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Analysing Australian news media reporting about the role of digital technologies in children's lives

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A MESSAGE FROM PROFESSOR SUSAN DANBY, CENTRE DIRECTOR

In 2021, the Australian Research Council (ARC) funded a Centre of Excellence devoted to studying and researching 'the digital child'. The focus of this Centre is on very young children from birth to age 8, and describes and examines their everyday lives with and through digital technologies, their learning and their health in the family, and various kinds of kindergarten, childcare and early primary education experiences.

The Centre brings together six universities across Australia, as well as partner investigators from North America, Asia and Europe and a range of public bodies and civil society stakeholders, to focus on a holistic understanding of what it might mean to 'grow up digital' today.

The Digital Child Working Paper Series reports on our work in progress. There are five series of papers aimed at different audiences:

A **'how to'** series offers instructional papers aimed at early career researchers or those new to the principles and practices of structured review.

A **'discussion'** series consisting of discussion papers aimed at the scholarly community, raising larger conceptual challenges faced by researchers at the Centre and drawing on forms of literature review.

A **'reviews'** series consisting of scoping reviews, literature reviews and systematic reviews, all addressing specific research questions particular to any of the programme disciplines in the Centre.

A **'methods and methodologies'** series consisting of digital research capacity building resource-rich discussion papers, offering more technical support for the research community and allied scholarship. These are more focused on methods and methodologies.

A **'policy'** series consisting of more public facing, policy-oriented papers produced for stakeholder engagement.

Each of the working papers has been authored by members of the Centre and has been subject to review as explained in each paper. The arguments in each paper represent the view of the authors.

We hope that readers find each of these papers stimulating and generative and that all sections of society can draw on the insights, arguments and ideas within the papers to create healthy, educated and connected futures for all and every child.

Professor Susan Danby

Director, Centre of Excellence for the Digital Child

June 2022

EXECUTIVE SUMMARY

This paper is part of a series of review papers aimed at stimulating discussion and debate amongst scholars about key themes, concepts, and theories underpinning research into digital childhood and what it might mean to be a digital child. These reviews draw on recent and relevant academic literature and aim to ask and frame new questions for research.

This paper has been checked by the sub-series editorial team to ensure it meets basic standards around clarity of expression and acceptable and inclusive language. It has also been presented in a seminar held by the ARC Centre of Excellence for the Digital Child and responded to feedback.

Frequently, discussions of media panics surrounding children revolve around new technologies. There is, however, scant coverage on how prevalent this negative press outlook really is within Australian media coverage of children and digital technologies. Thus, we conducted a study of Australian newspaper headlines and articles to answer this question. We examined headlines from Australian newspapers of record from 2000-2022, with a population of 604 relevant newspaper headlines.

We assessed these headlines through both a quantitative and a qualitative method. The quantitative method involved using an empirically validated sentiment analysis tool to generate a numeric sentiment score for headlines. This quantitative analysis found a plurality of the headlines have a negative sentiment. When charted in a scatter plot, this data shows an increase in negative sentiment over time. The qualitative method involved a manual assessment of each headline (and when necessary the body of the article). The most prominent themes in the data were: child sexual abuse material; parenting; screen time; and health. The qualitative analysis again largely found headlines to be 'negative', with this negativity intensifying over time.

This research indicates that Australian news media largely frames children's digital technology use in negative terms. We do not suggest that this is necessarily surprising. However, by empirically verifying common assumptions about media coverage in this area, we can begin to ask further questions about the role of the media in wider discourses about children's use of digital technology and, importantly, what alternatives might exist.

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Introduction

Children's relationship with media technologies has long been an area of significant news interest. News coverage in this area is often perceived as focusing on negative elements, perhaps even constituting a 'media panic' (Buckingham & Strandgaard Jensen, 2012). The Centre of Excellence for the Digital Child is and always has been, sensitive to the perceived or assumed orientation of media to the value and impact of digital media during childhood. Many researchers perhaps feel as though Australian news media is more often than not negative about children's use of digital technologies, yet it is difficult to point to evidence of such trends. Some relevant examples do exist, such as Page Jeffery's (2018) discussion of the media panic around the sexualisation of children and the apparent increasing influence of technology in this phenomenon[1]. Facer (2012) examines panics around children and digital technology in Australia more broadly; media articles and government documents between 1997 to 2001, provide a historical context for our contemporary landscape. However, long-reaching data on the media's portrayal of children and digital technology more generally is lacking.

This paper thus attempts to assess prominent Australian news media's portrayal of children and digital technologies. It does so by specifically by assessing articles from mainstream print newspapers[2], particularly their headlines. As such, this working paper itself acts as a 'headline' of the topic, identifying high level trends that future research could investigate.

This working paper asks: what is the tone and subject of Australian media coverage of issues relating to children and digital technologies? To address this question, we first provide an explanation of the concept of 'news values' and its role in our analysis. We then outline our methods, which involved collecting and analysing articles published in 14 Australian newspapers between 2000 and 2022. This is followed by our findings which indicate an overall tendency toward negative reporting, with an increase in negativity over recent years.

[1] It is unclear, however, which media outlets Page Jeffery (2018, 370) explores beyond 'Australia's national and metropolitan daily newspapers and weekend editions', raising some ambiguities; is *Il Globo,* a Melbourne-based Italian language newspaper counted in this, for example?

[2] Online versions of these newspapers were also assessed; it is simply that a print version of the newspaper also exists that is of interest to us.

News values – conceptualising 'the media'

Media reporting is shaped by a wide range of factors, including immense pressures on business models that have constricted the work of journalists (Hall, 1980; Hall et al., 2013). While a full discussion of the pressures impeding journalistic work is beyond the scope of this paper, we wish to be explicit that our aim is not to simplistically disparage contemporary reporting. Rather, our intention is to avoid and prevent baseless disparagement of the media, instead providing it a fair assessment, through a large-scale appraisal of its own words.

Nonetheless news values play a key role in shaping news reporting. 'News values' broadly refers to the values through which events are rendered news worthy, and the concept has long been central to scholarly analysis of news content (Galtung & Ruge, 1965). It is necessarily true that journalists must choose to report on some issues and not others; this is what makes something 'news'. However, the question of *why* something becomes news is more difficult to pin down, with a common response being simply, 'it just is!' (Brighton and Foy, 2007, 194). As was noted by Galtung and Ruge (1965), however, for something to be news, it must be meaningful to those hearing it. Similarly, it must have a cultural connection if it is to become meaningful to the reader. News values are what separates the 'signal' of news from the 'noise' of mere events and they supposedly reflect the values of society more broadly. As a result, media in different places (or even in the same place but with different audiences) will have different 'news values', necessitating a system for prioritising events based on their relevance to a media outlet's audience (Brighton and Foy, 2007).

Galtung and Ruge (1965) list 12 central factors and 6 subfactors through which an 'event' becomes 'news', and propose that at least three of these factors must be met in order for an event to be rendered news worthy. These factors are listed in Table 1 below.

While many of these values are still relevant, we primarily draw on Harcup and O'Neill's (2017) updated framework of news values which specifically accounts for the changes in news reporting practices brought about by digital technologies. Harcup and O'Neill list 15 characteristics which shape contemporary news (see Table 2). They note that at least one of these values is required for a story to be deemed 'news' but that most stories contain multiple values.

When discussing media reporting on children's use of digital technologies, we may expect several of Harcup and O'Neill's news values to be relevant. For example, parental concerns around the 'appropriate' amount of screen time for their child and how this reflects whether or not one is a 'good' parent are common (Blum-Ross and Livingstone, 2018). The issue of screen time may cause parental anxieties around whether or not one is a 'good' parent; or, indeed, if they have a 'dysfunctional parenting style… [and] low self-efficacy for managing screen time', leading to 'screen time-related child behaviour problems' (Halpin et al, 2021, 824). Thus, in media reporting on screen time, we may expect to see news values which play on this, including 'bad news', 'magnitude', and 'surprise'. As Harcup and O'Neill (2017) note, in the

contemporary, digital news context, 'shareability' has become a central value and so we may expect to see this become more common later in our search.

Factor number	Factor name
F1	Frequency
F2	Threshold (the minimum interest needed for an event to be newsworthy)
F2.1	Absolute intensity
F2.2	Intensity increase
F3	Unambiguity
F4	Meaningfulness
F4.1	Cultural proximity
F4.2	Relevance
F5	Consonance (what one would expect from the news, particularly negativity)
F5.1	Predictability
F5.2	Demand
F6	Unexpectedness
F6.1	Unpredictability
F6.2	Scarcity
F7	Continuity (once an event has become news, it will remain news more easily)
F8	Composition (news media has a 'form', pre-allocating space for certain topics)
F9	Reference to elite nations
F10	Reference to elite people
F11	Reference to persons
F12	Reference to something negative

Table 1: Galtung and Ruge's (1965) original news values

News value	Description
Exclusivity	"Stories generated by, or available first to, the news organisation as a result of interviews, letters, investigations, surveys, polls, and so on."
Bad news	"Stories with particularly negative overtones such as death, injury, defeat and loss (of a job, for example)."
Conflict	"Concerning conflict such as controversies, arguments, splits, strikes, fights, insurrections and warfare."
Surprise	"Stories that have an element of surprise, contrast and/or the unusual about them."
Audio-visuals	"Stories that have arresting photographs, video, audio and/or which can be illustrated with infographics."
Shareability	"Stories that are thought likely to generate sharing and comments via Facebook, Twitter and other forms of social media."
Entertainment	"Soft stories concerning sex, showbusiness, sport, lighter human interest, animals, or offering opportunities for humorous treatment, witty headlines or lists."
Drama	"Stories concerning an unfolding drama such as escapes, accidents, searches, sieges, rescues, battles or court cases."
Follow-up	"Stories about subjects already in the news."
The power elite	"Stories concerning powerful individuals, organisations, institutions or corporations."
Relevance	"Stories about groups or nations perceived to be influential with, or culturally or historically familiar to, the audience."
Magnitude	"Stories perceived as sufficiently significant in the large numbers of people involved or in potential impact, or involving a degree of extreme behaviour or extreme occurrence."
Celebrity	"Stories concerning people who are already famous."
Good news	"Stories with particularly positive overtones such as recoveries, breakthroughs, cures, wins and celebrations."
News organisation's agenda	"Stories that set or fit the news organisation's own agenda, whether ideological, commercial or as part of a specific campaign."

