

## Article

# 'I'm doomed!': audience responses to media reporting on the link between sleep and Alzheimer's disease

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### Abstract

The media are influential in shaping beliefs and attitudes towards health practices and behaviours, and the science of sleep is often disseminated through online news media. This paper explores audience responses to media reporting on the link between disrupted sleep and Alzheimer's disease. The news article analysed was based on a scientific publication reporting on the link between sleep disruption and Alzheimer's disease and the institutional press release about that publication. The online news article and the 536 Facebook comments posted in response were analysed using thematic analysis. Although the scientific article and institutional press release were guarded about the implications of the research for human health, the media article used sensationalist reporting on the impact of a single night's sleep disruption to emphasize the everyday implications of the findings. Audience members who identified as sleeping poorly responded fatalistically, whereas commentators who identified as sleeping well were reassured by the news article. The sensationalist framing provoked an affective response in audience members, which at times led to disbelief in the specific message or questioning of scientific research. Sensationalist media reporting of science has unintended consequences. Attempts to engage audiences with science communication that is simplistic and personal may encourage readers to reject scientific evidence as logically incoherent. This approach discounts the ability of audiences to weigh evidence and accept complexity.

**Keywords:** sleep; media analysis; social media; Alzheimer's disease

### Contribution to Health Promotion

- Media dissemination of scientific research on human health commonly emphasizes the applicability of findings to everyday life, which shapes audience response.
- A scientific article and institutional press release on the link between Alzheimer's disease and sleep downplayed the clinical importance of the research.
- The news article reporting these findings used sensationalist messaging, which led to fear, scepticism, and rejection of the message by some social media commentators.
- How science communication is represented shapes audience acceptance of specific findings and scientific research

### INTRODUCTION

The media play a key role in determining which issues are newsworthy, and for most people, research findings are more easily accessible from popular media sources than scientific articles (Rozanova *et al.* 2016). Consequently, media platforms play a vital role in shaping public perceptions of scientific research. Neuroscience particularly generates considerable media coverage as people are interested in physiological processes that shape behaviour and disease outcomes (Koh *et al.* 2016). Audience responses to media messaging are complex, as interpretations depend on the individual and

collective positioning of audiences (Dew *et al.* 2016, Gabe *et al.* 2017, Breheny and Severinsen 2018). The affordances of different social media platforms to share, like and comment on content increases the reach of content that generates engagement, making audience response a powerful force for influencing health research (Livingstone 2015).

### Media representation of sleep

Sleep is increasingly recognized as a pillar of health across the life course (Grandner 2019). The field of sleep science has rapidly grown across disciplines, prompting increased public

interest in sleep as a topic. Sleep-related research findings have therefore become popular material for dissemination in the media. Given the universality of sleep, reporting on the subject meets the journalistic value of relevance, where reporters draw out how the news connects to the everyday lives of the audience (Mellor 2015). Previous research has considered the role of the media in the medicalization of sleep problems and their treatments (Kroll-Smith 2003, Seale *et al.* 2007, Williams *et al.* 2008a, 2008b, Gabe *et al.* 2017, Varallo *et al.* 2022), as well as the gendered nature of discourses of sleep (Zarhin 2021), and the influence of working life on sleep (Williams and Boden 2004, Boden *et al.* 2008). Such works indicate how sleep-related messages in the media are often divorced from both scientific rigour and the realities of individual and social circumstances.

The management and medicalization of sleep is a highly moralized issue that encourages audience reactions. By making links between sleep practices and the imperatives of healthy living, the media exploit the morality of sleep-related topics to increase engagement (Ceuterick *et al.* 2023). Consequently, sleep research findings are often re-presented and re-packaged in terms of simple tips for people to follow to improve their health. This framing is not necessarily reflective of the findings themselves; rather, this framing is how the findings are made palatable to and relevant for a broad audience (Armstrong 1995, Meadows *et al.* 2018). Despite this tension, media platforms remain crucial for circulating information on sleep research and the implications of problematic sleep for health and well-being (Gibson 2025). They also have the potential to influence the way that sleep practices and problems are interpreted—including perceptions around responsibilities and solutions.

