence-themed message) they will be permanently dissuaded from viewing CSAM. Rather, these data support the notion that online messages are an additional useful tool to adopt at-scale even if they can alter the behaviour of only a fraction of Internet users who are at risk of viewing CSAM. In this respect the experiment supports the findings of Scanlan et al.'s (2024) study of therapeutic messages in situ.

4.2. Images

In our earlier 'sharing' experiment (Prichard, Scanlan, Krone, et al., 2022) we found that adding a cartoon-like infographic to a warning message did not increase its effectiveness. Likewise since there were no significant differences between the messages tested in this second 'viewing' experiment, we cannot conclude with confidence that the inclusion of images made any real difference. (We could not statistically compare the moving infographic against the images because of the contextual differences in their respective experiments: the former sharing sexual images at a 'revenge porn' website, and the latter visiting *JBL*.) However, the trends we observed do warrant some discussion. Notably, the desistance rate of the deterrence-themed message in D1 was 49 % (Prichard, Wortley, Watters, et al., 2022). By adding an image of a young man being arrested (D3) we found that the desistance rate increased to 65 %. By contrast adding the image to our therapeutic-themed message – depicting a man looking isolated – made the desistance rate fall slightly from 47 % (T1) to 40 % (T2). Our tentative interpretation of these results is that the 'arrest' image may have increased desistance because it was more explicitly connected to the text it accompanied – which referred to police activity. On reflection the image we tested in T2 lacked 'explicitness' (see Kees et al., 2010); what we imagined depicted 'isolation' really could have been interpreted by participants in many ways, including simply as an image of a man outdoors.

4.3. Limitations

Barely legal was used as a proxy for CSAM, but legal and ethical considerations meant that *JBL* – its language and imagery – did not imply that CSAM could be accessed. Nonetheless, we think the proxy was adequate for the purposes of this study – given that some barely legal pornography encourages the fantasy adult-minor sex (e.g. Peters et al., 2014). Moreover, any disconnect between the reality of CSAM and the '*JBL* aesthetic' actually increases our confidence that messages will dissuade some CSAM offending in the real world. Our logic is that if participants in our study reacted to messages that they received from an "obscure fitness website" (Prichard, Wortley, Watters, et al., 2022: 118) about *JBL*, then messages concerning CSAM from high-profile agencies (e.g. law-enforcement) could be expected to have greater impact, especially for those contemplating using CSAM for the first time.

Our method captured the immediate responses of participants to an online message. Other than having fair confidence that the participants were Australian males aged between 18 and 30 years, which was the profile we targeted through social media advertising, we know very little about the cohort's demographic profile. Nor did the study measure how the participants behaved over time, which could have revealed how long effects lasted. These disadvantages are arguably offset by the study's ecological validity, as noted above, and the fact that it controlled for extraneous variables through a randomised experimental design.

5. Conclusion

The scale and complexity of the CSAM market continues to shock those who work in this space. The international community needs evidenced-based strategies that can disrupt and prevent the CSAM market from functioning and alleviate strain on law enforcement agencies. The point of the present study, and the experiments that preceded it, was to examine whether online messages could be a useful additional tool when deployed at scale and at a low cost to combat CSAM. The findings of this study suggest that online messages offering therapy for users who are interested in CSAM may be as effective as messages with a law-enforcement focus.

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CRediT authorship contribution statement

Jeremy Prichard: Writing – original draft, Visualization, Supervision, Methodology, Funding acquisition, Conceptualization. **Richard Wortley:** Writing – review & editing, Methodology, Conceptualization. **Paul Watters:** Writing – review & editing, Software, Methodology, Data curation, Conceptualization. **Caroline Spiranovic:** Writing – review & editing, Methodology, Formal analysis, Data curation, Conceptualization. **Joel Scanlan:** Writing – review & editing, Project administration, Methodology.

Declaration of competing interest

The authors have no competing interests to declare.

Data availability

Data will be made available on request.

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