Table 2: Harcup and O'Neill's (2017, 1482) updated news values

Research Methods

This study examined 604 news headlines, published between 2000 and 2022 across 14 significant Australian newspapers. Analysis involved automated, quantitative sentiment analysis and inductive qualitative coding (see sections 5.1 and 5.2 for a full explanation of the quantitative and qualitative analyses, respectively). Further detail on data collection and analysis is provided below.

Selection of news outlets and headline collection

Our search focused on Australian mainstream newspapers as these remain influential in the digital age (Phillips, 2012); with print editions often providing material for online editions (of which newspapers such as *The Guardian* and *The Daily Mail*, neither of which are assessed here, have also dominated).

In determining *which* papers to assess, we began with the National Library of Australia's (NLA) (n.d.) list of 'regular dailies': these are papers which have their daily and weekly copies archived by the NLA and thus can be considered newspapers of record. While these newspapers are archived through print and microfilm, the NLA also provides digital access through the NewsBank service. These newspapers are listed in Table 3.

Newspaper	Location
The Advertiser	Adelaide, SA
The Age	Melbourne, VIC
The Australian	Sydney, NSW
The Australian Financial Review	Sydney, NSW
The Courier Mail (and Sunday Mail)	Brisbane, QLD
The Daily Telegraph (and Sunday Telegraph)	Sydney, NSW
Herald-Sun (and Herald-Sun Sunday)	Melbourne, VIC
Koori Mail	Tuckurimba (Lismore, NSW)
The Land	North Richmond, NSW
The Mercury (Saturday Mercury and Sunday Tasmanian)	Hobart, TAS
The Queanbeyan Age	Queanbeyan, NSW
The Sun-herald	Sydney, NSW

The Sydney Morning Herald	Sydney, NSW
The Yass Tribune	Yass, NSW

Table 3: The National Library of Australia's 'regular dailies'

These papers cover a range of political perspectives and geographic locations, although New South Wales is overrepresented, while Western Australia and the Northern Territory are not represented at all. To the NLA's list, we added the *Canberra Times*, due to its location in the Australian Capital Territory and thus proximity to the Federal government. A number of articles were also initially included from the UK version of the Sunday Telegraph, which were then screened out due to a lack of geographical relevance. We removed the *Koori Mail* and *The Mercury* as the database we used to collect the article headlines (Factiva, n.d.) did not index these mastheads. The list of newspapers searched is provided in Table 4.

We note here that we are *only* looking at newspapers and not other forms of news media e.g. television, non-traditional online news sources. While these other sources are worth considering in future research, it was determined that, for this research, print newspapers provided an adequate indication of news coverage. There is significant evidence that newspapers remain significant and influential within the overall news media environment. In their review of news sources, Boumans et al (2018) find that online news overwhelmingly depend upon news agencies (e.g. Associated Press), operating in a 'copy and paste' manner with no new analysis added. Conversely, while print media uses news agencies, it was to a lesser degree and with fewer instances of 'churnalism' seen in the copy and paste approach from online sources. Similarly, Peterson (2021) finds that while the influence of newspapers on the public has declined from earlier decades, this decline stabilised, rather than accelerated after 2009, despite the increase in online news sources. Fletcher et al (2020) report that online news is more polarised and less balanced than print news media, including in Australia, making print media more reliable as a representation of society in general. Further, newspapers continue to be used as a reliable source of gauging public understandings and societal values in Australian research (e.g. Tiffen, 2014; Stephenson et al, 2019; Dwyer et al, 2021).

Newspaper	Location
The Advertiser	Adelaide, SA
The Age	Melbourne, VIC
The Australian	Sydney, NSW
The Australian Financial Review	Sydney, NSW
Canberra Times	Canberra, ACT
The Courier Mail (and Sunday Mail)	Brisbane, QLD
The Daily Telegraph (and Sunday Telegraph)	Sydney, NSW
Herald-Sun (and Herald-Sun Sunday)	Melbourne, VIC
The Land	North Richmond, NSW
The Queanbeyan Age	Queanbeyan, NSW
The Sun-herald	Sydney, NSW
The Sunday Telegraph	London, UK
The Sydney Morning Herald	Sydney, NSW
The Yass Tribune	Yass, NSW

Table 4: Newspapers scanned in this search

Articles were collected through a Factiva[3] search of the newspapers listed in Table 4, using the search string listed below (Table 5). The search was restricted to articles published from 2000 to 2022 and search terms only examined the article headlines. The search produced 1,164 headlines, which we downloaded in an RTF file. All news articles within Factiva are provided directly by the mastheads, with each masthead filtered separately within the database. This filtering largely removes the risk of similarly named publications being accidentally included in our search, while ensuring that the research data represents the published materials. A limiting factor is that this study does not consider publication decisions related to font, design, and layout, such as relative position to other stories and advertisements, placement of images, and/or the size of typefaces.

Worth noting here is that, due to our interest in how the media discusses children and digital technologies, the search string used focused largely on *current* technologies, i.e. older and more generic search terms,

[3] Factiva's owner, Dow Jones (n.d.), describes Factiva as 'a business intelligence platform that includes content from 33,000 news, data and information sources from 200 countries and 32 languages… the unrivalled content set includes newspapers, magazines, journals, websites, blogs, market research and multimedia formats from credible, reliable sources.'

such as 'television', were not included. As a result, any increases in the frequency of articles over time can likely be explained (to some degree) by the more general increase in use of certain terms included in the search string, such as 'iPad', 'YouTube', or 'social media'. While we recognise how this may inherently limit the articles found in the Factiva search, we do not see this necessarily as a limitation; this is a study on how the media reports on children and *digital technologies* specifically, not children and media more broadly.

These results were exported to an Excel spreadsheet using the Python-based 'headlineparse' tool developed for this project (Fordyce, 2024a). As noted by Fordyce (2024b), this tool uses the 'pandas' data analysis library to organise data from the Factiva-generated Rich Text Format (RTF) file into the appropriate categories in an Excel spreadsheet[4]. It also ran an automated sentiment analysis, which we discuss in the analysis methods section below.

Factiva Search Terms
(child* OR infant* OR toddler* OR baby OR babies) AND (digital* OR technolog* OR internet OR online OR electronic* OR networked OR screen time OR mobile OR phone* OR smart phone* OR smartphone* OR cell phone OR tablet OR ipad OR iPhone OR computer* OR "smart toys" OR "electronic toys" OR social media OR platform* OR youtube OR video* OR streaming OR streams OR games OR gaming OR messaging OR chatroom*)

Table 5: Search string used in Factiva to pull newspaper headlines

Headline screening

The screening process identified 604 relevant articles. The screening process first removed duplicates: the remaining 1090 articles were screened for relevance. This involved accessing the full text of each article via NewsBank[5] and reading as much as necessary to establish relevance. In a first round of screening, 558 articles were screened in ('included'), 114 sent to a second review ('maybe'), 418 were screened out ('excluded'). After a joint review of the 'maybe' articles by two authors, 46 were included and 68 were excluded, leaving a final total of 604 included articles.

[4] Pandas (n.d.) describes itself as 'a Python package providing fast, flexible, and expressive data structures designed to make working with "relational" or "labelled" data both easy and intuitive'. The name refers to the library's application in assessing 'panel data' as used in economic analysis; panel data is data that is arranged in a similar fashion to spreadsheets and is designed for easy mathematical analysis while reducing the risk of user error in overwriting or miskeying information. This, in our case, is used to extract data from a given document, sort these data into discrete categories (e.g. 'title'; 'source'; 'date'; 'authors') and present these collated data in an Excel sheet (i.e. 'data wrangling'). Examples can be seen in images 1 and 2 below.

[5] NewsBank (n.d.) is an online resource which 'consolidates current and archived information from thousands of newspaper titles, as well as newswires, web editions, blogs, videos, broadcast transcripts, business journals, periodicals, government documents and other publications'.

Generally, articles that were excluded were obviously irrelevant. For example, this included articles about children and the Olympic Games (which would have been captured because of the term 'games') and articles about children falling between train platforms (captured because of the term 'platforms'). Articles about birth or pregnancy related technologies were also excluded as these spoke to a different set of concerns, mostly around IVF treatments or 'designer babies'. Similarly, we excluded articles that were exclusively about teenagers as our focus was on the category of 'children'.

While our focus was primarily on reporting about how children and families engage with technologies, we found that a large portion of the articles were about digital child sexual abuse material ('CSAM'). We included these because while some of the issues don't involve use of technology by children themselves (e.g. online distribution of abusive images of children) these issues were generally conflated with or presented alongside issues that did involve children's use of technologies (such as the risks of children encountering predators online).

Year	Included	Excluded	Total
2000	23	18	41
2001	11	24	35
2002	16	17	33
2003	16	22	34
2004	23	22	49
2005	21	33	54
2006	29	37	66
2007	31	15	46
2008	23	18	41
2009	19	18	37
2010	19	24	43
2011	29	13	42
2012	31	21	52
2013	17	26	43
2014	21	18	39
2015	22	15	37
2016	17	16	33

2017	18	14	32
2018	24	27	50
2019	53	37	90
2020	69	16	85
2021	35	13	48
2022	37	22	59
Total	**604**	**486**	**1090**

Table 6: Article judgements upon second round of screening

Article and headline analysis

Our analysis methods are elaborated in the findings below but in short, involved two key processes. To establish a high-level sense of the positive or negative tone of the reporting we used an automated sentiment analysis tool, called VADER (Valence Aware Dictionary and sEntiment Reasoner) to analyse the article headlines (Fordyce, 2024b)[6].