The role of sleep for promoting well-being is a key area of scientific and social interest in the context of population ageing (Ravyts and Dzierzewski 2024). A recent discourse analysis of content on sleep and ageing in the New Zealand news media revealed how sleep is typically constructed as something that will inevitably decline with age whilst also being a risk factor for disease (Breheny *et al.* 2023). Simplified sleep solutions were found to be promoted alongside recognition of the complexities of sleep (Breheny *et al.* 2023). The contradictions within these messages mean it is important to consider how audiences consume, interpret, and respond to media messages on sleep and ageing. Dementia (particularly Alzheimer's disease) functions as a feared condition in older age (Behuniak 2011, Peel 2014, Low and Purwaningrum 2020), and dementia is often used to illustrate the possible age-related dangers of sleeping poorly (Sabia *et al.* 2021). Therefore, a focus on media representations and reactions to messaging of sleep and dementia is particularly instructive for understanding audience response to science communication through social media.

### Medialization of health science

The entanglement of media processes and practices with other institutions such as politics, sports, and science is referred to as medialization (Välvirronen 2008, Franzen *et al.* 2012). These processes include increasing media attention to science and the adaptation of science to media principles and practices (Bucher 2019). Mass media (with its own logics of what is newsworthy) shape the communication methods and messaging that is used to convey science to broad audiences (Franzen *et al.* 2012, Koh

*et al.* 2016). Media logics are not singular or separate; they are intertwined with commercialization and promotional cultures which shape the priorities and values of media production (Välvirronen 2008, Welber and Opgenhaffen 2019). Medialization processes may be particularly apparent in the dissemination of health research because of the close connection between health and practices of everyday life (Rödder and Schäfer 2010). This intersects with the primacy of 'health promotion' as people are increasingly expected to know the benefits and limitations of science when making decisions about their health practices (Franzen *et al.* 2012). The potential of scientific findings to support decision-making becomes part of the perceived usefulness of science to society (Välvirronen 2008). This may contribute to overly optimistic or premature claims about scientific breakthroughs or the relevance of research to everyday health practices being promoted through the media (Välvirronen 2008).

Social media platforms also shape the production and reception of science messaging. The shift from mass media logic to social media logic 'favours user engagement, share-worthiness and virality' (Welber and Opgenhaffen 2019, p. 46). Material is shared through social media to engage large nonspecific audiences with news items designed to pique interest through common human values (Franzen *et al.* 2012). Social media is therefore best suited to simple and more emotionally charged messaging than news media (Zhuravskaya *et al.* 2020). This shifts science reporting to an emphasis on practical application rather than incremental knowledge acquisition (Koh *et al.* 2016). Social media platforms can be influential for increasing the visibility of scientific research and creating additional funding opportunities (Koh *et al.* 2016). These public engagement activities increase visibility for specific research programmes and research institutions (Dempster *et al.* 2022). This creates imperatives for scientists to engage new audiences through sharing research findings on social media (Bail 2016). This represents a core tenet of medialization—that the relations between science and media are reciprocal (Bucher 2019).

However, imperatives to communicate science to broad audiences may result in misrepresentation of research findings (Dempster *et al.* 2022). Dempster found that sensationalism was often introduced at the institutional press release stage. Media reports often directly quoted extracts from these press releases and the clinical implications presented were those suggested by the researchers. For example, O'Connor and Joffe (2014) examined an original scientific article on neurobiological sex differences in brain structures, a press release on the article, and subsequent news articles, blogs, and readers' comments. They identified ways in which the press release cued particular readings of the scientific findings as well as encouraging the media to draw upon prevailing gender stereotypes to make sense of the findings. These stereotypical elements sometimes provoked strong misogynistic reactions in the comments.

### Audience engagement

Audience engagement refers to the cognitive and emotional experiences users have in response to media content (Broersma 2019). Understanding how and why some media representations resonate with audiences, whereas others are deflected can inform science communication; different portrayals work to convince people or create disbelief and resistance.

Audiences are active in their endorsement of and resistance to particular messaging (Su and Li 2023). Messaging that aligns with the way people understand the world tends to generate more acceptance and momentum than messages which lack such fit (Bail 2016). Furthermore, linking media reports to personal experiences or evoking emotion is more likely to provoke audience engagement (Klassen *et al.* 2018). Consequently, audiences respond to media reporting of scientific research in terms of personal biographies and situated understandings of risk (Gabe *et al.* 2017).