We also used a manual coding process to generate further data about the sentiment and key topics of the articles. This involved accessing the full text of the article and reading as much as necessary to determine the core phenomena of interest in terms of topic and type of technology, and whether the article adopted an explicitly positive framing.

Thus, while this research is a review of headlines, we have nonetheless read the full text of articles to ensure relevance and to appropriately code articles for content. It should be noted that there was no limit on the number of codes applied to an article. Codes are also not treated as mutually exclusive but rather as overlapping in many instances e.g. the 2012 article from *The Advertiser* titled 'Games a risk to children – Lessons in violence' (Strokes, 2012) is tagged with 'video games', 'screen time' and 'violence'. An example of this is provided below in image 1.

url	title	source	date	neg	neu	pos	compound	Comment	Second review
https://globa	Games blamed for child crime.	Herald-Sun	2000-03-23	0.688	0.312	0	-0.765	Video games; violence	
https://globa	Computer games give children sporting chance.	Australian	2001-01-19	0	0.714	0.286	0.25	Video games; sports; positive	
https://globa	Children swap video games for billycarts.	Daily Telegraph	2002-01-19	0	1	0	0	Return of 'retro' toys; video games	
https://globa	Censors can't see the fun in games that aren't child's play.	The Australian	2002-05-30	0.464	0.536	0	-0.713	Gaming ratings; violence; video games	Concern over games being too realistic
https://globa	Pornographic violence and the games children play.	The Australian	2003-04-09	0.357	0.435	0.209	-0.4019	Video games; violence (described as pornographic)	
https://globa	Spare The Violent Video Games, Save On Child Psychology	The Sydney Morning Herald	2003-09-10	0.277	0.496	0.227	-0.1779	video games; violence; parenting	
https://globa	Violence in games 'damages children'	The Australian	2003-09-23	0.7	0.3	0	-0.7906	Video games; violence	
https://globa	Computer Games Can Be Good For Children	The Age	2004-01-23	0	0.674	0.326	0.4404	Gaming (positive); video games	
https://globa	We're Playing Games With Our Children	The Sydney Morning Herald	2004-01-29	0	0.735	0.265	0.2023	Parenting; video games; rating systems	
https://globa	CHALLENGE TO POPULAR PERCEPTION ON CHILDREN'S HEALTH Video games not TV obesit	Advertiser, The (Adelaide)	2004-03-25	0	0.571	0.429	0.7599	Screen time; health; obesity; video games; TV	
https://globa	Toy cars overtake electronic games as children's favourites	Sun Herald	2004-07-04	0	1	0	0	Video games; buying guide	
https://globa	Computer game realism induces child violence, warns counsellor	The Courier-Mail	2004-11-25	0.478	0.522	0	-0.6705	Video games; violence	
https://globa	Violent games provoke children	The Australian	2005-02-19	0.767	0.233	0	-0.765	Video games; pathology; violence	
https://globa	Child's play ... The games to buy your kids this Christmas - Game codes get green light	Daily Telegraph	2005-12-21	0	0.87	0.13	0.34	Video games; parenting; buying guide	
https://globa	QUESTION: Do you think that violent video games encourage violence in children?	The Advertiser	2006-01-18	0.394	0.443	0.163	-0.6908	Letters to editor; video games; violence	
https://globa	VIDEO VIOLENCE Challenge to existing theories How games impact on children	The Advertiser	2006-01-18	0.319	0.595	0.086	-0.6739	Video games; violence	
https://globa	QUESTION: Are video games just time wasters, or can they help our children...	The Advertiser	2006-03-04	0	0.816	0.184	0.4019	Letter to editor; video games	
https://globa	Junk food sites use games to lure children	The Australian	2006-06-13	0	1	0	0	Health; diet; video games; advertisement	

Image 1: Sample coding, articles filtered by 'video games' tag and sorted chronologically.

[6] VADER (Hutto, 2022) is 'a lexicon and rule-based sentiment analysis tool that is specifically attuned to sentiments expressed in social media'. This essentially assigns sentiment scoring to words, through a combination of polarity (whether the words are positive or negative) and intensity (considering word-order sensitive relationships between terms, rather than assessing sentiment purely through a 'bag-of-words' model). Sentiment scores are based on an empirically validated model, in which 10 independent human rates scored over 9,000 terms.

Findings

Quantity of reporting: Trends in the number of articles per year

Overall, the quantity of reporting is relatively steady with a gradual increase overtime, however there is a notable spike in the years 2019 and 2020, with 2021 and 2022 returning more closely to the norm.

Across the time period studied, there is an average (mean) of 26.3 articles per year, with a standard deviation of 12.7. While this deviation may seem reasonably large relative to the mean, it is worth noting that these numbers are strongly influenced by the spike in 2019 and 2020 results. Previous to these years, there is an almost flat trendline in the average number of articles per year and a reasonably strong normal distribution, displayed in figures 1 and 2 below, respectively. This suggests that, while there may be some variation in the total number of articles published per year, this has followed a narrow pattern.

It appears that an increase in reporting about CSAM is a key reason why 2019 and 2020 saw such a spike in articles. In 2019, 26 of the 53 articles pertained to CSAM. A further 11 of the 53 related to ideas around screen time or screen 'addiction' – a trend at least somewhat related to the World Health Organisation (2019) publishing new recommendations for childhood health which specifically suggested no, or limited, on screen time for young children.

While it may be expected that the COVID-19 pandemic would cause the rise in 2020, such expectations were limited, with only 13 articles pertaining to COVID-19. These 13 COVID-19 related articles account for most of the total increase in articles between 2019 and 2020. Otherwise, the high number of articles in this year was again down to reporting on CSAM, with 45 of the 69 relevant articles from 2020 covering this topic (this includes 7 of the pandemic related articles). The years 2021 and 2022 saw 23 and 22 articles on CSAM, respectively, accounting for the decrease in articles in these years compared to 2020. The preponderance of child sexual abuse articles is discussed further below.

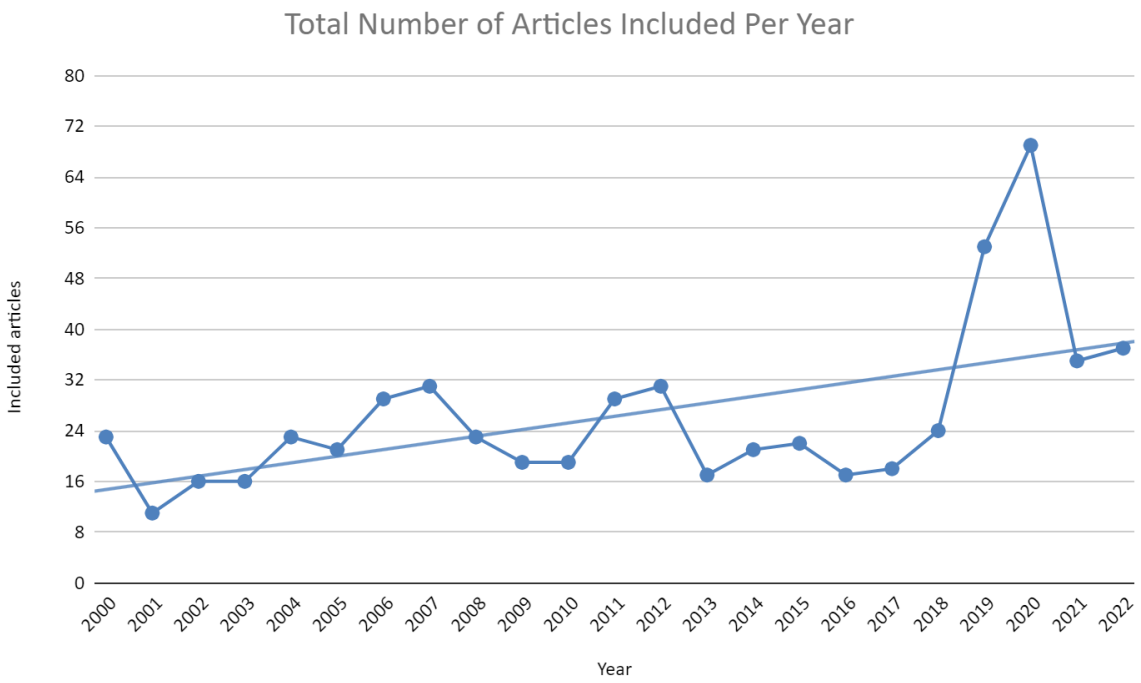


Figure 1: Total number of articles per year, each year 2000-2022 (inclusive)

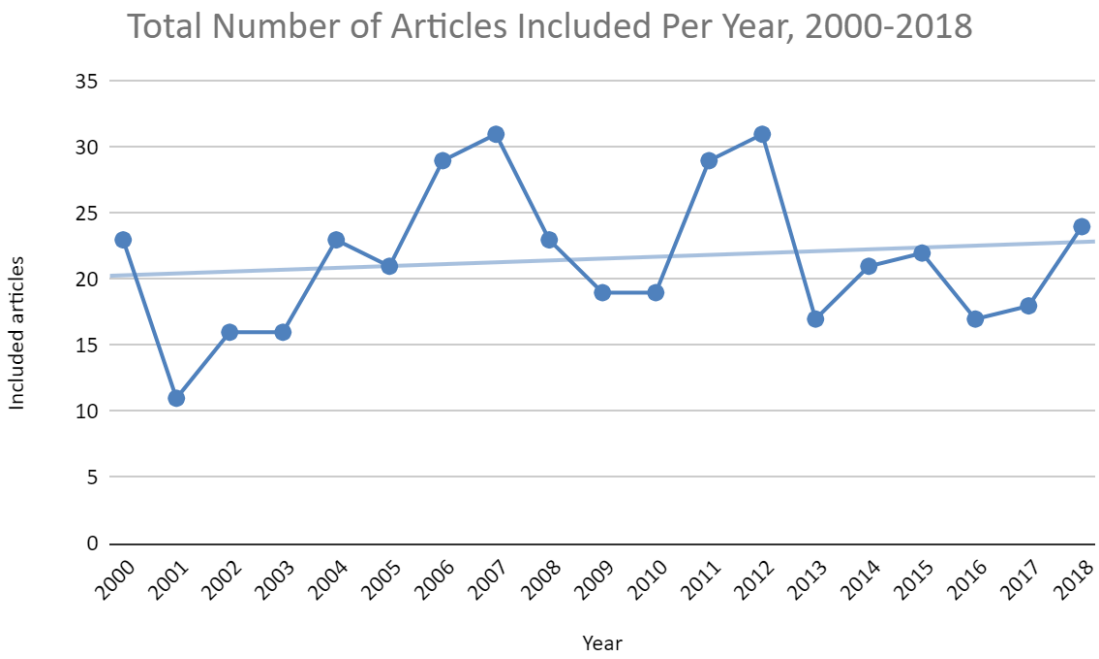


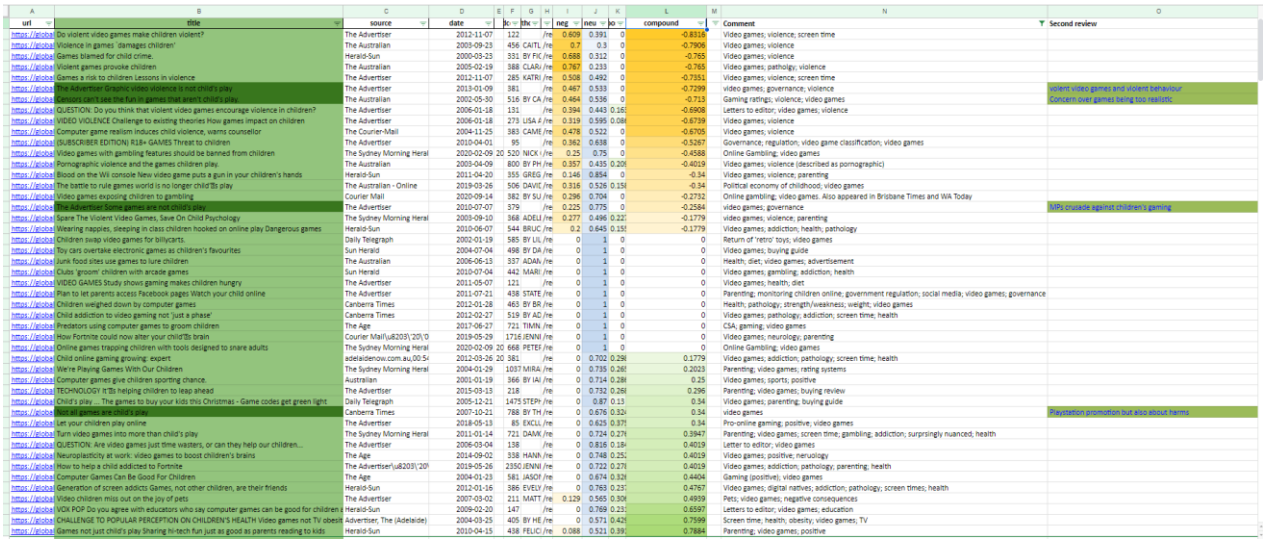
Figure 2: Total number of articles per year, each year 2000-2018 (inclusive)

Sentiment: Is the reporting positive or negative?

To investigate whether the reporting was broadly positive or negative, we conducted two forms of analysis. Firstly, we ran an automated sentiment analysis. This showed that the tone of the reporting is broadly negative, with an increase in negativity from 2017. Secondly, we manually coded articles that have an explicitly positive framing, finding that these were a very small minority of total articles and largely published before 2010.

Automated sentiment analysis

To get a broad sense of the tone of the news reporting, we used VADER (Valence Aware Dictionary and sEntiment Reasoner) to conduct an automated sentiment analysis of the newspaper headlines.[7] VADER is a tool that classifies the sentiment of a piece of text in terms of being positive, negative, or neutral. For example, the Stokes (2012) article discussed above (titled 'Games a risk to children – Lessons in violence') received an overall sentiment score of -0.7351, likely due to the inclusion of both 'risk' and 'violence' in the headline. VADER is specifically designed to conduct reliable sentiment analysis on short-form writing in English, and is effective at analysing headlines, titles, single sentences, and social media content on services such as Twitter/X. The project's headlineparse tool automatically incorporated a VADER analysis into the Excel spreadsheet of headlines. An example of this can be seen below, in image 2.



url	title	source	date	neg	neu	compound	Comment	Second review
https://globa	Do violent video games make children violent?	The Advertiser	2012-11-07	0.609	0.391	-0.8316	Video games; violence; screen time	
https://globa	Violence in games 'damages children'	The Australian	2003-09-23	0.7	0.3	-0.7906	Video games; violence	
https://globa	Games blamed for child crime.	Herald-Sun	2000-03-23	0.688	0.312	-0.765	Video games; violence	
https://globa	Violent games provoke children	The Australian	2005-02-19	0.767	0.233	-0.765	Video games; pathology; violence	
https://globa	Games a risk to children Lessons in violence	The Advertiser	2012-11-07	0.508	0.492	-0.7351	Video games; violence; screen time	
https://globa	The Advertiser Graphic video violence is not child's play	The Advertiser	2013-01-09	0.467	0.533	-0.7299	video games; governance; violence	violent video games and violent behaviour
https://globa	Critics can't see the fun in games that aren't child's play.	The Australian	2002-05-30	0.464	0.536	-0.713	Gaming ratings; violence; video games	Concern over games being too realistic
https://globa	QUESTION. Do you think that violent video games encourage violence in children?	The Advertiser	2006-01-18	0.394	0.443	-0.6908	Letters to editor; video games; violence	
https://globa	VIDEO VIOLENCE Challenge to existing theories How games impact on children	The Advertiser	2008-01-18	0.319	0.595	-0.6739	Video games; violence	
https://globa	Computer game realism induces child violence, warns counsellor	The Courier-Mail	2004-11-25	0.478	0.522	-0.6705	Video games; violence	
https://globa	(SUBSCRIBER EDITION) R18+ GAMES Threat to children	The Advertiser	2010-04-01	0.362	0.638	-0.5267	Governance; regulation; video game classification; video games	
https://globa	Video games with gambling features should be banned from children	The Sydney Morning Herald	2020-02-09	0.25	0.75	-0.4588	Online Gambling; video games	
https://globa	Pornographic violence and the games children play.	The Australian	2003-04-09	0.357	0.435	-0.4019	Video games; violence (described as pornographic)	
https://globa	Blood on the Wii console New video game puts a gun in your children's hands	Herald-Sun	2011-04-20	0.146	0.854	-0.34	Video games; violence; parenting	
https://globa	The battle to rule games world is no longer child'Bs play	The Australian - Online	2019-03-26	0.316	0.526	-0.34	Political economy of childhood; video games	
https://globa	Video games exposing children to gambling	Courier Mail	2020-09-14	0.296	0.704	-0.2732	Online gambling; video games. Also appeared in Brisbane Times and WA Today	
https://globa	The Advertiser Some games are not child's play	The Advertiser	2010-07-07	0.225	0.775	-0.2584	video games; governance	MPs crusade against children's gaming
https://globa	Spare The Violent Video Games, Save On Child Psychology	The Sydney Morning Herald	2003-09-10	0.277	0.496	-0.1779	video games; violence; parenting	
https://globa	Wearing nappies, sleeping in class children hooked on online play Dangerous games	Herald-Sun	2010-06-07	0.2	0.645	-0.1779	Video games; addiction; health; pathology	
https://globa	Children swap video games for billycarts.	Daily Telegraph	2002-01-19	0	1	0	Return of 'retro' toys; video games	
https://globa	Toy cars overtake electronic games as children's favourites	Sun Herald	2004-07-04	0	1	0	Video games; buying guide	
https://globa	Junk food sites use games to lure children	The Australian	2006-06-13	0	1	0	Health; diet; video games; advertisement	
https://globa	Clubs 'groom' children with arcade games	Sun Herald	2010-07-04	0	1	0	Video games; gambling; addiction; health	
https://globa	VIDEO GAMES Study shows gaming makes children hungry	The Advertiser	2011-05-07	0	1	0	Video games; health; diet	
https://globa	Plan to let parents access Facebook pages Watch your child online	The Advertiser	2011-07-21	0	1	0	Parenting; monitoring children online; government regulation; social media; video games; governance	
https://globa	Children weighed down by computer games	Canberra Times	2012-01-28	0	1	0	Health; pathology; strength/weakness; weight; video games	
https://globa	Child addiction to video gaming not 'just a phase'	Canberra Times	2012-02-27	0	1	0	Video games; pathology; addiction; screen time; health	
https://globa	Predators using computer games to groom children	The Age	2017-06-27	0	1	0	CSA; gaming; video games	
https://globa	How Fortnite could now alter your child'Bs brain	Courier Mail(\u8203\'20\'0	2019-05-29	0	1	0	Video games; neurology; parenting	
https://globa	Online games trapping children with tools designed to snare adults	The Sydney Morning Herald	2020-02-09	0	1	0	Online Gambling; video games	
https://globa	Child online gaming growing: expert	adelaidenow.com.au;20:5	2012-03-26	0	0.702	0.2	video games; addiction; pathology; screen time; health	
https://globa	We're Playing Games With Our Children	The Sydney Morning Herald	2004-01-29	0	0.735	0.2	Parenting; video games; rating systems	
https://globa	Computer games give children sporting chance.	Australian	2001-01-19	0	0.714	0.2	Video games; sports; positive	
https://globa	TECHNOLOGY It'Bs helping children to leap ahead	The Advertiser	2015-03-13	0	0.732	0.2	Parenting; video games; buying review	
https://globa	Child's play ... The games to buy your kids this Christmas - Game codes get green light	Daily Telegraph	2005-12-21	0	0.87	0.13	Video games; parenting; buying guide	
https://globa	Not all games are child's play	Canberra Times	2007-10-21	0	0.676	0.3	video games	Playstation promotion but also about harms
https://globa	Let your children play online	The Advertiser	2018-05-13	0	0.625	0.3	Pro-online gaming; positive; video games	
https://globa	Turn video games into more than child's play	The Sydney Morning Herald	2011-01-14	0	0.724	0.2	Parenting; video games; screen time; gambling; addiction; surprsingly nuanced; health	
https://globa	QUESTION. Are video games just time wasters, or can they help our children...	The Advertiser	2006-03-04	0	0.816	0.1	Letter to editor; video games	
https://globa	Neuroplasticity at work: video games to boost children's brains	The Age	2014-09-02	0	0.748	0.2	Video games; positive; neurology	
https://globa	How to help a child addicted to Fortnite	The Advertiser\u8203\'20\	2019-05-26	0	0.722	0.2	Video games; addiction; pathology; parenting; health	
https://globa	Computer Games Can Be Good For Children	The Age	2004-01-23	0	0.674	0.3	Gaming (positive); video games	
https://globa	Generation of screen addicts Games, not other children, are their friends	Herald-Sun	2012-01-16	0	0.763	0.2	Video games; digital natives; addiction; pathology; screen times; health	
https://globa	Video children miss out on the joy of pets	The Advertiser	2007-03-02	0.129	0.565	0.3	Pets; video games; negative consequences	
https://globa	VCK POP Do you agree with educators who say computer games can be good for children	Herald-Sun	2009-02-20	0	0.769	0.2	Letters to editor; video games; education	
https://globa	CHALLENGE TO POPULAR PERCEPTION ON CHILDREN'S HEALTH Video games not TV obesity	Advertiser, The (Adelaide)	2004-03-25	0	0.571	0.4	Screen time; health; obesity; video games; TV	
https://globa	Games not just child's play Sharing hi-tech fun just as good as parents reading to kids	Herald-Sun	2010-04-15	0.088	0.521	0.3	Parenting; video games; positive	