Social media platforms are particularly suited to increasing audience engagement by connecting abstract research findings to personal biographies. Research findings are often curated into accessible and personally relevant content to communicate the everyday relevance of research to wide audiences. Social media audiences become part of the science communication system by transmitting the message to their social network (Yap *et al.* 2019). Creating content that people want to share provides a competitive advantage (Welbers and Opgenhaffen 2019); simple messages and provocative headlines concerning ubiquitous experiences (such as sleep) increase engagement. Engagement is encouraged by directly addressing the audience (Welbers and Opgenhaffen 2019). For example, personalized messaging invites audiences to apply the content to their circumstances, thereby evoking personal reactions and emotions. However, attempting to create moments of connection to convince or engage audiences may overlook individual sense-making which contributes to message reception, acceptance, and resistance (McDonnell *et al.* 2017).

### Linguistic context

News articles reporting on scientific research often originate directly from institutional communication professionals writing press releases (Dempster *et al.* 2022). Press releases can be influenced by institutional marketing, and therefore, newsworthiness may be prioritized over scientific integrity in the dissemination of scientific research (Dempster *et al.* 2022, Entradas 2022). These press releases arise from and reflect scientific publications, which adhere to genre requirements that prioritize formality of language, tentativeness towards new knowledge claims, and science as an ongoing process.

Press releases often form the basis of online news media articles, which have their own production imperatives. Online news articles tend to have more simplistic messaging or include argumentative provocation to retain audience engagement for their publication (O'Connor and Joffe 2014). News articles typically contain rhetorical formulations that people are familiar with and are willing to respond to (McDonnell *et al.* 2017). In addition, online media seek to attract attention for both the specific news article and the media outlet, and this is best achieved through sensationalism and emphasizing everyday implications of research findings (Dempster *et al.* 2022). Media articles typically begin with headlines to attract immediate attention and then provide decontextualized findings that emphasize scientific novelty; any subtlety or contextual details are typically relegated to the final paragraphs (Dempster *et al.* 2022). Social media audience responses also have their own linguistic context. Comments on social media platforms such as Facebook are regarded as the most significant form of engagement, revealing explicitly what aspect of the media message is viewed as salient (Guo and Sun 2020). Social media comments prioritize brevity and connection to others via relational and interactive messaging

characteristics (Kim and Yang 2017), making it a unique platform for understanding readers' engagement and response.

### Aims and objectives

The use of sleep research in science communication shapes how sleep problems and practices are presented to audiences (Breheny *et al.* 2023). Given the universality of sleep and the feared nature of Alzheimer's disease, the present research aimed to examine the ways that research linking the two is reproduced in the media and then responded to and resisted by social media audiences. Because of the unique linguistic contexts across levels of production, the published scientific article and institutional press release about the research were also examined alongside the online news article and the social media responses. This research answered the following question: how is scientific research on sleep reproduced in online news media and responded to by social media audiences?

## MATERIALS AND METHODS

To understand the audience reception to media content on the link between sleep and Alzheimer's disease, we selected a media article from Stuff.co.nz website that was widely shared on Facebook (Brain plaque 2017). Stuff.co.nz provides free online content and consequently has a wide readership in New Zealand. In 2024, 51% of New Zealanders surveyed accessed Stuff for news content in the past week, second only to Television New Zealand as a news source (Myllylahti and Treadwell 2024). News media in New Zealand tends to be comparatively centrist; within this context, Stuff has been categorized as high in factual reporting with a left-centre editorial position (Media Bias 2025). Facebook is the most commonly accessed social media platform for news content; 53% of New Zealanders surveyed had used Facebook to access news (Myllylahti and Treadwell 2024). This parallels international research that found 51% of respondents used social media for news, most commonly using Facebook for reading and sharing news (Newman *et al.* 2016).

### Sources

The Stuff.co.nz media article's headline was 'Brain plaque: researchers find Alzheimer's link to a poor night's sleep'. Immediately below this headline was a coloured image of a brain scan with the caption 'A bad night's sleep could be doing you more damage'. Using this image focuses attention on the physiological structure of the brain to reinforce the scientific validity of the findings (Bucher 2019), whereas the caption summarizes the media article message of a single night of poor sleep as damaging. This juxtaposition of scientific validity and universal applicability is repeated across the media article to reinforce the key message that we are all at risk of Alzheimer's disease. In the middle of the media article text, links to related articles are provided under the heading 'READ MORE:'. These links reference research funding for new Alzheimer's disease drugs as well as lifestyle content on 'The cruel disease that has taken my young mother's mind' and 'documenting Alzheimer's disease whilst I still can' to reinforce the seriousness of the disease. The Facebook post sharing the Stuff.co.nz article was headed 'Sleep is the word.   '. The post generated 216 likes, 68 'wow' emojis, 20 'cry' emojis, and 1 'laugh' emoji. Responses on the Facebook platform included 536 comments and 152 shares of the media article.