Image 2: Sample coding, articles filtered by 'video game' tag, sorted by VADER sentiment score, from lowest to highest

When this analysis was run on the headlines of the 604 articles included in the sample, it demonstrated an overall tendency toward negative sentiment, suggesting that a majority of the reporting on this topic is

[7] As noted above, this was built into the headlineparse tool developed for this project.

framed negatively. This is seen in figure 3 below, in which the trend line indicates a sentiment score of around -0.2 during the sampled time period (a score below '0' indicates negative sentiment).

Interestingly, this tendency increases over time, with a particularly strong concentration of negative headlines beyond 2017. There are a few likely explanations for this. One is that, as noted above, there is a high proportion of stories about child sexual abuse material in the more recent reporting and these are obviously framed in negative terms. Another likely factor is that there were broader shifts in public sentiment toward technology around this time as high profile incidents drew attention to 'big tech' companies' lack of social responsibility. These incidents included the 2016 US-election (Howard et al, 2018) and Brexit referendum (Bastos and Mercea, 2018), which highlighted social media platforms' unwillingness to address disinformation, and the Cambridge Analytica scandal in early 2018 (van Dijck, 2020), which reiterated Facebook's disregard for user privacy. While none of these events directly featured children, they contributed to a shift toward greater public mistrust of digital technology companies in particular, and greater critique and concern about digital technologies generally.

While this gives a broad sense of sentiment, these results should be interpreted with caution. The trend line presented here can only tell us about the overall trend across 22 years. This is useful for a general picture and suffices for the stated intention of this paper of providing a 'headline' view of news headlines. However, a deeper understanding of headline sentiment would represent the data in weekly or monthly tranches, allowing for comparisons across these time periods and showing the changing sentiment on a rolling basis. This presents an opportunity for future work in news headline analysis.

Further, it bears considering the potential limitations of automated sentiment analysis. 37.7% (228 of the 604) of the headlines assessed here were given a 'neutral' sentiment score of 0. This *does not* mean that the articles themselves are neither positive nor negative. Instead, as is stated by Fordyce (2024b), this simply means that the headline itself does not make a significant judgement claim. Even if the sentiment of these headlines is, in fact, relatively neutral, this does not mean that the articles can be ignored. Rather, this may suggest a level of ambivalence toward digital technology in the lives of children from newspapers. Viewing this relationship as pedestrian is, in itself, interesting, as it raises questions about what issues are potentially maligned by the news values of these papers.

Another consideration is around the fact that an automated sentiment analysis can tell us that a headline is negative but it cannot tell us the specific way in which these headlines may be negative nor what they are negative about. For example, as noted above, a great deal of headlines in 2019 concerned CSAM. The negative sentiment in this case was due to concerns about digital and online material about children. Conversely, it was also noted above that many articles were written about the dangers of (excessive) screen time for children in 2019 as well. In this case, the negative sentiment would be due to concerns about the impacts of children's use of digital and online technologies. In both cases, negative sentiment is present but it's only through further analysis that the subject and nature of that sentiment becomes clear.

Thus, due to the potential limits of an automated sentiment analysis (both the perception of neutrality in headlines and the lack of granularity about positive and negative articles), a more micro-level qualitative analysis of articles within the sample was also conducted. This qualitative analysis sought to verify or

falsify the quantitative sentiment findings, as well as assessing thematic changes in media reporting over time. The discussion below provides an overview of these findings.

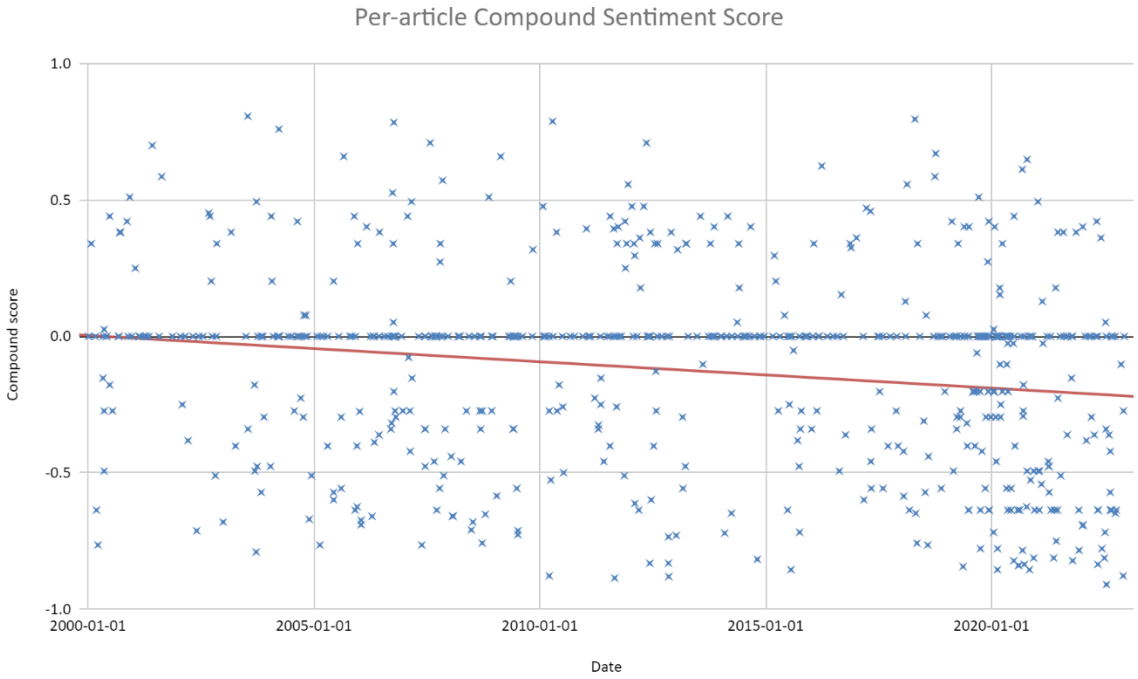


Figure 3: Sentiment analysis scores of included articles over time. Each blue point represents the summative of positive and negative sentiments for a single published headline. Possible sentiment scores range from 1.0 (maximum positivity) to -1.0 (maximum negativity). These maxima represent absolute positions, and are not relative to the project dataset. A red trendline has been added to demonstrate the overall trend of an increased negative sentiment from 1 January 2000 to the end of the project.

It was also noted that media reporting was seen to become much more negative after 2019, corresponding with the COVID-19 pandemic. This finding may surprise, as anecdotally reporting around digital technology was also more positive during this time period as family life relied more on digital communication and entertainment. This COVID-related negative turn is represented below in a scatter graph indicating VADER's compound sentiment scores of the assessed articles from 2000-2019 (inclusive). This graph can be seen below in figure 4. The trend line in this graph shows a negative compound score of just over -0.1, compared to the score of -0.2 seen across the whole dataset, indicated in figure 3. This confirms that, while newspaper headlines did have an overall negative sentiment across the dataset, this was increased during and after the COVID-19 pandemic. Thus, future studies may be interested in researching this phenomenon, given the more generally held, anecdotal feeling that media reporting was more positive about digital technologies during the pandemic.

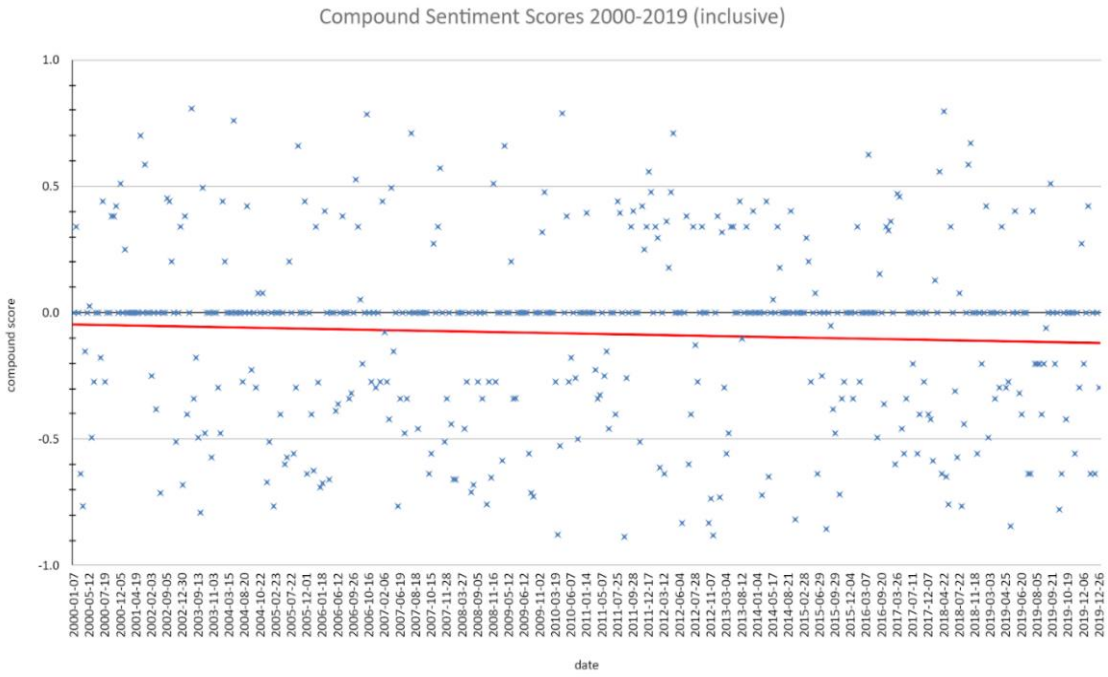


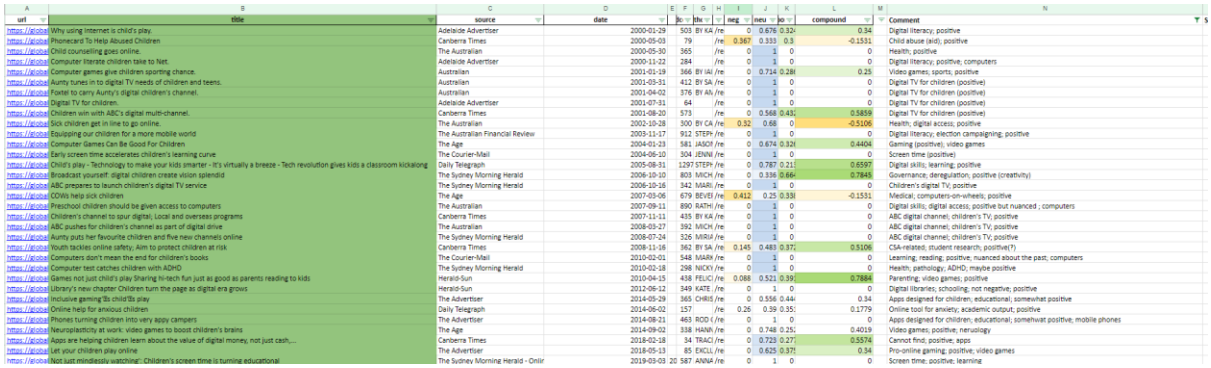
Figure 4: Sentiment analysis scores of included articles over time, 2000-2019 (inclusive)

Manual coding of positive articles

to identify how many articles adopted an explicitly positive framing. Of the 604 articles, 33 (5.46%) had an explicitly positive framing and 2 (0.331%) were considered 'nuanced', meaning they discussed a mixture of risks and benefits provided by digital technologies. These articles can be seen in images 3 and 4 below. We did not code neutral or negative articles. Of the 33 positive articles: 8 related to the launch of digital television channels for children, 5 related to video games, 5 related to digital skills or literacies, 4 related in some way to health or medical contexts, and the remaining 11 related to various other miscellaneous issues.

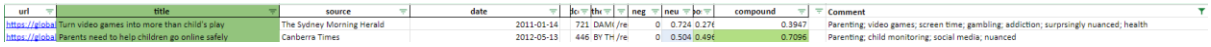
There is a notable decrease in the number of positive and nuanced articles over time. Of the 35 positive and nuanced articles, 25 (71.4%) occurred between 2000-2010. This leaves only 10 (28.6%) positive or nuanced articles between 2011-2022. Further again is that, in the years between 2019-2022, only 1 article was deemed to be 'positive'.

This distinction is even more stark when considering the proportion of included articles in each respective time period. Of the total 604 articles, only 231 (or 38.2%) were published between 2000-2010. Thus, in this time period, 15.2% of the articles were considered 'positive'. In contrast, 194 of the 604 articles (32.1%) were published just in the most recent four years (2019-2022). Only 1 of these articles was considered 'positive', representing only 0.515% of the articles in this time period.



url	title	source	date	compound	Comment
https://globa	Why using Internet is child's play.	Adelaide Advertiser	2000-01-29	0.34	Digital literacy; positive
https://globa	Phonecard To Help Abused Children	Canberra Times	2000-05-03	-0.1531	Child abuse (aid); positive
https://globa	Child counselling goes online.	The Australian	2000-05-30	0	Health; positive
https://globa	Computer literate children take to Net.	Adelaide Advertiser	2000-11-22	0	Digital literacy; positive; computers
https://globa	Computer games give children sporting chance.	Australian	2001-01-19	0.25	Video games; sports; positive
https://globa	Aunty tunes in to digital TV needs of children and teens.	Australian	2001-03-31	0	Digital TV for children (positive)
https://globa	Foxtel to carry Aunty's digital children's channel.	Australian	2001-04-02	0	Digital TV for children (positive)
https://globa	Digital TV for children.	Adelaide Advertiser	2001-07-31	0	Digital TV for children (positive)
https://globa	Children win with ABC's digital multi-channel.	Canberra Times	2001-08-20	0.5859	Digital TV for children (positive)
https://globa	Sick children get in line to go online.	The Australian	2002-10-28	-0.5106	Health; digital access; positive
https://globa	Equipping our children for a more mobile world	The Australian Financial Review	2003-11-17	0	Digital literacy; election campaigning; positive
https://globa	Computer Games Can Be Good For Children	The Age	2004-01-23	0.4404	Gaming (positive); video games
https://globa	Early screen time accelerates children's learning curve	The Courier-Mail	2004-06-10	0	Screen time (positive)
https://globa	Child's play - Technology to make your kids smarter - It's virtually a breeze - Tech revolution gives kids a classroom kickalong	Daily Telegraph	2005-08-31	0.6597	Digital skills; learning; positive
https://globa	Broadcast yourself: digital children create vision splendid	The Sydney Morning Herald	2006-10-10	0.7845	Governance; deregulation; positive (creativity)
https://globa	ABC prepares to launch children's digital TV service	The Sydney Morning Herald	2006-10-16	0	Children's digital TV; positive
https://globa	COWs help sick children	The Age	2007-03-06	-0.1531	Medical; computers-on-wheels; positive
https://globa	Preschool children should be given access to computers	The Australian	2007-09-11	0	Digital skills; digital access; positive but nuanced ; computers
https://globa	Children's channel to spur digital; Local and overseas programs	Canberra Times	2007-11-11	0	ABC digital channel; children's TV; positive
https://globa	ABC pushes for children's channel as part of digital drive	The Australian	2008-03-27	0	ABC digital channel; children's TV; positive
https://globa	Aunty puts her favourite children and five new channels online	The Sydney Morning Herald	2008-07-24	0	ABC digital channel; children's TV; positive
https://globa	Youth tackles online safety; Aim to protect children at risk	Canberra Times	2008-11-18	0.5106	CSA-related; student research; positive(?)
https://globa	Computers don't mean the end for children's books	The Courier-Mail	2010-02-01	0	Learning; reading; positive; nuanced about the past; computers
https://globa	Computer test catches children with ADHD	The Sydney Morning Herald	2010-02-18	0	Health; pathology; ADHD; maybe positive
https://globa	Games not just child's play Sharing hi-tech fun just as good as parents reading to kids	Herald-Sun	2010-04-15	0.7864	Parenting; video games; positive
https://globa	Library's new chapter Children turn the page as digital era grows	Herald-Sun	2012-06-12	0	Digital libraries; schooling; not negative; positive
https://globa	Inclusive gaming'Bs child'Bs play	The Advertiser	2014-05-29	0.34	Apps designed for children; educational; somewhat positive
https://globa	Online help for anxious children	Daily Telegraph	2014-06-02	0.1779	Online tool for anxiety; academic output; positive
https://globa	Phones turning children into very appy campers	The Advertiser	2014-08-21	0	Apps designed for children; educational; somewhat positive; mobile phones
https://globa	Neuroplasticity at work: video games to boost children's brains	The Age	2014-09-02	0.4019	Video games; positive; neurology
https://globa	Apps are helping children learn about the value of digital money, not just cash,...	Canberra Times	2018-02-18	0.5574	Cannot find; positive; apps
https://globa	Let your children play online	The Advertiser	2018-05-13	0.34	Pro-online gaming; positive; video games
https://globa	Not just mindlessly watching': Children's screen time is turning educational	The Sydney Morning Herald - Onlir	2019-03-03	0	Screen time; positive; learning

Image 3: Articles tagged as 'positive' during the qualitative coding process



url	title	source	date	compound	Comment
https://globa	Turn video games into more than child's play	The Sydney Morning Herald	2011-01-14	0.3947	Parenting; video games; screen time; gambling; addiction; surprsingly nuanced; health
https://globa	Parents need to help children go online safely	Canberra Times	2012-05-13	0.7096	Parenting; child monitoring; social media; nuanced

Image 4: Articles tagged as 'nuanced' during the qualitative coding process

This comparative decrease in 'positive' articles is striking, particularly considering the benefit digital technologies were often felt to bring in facilitating distance learning during periods of lockdown. As noted above, this is potentially linked to broader shifts in public sentiment toward digital technology across the full time period studied (2000-2022) as early optimism about the possibilities of digital technology gave way to disillusionment, concern, and distrust.