The original scientific article and university press release were found online using information from the media article. The scientific publication was published in the peer reviewed journal: *Brain* (Ju et al. 2017). The news release was published on the Washington University Department of Medicine's News Hub website and entitled 'Sleep, Alzheimer's link explained: Poor sleep leads to increase in Alzheimer's proteins associated with cognitive decline' (Bhandari 2017).

### Thematic analysis

Thematic analysis was used to identify patterns of recurring meaning across the data set. Reflexive thematic analysis is theoretically flexible and well-suited to identifying latent patterns of shared meaning (Braun and Clarke 2019, 2022, 2024). This analysis explored patterns of meaning that both aligned and diverged in the media article and Facebook responses. We also considered how these reflected or distorted the messages in the scientific paper and institutional media release. In this research, we focused on sense-making as a social practice (Braun and Clarke 2024). This analysis is a social constructionist thematic analysis. Social constructionism views language as foundational to establishing knowledge (Burr 2015). Claims to knowledge and challenges that undermine knowledge reflect power structures which assign different authority to speakers depending on their relative positioning in knowledge hierarchies (Parker 1992).

The comments written in response to the Facebook post were analysed to explore how people interacted with the media representation of scientific research and how users engaged with other's posts and comments. Comments on the Facebook post were copied into Microsoft Word using the original wording, spelling, grammar, punctuation, and emoji use. The comments and replies were treated as a set. The data were anonymized as online environments are contextual; although commenters are unlikely to expect privacy, they may see platforms as sites of support and information sharing, or places of moral debate rather than data for health research. Ceuterick et al. (2023) and Smedley and Coulson (2018) suggest anonymizing online posts for health research by: deleting identifiable information such as user tagging; deleting any potentially identifiable details in quotes; and paraphrasing or fragmenting quotes to reduce searchability. Extracts reproduced here were searched to ensure they did not link to user profiles. Emojis were included when they occurred alongside textual comments as the tone of comments was often indicated using emojis. Responses that consisted only of emojis or tagging another Facebook user were not included for further analysis.

The submitted comments were read and re-read by all authors and codes were developed that reflected the substantive content of the comments (e.g. inevitability, instruction), the emotional tone of the statements (e.g. fear or reassurance), and the use of metaphor or humour (e.g. for establishing scepticism). The codes were then workshopped by all authors to identify overlaps or inconsistencies. Once a stable code set was established, the comments were re-coded by the first author to ensure consistency. These codes were grouped into themes which represented distinct patterns in the data. Some thematic patterns showed alignment; for example, fear and inevitability made sense together whilst being distinct patterns of responses. Following this, the media article was re-read to understand the patterns that might explain the affective and cognitive responses found in the social media comments.

These thematic patterns were compared to the claims made and the tone of the original scientific paper and the institutional press release. The analysis highlighted how thematically similar material might be argued differently or have different consequences in different contexts. This allowed for an analytic framework to be developed which highlighted the alignment of thematic patterns across science production and science communication. Extracts were selected to illustrate this analytic framework, maintaining their original grammatical constructions.

### Reflexivity

As academics, we are part of the scientific knowledge production system, which is built on an understanding of science as a productive force for improving people's lives. This positionality shapes our evaluation of science as worthwhile, and we may be therefore more likely to attribute fault to the media communications system, seeing it as disrupting the 'proper' transmission of knowledge from scientific experts to 'interested' audiences. This position has likely contributed to our analysis; we are more likely to ascribe science with inherent value and to question the usefulness of science communication efforts when they misrepresent findings or have no practical implications for people. Reflexivity involves being aware of these perspectives and how they might shape our data analysis and recommendations. We also acknowledge the different power of science and media and the claims each make to establishing knowledge and serving the public—claims that do not always align. Given our positionality, we are likely to prioritize scientific accounts of knowledge and service.