Reflecting on the news values discussed on page 7, Galtung and Ruge's (1965) notion of consonance is relevant for both the automated and qualitative sentiment analysis. Galtung and Ruge (1965, 69) suggest that negative news is *more* consonant to the public as, 'negative news fulfills some latent or manifest needs and that many people have such needs… [this] presupposes a relatively high level of general anxiety to provide a sufficient matrix in which negative news can be embedded with such consonance'. They go on to note that this should be expected during times of crisis: in this case, increased access to digital technologies is presented as a crisis for the safety of children (and their parents, as news readers). It is important to stress here that we do not suggest 'negative' sentiment is inherently unjustified: there are certainly real risks with digital technologies and we do not deny this. Rather, it is the quantity of representation that these articles received that we query here.

Year	Positive articles
2000	4
2001	5
2002	1
2003	1
2004	2
2005	1
2006	2
2007	3
2008	3
2009	0
2010	3
2011	0 (+1 nuanced)
2012	1 (+1 nuanced)
2013	0
2014	4
2015	0
2016	0

2017	0
2018	2
2019	1
2020	0
2021	0
2022	0
Total	33 (+2 nuanced)

Table 7: Positive (and nuanced) articles based on manual coding

Technologies mentioned

To get a sense of what technologies were being discussed in the reporting, articles were coded based on any mention of a specific technology e.g. the 2021 article published in *The Courier Mail* with the headline 'TABLETS, PHONES WORSE THAN TV FOR TODDLERS' (Royall, 2021) was tagged with 'mobile phones', 'tablets' and 'TV'. Table 8 shows the prevalence of technologies by year of reporting.

Overall, the most common technology discussed was the mobile phone (or later the smartphone). With the exception of 2010, mobile phones appeared in at least one article each year, for a total of 71 articles. This equals the combined total of 71 mentions of 'television/TV', 'computers', 'tablets', and 'apps' in articles, indicating the dominance of the mobile phone as the seeming medium of choice for young children.

Television (TV) was another commonly referenced technology, with 21 (3.48%) of the 604 articles referencing it directly. This is despite the fact that the terms 'television' and 'TV' were not included in our search string as we were focusing on explicitly digital technologies. Somewhat unsurprisingly, the prevalence of TV peaked in the first half of the search, with 13 of these 21 articles appearing between 2000-2008. Between 2019-2022, only three articles made direct reference to television, with two comparing it favourably to tablets and phones and the third reporting that children now preferred 'the internet' to television. A similar trend can be seen in articles relating to 'computers', with half of these articles appearing between 2000-2006, and only one article between 2019-2022. In contrast, reporting on 'apps' and 'tablets' began to appear from 2009 and increased across the remaining time period.

Year	Video games	Mobile Phones	Tablets	Computers	Apps	Television	Gambling	Buying Guide
2000	1	6	0	4	0	1	0	1
2001	1	1	0	0	0	4	0	1
2002	2	1	0	4	0	2	0	1
2003	3	2	0	2	0	0	0	0
2004	5	4	0	0	0	1	0	1
2005	2	5	0	0	0	0	0	1
2006	4	4	0	3	0	2	0	0
2007	2	2	0	3	0	1	0	0
2008	0	5	0	0	0	2	0	0
2009	1	6	0	1	1	0	0	0
2010	5	0	0	1	0	0	1	0
2011	4	4	1	2	4	0	1	0
2012	6	4	1	2	1	2	2	0
2013	1	2	0	1	1	2	1	0
2014	1	3	1	0	2	0	0	1
2015	1	1	1	1	2	1	0	2

2016	0	1	0	1	1	0	0	0
2017	1	2	2	0	0	0	0	1
2018	1	2	0	0	1	0	0	0
2019	3	8	0	0	0	0	1	1
2020	3	4	0	1	0	1	3	2
2021	0	2	2	0	1	2	0	0
2022	0	2	1	0	1	0	1	0
Total	47	71	9	26	15	21	10	12

Table 8: included articles per material objects, per year

Thematic analysis

There are a number of recurrent themes across the 22 years searched. As noted, these broadly fall into one of two categories: how children and families engage with digital technologies, and how child sexual abuse practices intersect with digital technologies. These are discussed in turn.

How families and children engage with digital technologies

Pathological and moral risks: screen time, health, and 'vice'

Relating to the ways in which young people use digital media, the themes here are, perhaps, unsurprising. The most common was screen time. Throughout the time period searched, the 'correct' amount of time children should be allowed to use digital technologies remains contested. Equally, the reason *why* children may want to avoid excessive screen time changes as well: in particular, in the early 2000s, concerns around the radiation emitted by mobile phones were common.

Of the 604 included articles, 68 (11.3%) discussed 'screen time'. Articles which discussed screen time were often framed around discourses of health, with 25 of the 68 (36.8%) discussing the health consequences of digital technology use for children (and 2 on the negative health impacts of screen time on parents). These health consequences ranged from poor eyesight, to increased obesity rates, to the more recent trend suggesting that 'excessive screen time' causes 'autism-like symptoms'. The remaining articles on screen time articles tended to suggest other negative outcomes of excessive digital device use, including children accessing 'inappropriate content' such as pornography or excessively violent content, increasing isolation and loneliness amongst young people, and a general sense of the loss of 'traditional' childhood. In general, screen time was seen as an issue to be tackled (or at least heavily moderated), with the implicit suggestion that screen time represented either a pathological or moral 'risk' for young people.

Only a very small minority of articles about 'screen time' did not treat it as inherently negative. In June 2004, The Courier Mail published an article titled, *'Early screen time accelerates children's learning curve'* (Dudley, 2004). Similarly, in March 2019, the Sydney Morning Herald published an article titled, *'Not just mindlessly watching: Children's screen time is turning educational'* (Prytz, 2019). These were the only two headlines that were outrightly positive about screen time. One additional article, published by the Sydney Morning Herald in 2016, took a more neutral approach, promoting 'screen quality' over 'screen time' (Orlando, 2016). However, this article was not framed around perceived benefit for children but rather alleviating parental shame, being titled, '*Don't feel guilty about screen time for children'.*

One explanation for this is the connotations and associations of the term 'screen time'. As noted above, there was some explicitly positive reporting across the sample but this tended to avoid the term 'screen time'. Instead, these articles focused on terms like 'digital literacy', with the idea that such skills are important for 'a more mobile world', as one article from 2003 suggested. While these articles don't engage with the term screen time, it could be argued that, in framing children's use of digital technologies

economically and as a larger part of civic engagement, these pieces reflect an unspoken understanding that 'screen time' must be justified in order to be deemed acceptable.

This 'screen time' theme was part of a broader focus on pathological and moral risks. In terms of the pathological, 54 (8.94%) of the 604 included articles were directly related to health[8]. This included the articles about screen time and health noted above, as well as a further 27 articles that were not specifically about screen time. Concerns in these articles were often similar to those in 'screen time' articles, such as digital addiction, poor sleep patterns, and increased weight. Some distinct concerns did arise here though, with six articles showing concern over possible relationships between the radiation produced by mobile phones and increased cancer rates. Other concerns included mental health issues (including suicide), weakened bones in later life, and an increase in hunchbacked children. Only three of the 54 'health' related articles took an explicitly positive framing: these discussed online child counselling, digital access for children in hospitals, and a computer diagnostic test for ADHD.

The moral risks of digital technologies were perhaps most common in articles discussing video games. 47 articles which discussed video games in general (7.78% of the total 604). Of these 47 articles, 13 discussed the violence present in video games, 7 discussed addiction stemming from video games, and 5 discussed gambling as a result of playing video games[9]. 6 of these 47 articles promoted either greater government regulation or a stricter ratings system around video games as a result of these issues. Despite this, 3 articles acted as video game 'buying guides' for parents and articles were more explicitly positive about video games.

Who is responsible for children's use of digital technologies?

When discussing the young people's use of digital technology, a substantial portion of the included articles gave recommendations or made judgements around parenting. 112 (18.5%) of the 604 included articles were tagged as being 'parenting' related. Of these 112, 24 (21.4%) discussed methods of parental monitoring of children's digital technology use and 24 (21.14%) of the 112 articles also specifically discussed 'screen time'. Only 1 article overlapped between these two categories, meaning that of the 112 parenting-related articles, 47 (42.0%) were concerned with ideas of either surveilling or limiting children's use of digital technologies. Interestingly, three of these articles were about the 'screen time' of parents, all suggesting that parents were now spending less time with their children as a result of digital technologies.

Compared to parents, governments appeared to be charged with a lesser role in regulation of digital technologies used by children. 41 (6.79%) of the 604 articles related to governance of digital technologies. However, 2 of these articles were specifically about US regulation and 1 discussed regulation being conducted in the UK. This left only 38 (6.29%) of articles relating to Australian governance. Of these 38

[8] These were, in general, about physical health. However, mental health and, in particular, addiction were also discussed in some articles.

[9] It is worth noting that children gambling via digital technologies was a moral risk of increasing prevalence across the years studied. A total of 10 articles discussed children's online gambling, with seven of these articles published from 2019-2022.

articles, 2 discussed the government granting parents greater surveillance powers over their children's online activities and 5 were simply calling for further governance, rather than discussing any online governance. This leaves only 31 articles (5.13%) in which the Australian government is portrayed as conducting online regulation themselves. 8 of these 31 articles (25.8%) are specifically about CSAM-related regulation (discussed further in the following section). As a result, only 23 (3.81%) of the 604 total articles were around Australian governmental regulation of digital technology for children, less than the number of articles in either of the parental categories discussed above.

There are several news values that appear likely to shape this reporting. With Harcup and O'Neill's (2017) suggesting that stories involving 'the power elite' is a central, contemporary news value, stories around the Australian government appeared less frequently than may have been expected in the context of regulation. This may be due to a notion that (in the digital context, at least), the government may be 'the power elite' but not necessarily power*ful*. This is substantiated by a number of articles reporting on regulation by other governments (particularly the US) and regulation either by or demanded of 'big tech' companies. Comparatively, a surprising number of articles pertained to either the action or powers of police forces to combat issues relating to children and digital technology (generally, in this case, CSAM). This appears to frame issues like CSAM as somewhat inevitable and insurmountable, with governments being unable to act as a 'preventative' force for such issues, requiring the police to act as a 'responsive' force instead. This raises questions not only around where power lies in regard to digital regulation but also who the media (and, by proxy, the public) trust to hold this power.

Conversely, the charging of parents as the group 'responsible for' the regulation of children's use of technology is perhaps not surprising but its frequency is nonetheless noteworthy. There is a slightly self-evident news value of magnitude (Harcup and O'Neill, 2017) or frequency (Galtung and Ruge, 1965) here; simply, stories around parenting feature frequently in papers and stories around digital technologies feature frequently in papers, making it unsurprising that stories about parenting *and* digital technologies would appear in papers. This does raise a question of newspaper composition. Galtung and Ruge (1965) suggest that the newspaper has a specific form, resulting in pre-allocation of space for certain topics. In a digital age, the composition of the news is more influenced by factors such as clickthrough rate than the available inches of a broadsheet or tabloid layout. In this sense, the composition of the news media remains a central news value, it is merely the metrics by which this value is measured which has changed.

In relation to parenting, importance of the composition of clicks relates to one of the contemporary news values suggested by Harcup and O'Neill (2017): surprise. Many of the parenting-related headlines asked evidently leading questions, with the underlying implication of some 'shocking' suggesting having been made about children's use of digital technology. This is seen throughout the data e.g. *The Advertiser's* (2009) headline 'Do children as young as four need a mobile phone?', the *Herald Sun's* 2016 headline 'Should you stalk your child's smartphone?' (Armitage, 2016), or The Advertiser's 2021 headline 'Is social media parenting our children?' (Sampson, 2021). In combination with suggestions such as 'Parents warned of dangers in posting children's images online' (Browne, 2014), 'Online child sexploitation challenges today's parents' (*The Australian*, 2015), and 'Bad online experiences for children 'invisible' to parents during lockdown' (Chrysanthos, 2021). There is a persistent suggestion that parents do not know

what their children are doing with digital technologies and that they would be appalled to find out. As a result, parents are responsibilised[10] for children's use of digital technologies, with a tacit suggestion that they are acting irresponsibly if they do not consistently read about the newest digital surprise.

Child sexual abuse

Of the 604 articles, 251 (41.6%) of articles pertained to child sexual abuse material (CSAM). Coverage of this topic has grown across the years studied. Of the 259 articles on this topic, 116 (46.2%) came from the years 2019-2022 (inclusive), meaning CSAM articles made up 59.8% of all the relevant articles in those years. In comparison, from 2000-2018 (inclusive), CSAM-related articles accounted for 32.9% of all included headlines, suggesting that the media's focus on CSAM has grown over time.

Of the CSAM-related articles found in the years 2019-2022 (inclusive), only two of these articles related to potential government regulation of social media platforms due to CSAM concerns. In contrast, 6 articles called for 'big tech' to solve this issue (framed either through a 'crack down' or through 'keeping children safe'). Further, 8 of the included articles directly suggested that the COVID-19 pandemic was responsible for an increase in CSAM online, with 1 additional article simply proclaiming a rise in CSAM without linking it to the pandemic. Thus, the number of articles discussing only the *increase* in CSAM content between 2019-2022 (inclusive) is above the average number of CSAM-related articles per year prior to 2019.

Returning to the concept of news values, Harcup and O'Neill (2017) note that stories which contain bad news, surprise, and magnitude are likely to be reported, as well as those with relevance to a perceived audience. It is not surprising then that news media may view stories of online child sexual abuse as 'newsworthy' in the early 2000s, targeting parents (and other family members) with descriptions of an as-yet largely unknown internet. While Harcup and O'Neill (2017) note that entertainment is a primary driver of news media (and particularly those discussing sex), these stories are generally presented with a light tone. Conversely, the discussion of online child sexual abuse found in this study frequently present these events with a lurid tone, often in an arguably unnecessary degree of detail[11]. These stories do, however, still seek to engage readers in a similar manner as the sex-related, entertainment stories discussed by Harcup and O'Neill (2017), creating a form of 'sin-tertainment' in stories about children and digital technologies. These stories utilise children (and the real risks that exist in online spaces towards them) as a form of spectacle for readers, suggesting that not only is it dangerous for children to use digital

[10] We take 'responsibilised' here to indicate a discourse of risk and the increasing onus on individuals (rather than the state, for example) for managing this risk. This stems from Miller and Rose's (2008, 100) assessment that contemporary society is experienced as a series of risks which are 'simultaneously proliferated and rendered potentially manageable', and in which 'someone must be held to blame for any event' which creates risk. This leads to the process of responsibilisation, in which each individual bears an active responsibility to mitigate risk through an investment in security, lest they are deemed guilty of failing to protect themselves and others related to them (such as their children).

[11] See Connolly (2001) *Judge Recoils at Child Sex Video* as a prominent example, which outlines the contents of child pornography explicitly and at length, including discussion of 'direction'.

technologies but that digital technologies are an inherent danger to children as a space for the sharing and dissemination of child abuse.

Conclusion

This paper indicates that between 2000 and 2022, Australian news media has had a consistent interest in issues relating to children and digital technologies and that these topics are largely framed in negative terms. We are not suggesting here that the events reported in newspaper headlines are necessarily incorrect, nor do we dispute that digital technologies (like all technologies) can have risks for children. Rather, we are seeking to highlight the predominance (and perhaps even disproportionate representation) of negativity in the media when reporting on children's use of digital technologies. Further, as noted in section 3, this research only explores this representation of children and digital technologies in print newspapers (and their online versions). It may be beneficial for future research to look beyond traditional Australian newspapers, analysing the depiction of children and digital technologies in other formats. However, our focus on traditional print newspapers was a deliberate methodological decision, with newspapers retaining much of their public influence (Peterson, 2021) and reliability as a source in comparison to other forms of news media (Fletcher et al, 2020). As a result, newspaper reporting remains an important starting point in understanding public debate on this issue. Much of the reporting observed in this research focuses on issues relating to child abuse or the possibility of children being negatively impacted by digital technology use, particularly in terms of poorer health outcomes.

Solutions for these issues are rarely suggested and, when they are, it is often in a vague sense of 'big tech cracking down' on offenders. As a result, parents continue to be framed as the primary force in preventing any and all negative outcomes for children using digital technologies; a task presented as simultaneously too large for any one person to combat and yet a moral imperative for the 'responsible parent'.

Areas for future study

We suggest that this research highlights a number of areas for future studies, in the following areas:

- Further exploration of why such a change in the media's presentation of digital technologies is seen after 2010, i.e. what caused the articles to become proportionally more negative?
    - This could be examined through the lens of Beck's (1992) 'risk society', which offers a means of theorising broader trends in attention to risk, particularly around children and parenting.
    - Security and privacy concerns related to the popularity of social and mobile media generally, and specifically children's use of these services, represent an additional concern.

- Further exploration of the impact of wider societal events on the media's reporting. For example, does the Australian Federal Government's establishment of an eSafety Commissioner in 2015 drive a focus on digital risks for children?
- Further exploration of the history of government regulation of digital spaces in relation to children and how this is reported on by the media. This could include early examples of digital regulation in Australia, for example the *Broadcasting Services Amendment (Online Services) Act* 1999, which gave the Australian Broadcasting Authority the power to 'censor' prohibited content online.
    - Future studies could also examine the Australian media's representation of influential regulation from other countries (such as the Children's Code introduced in the UK in 2020) and regulatory recommendations by international bodies (such as the WHO's updated screen time guidelines in 2019).

- Further exploration around media reporting on digital technologies and how this relates to the release dates of specific technologies. For example, does media reporting on the risks of video games for children spike around the release of new consoles?
- Further research could investigate whether specific mastheads are more responsible for driving negative or positive themes, or otherwise examine the political economics of media ownership and whether this ties into patterns within Australian media contexts.
- Further research could improve on our methodological contributions to the software tool. We would be especially encouraging of new studies or resources that improve sentiment analysis in newspaper contexts.

Our dataset is available for contributing to any such project, as well as our research tool, headlineparse upon request.

Through a discussion of news values on page 7, we have suggested some reasons *why* the media might look as it does. With this in mind, it is important for future research to go further and ask: how could the media look different? What would we *like* the media to be? While these may be utopian questions, to accept merely what 'is', to not demand what 'ought' to be, cedes the ground of what is yet to come. To make normative claims, instead, is not only a question of 'news values' but of 'academic values' as well.

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