## RESULTS

Three rhetorical features were recognizable in the scientific research, taken up in the subsequent press release and media report, and went on to shape audience responses. These were concerning 'research as settling the unknown', 'knowledge gaining status of certainty', and 'gaps in knowledge as incomplete or future knowledge'. The themes constructed from our analyses were combined into an analytic framework under these core features with illustrative examples. These are collated in Table 1. An overview of the rhetorical features is provided below before illustrating the key themes concerning the audiences' responses to the media article.

### Rhetorical patterns

In the academic publication, science was presented as cumulative and once findings achieve consistency, the matter was presented as 'resolved': 'Alzheimer's disease pathology is associated with sleep disruption, even in the preclinical stages of disease' (Ju et al. 2017, p. 2105). There is a shift in rhetorical tone when new knowledge is presented as 'discovered': 'one night of total sleep deprivation increases soluble amyloid-b in humans' (Ju et al. 2017, p. 2105). This aligns with the scientific convention of establishing statements as true or not true (Franzen et al. 2012). The third rhetorical convention in scientific publication is that knowledge is 'incomplete' and therefore requires ongoing research: 'Prospective studies will be required...' (Ju et al. 2017, p. 2109). Within this context, such incomplete knowledge is not presented as unreliability of knowledge, but the incremental acquisition of increasingly sophisticated knowledge of the external world.

Table 1. Sleep content from scientific publication to press release to online media article to Facebook comments.

Source	Settling the unknown	Gaining certainty	Gaps in knowledge
Scientific Publication	<b>Already Established</b> 'Alzheimer's disease pathology is associated with sleep disruption, even in the preclinical stages of disease' (Ju <i>et al.</i> 2017, p. 2105)	<b>Discovered</b> 'one night of total sleep deprivation increases soluble amyloid-b in humans' (Ju <i>et al.</i> 2017, p. 2105)	<b>Incomplete</b> 'Prospective studies will be required to test whether improving sleep quality and increasing SWA by treating underlying sleep disorders, medications, behavioural interventions, or acoustic enhancement of SWA can reduce amyloid-b levels, long-term risk of amyloid deposition, and progression to Alzheimer's disease' (Ju <i>et al.</i> 2017, p. 2109)
Press Release	<b>Well-Founded</b> 'Poor sleep leads to increase in Alzheimer's proteins associated with cognitive decline'	<b>Cautious Confidence</b> 'All we can really say is that bad sleep increases levels of some proteins that are associated with Alzheimer's disease. But a good night's sleep is something you want to be striving for anyway'	<b>Tentative</b> 'Ju thinks it is unlikely that a single night or even a week of poor sleep, miserable though it may be, has much effect on overall risk of developing Alzheimer's disease. Amyloid beta and tau levels probably go back down the next time the person has a good night's sleep, she said'
Media Article	<b>Established Knowledge</b> 'researchers find Alzheimer's link to a poor night's sleep' 'Studies have shown that poor sleep increases the risk of cognitive problems'	<b>Extreme Reporting</b> 'Just one night of poor sleep is enough to trigger a spike in a brain chemical linked to Alzheimer's disease, a study has shown'	<b>Fear of Unknown</b> 'scientists fear that continued sleep deprivation could allow an unhealthy build-up of brain plaque which eventually kills off neurons and wipes memory'
Submitted Comments	<b>Instruction</b> 'Oh my ... I will try to sleep more' 'prevention is key~ must sleep more' 'that's why it's important I have a good sleep 😊' 'Go to bed please'	<b>Fear</b> 'This is rather scary' 'god help us!' 'Oh god I'm stuffed already 😞😞' 'And bloody hell please shoot me if I'm the first in the family to get Alzheimer's 😞😞' 'Oh no. We're goners'	<b>Scepticism</b> 'Yeah, its def not all the aluminium in vaccines...' 'Take up table tennis. It's meant to prevent Alzheimer's according to my massage therapist' 'Something else to worry about...bacon, wine...sleep 😊' 'Or just government chemtrails'
Submitted Comments	<b>Reassurance</b> 'im good, i sleep like a panda' 'at least we know you won't get Alzheimer's then ae lol' 'I'll be sweet 😊' 'You should be ok. You sleep anywhere 😊'	<b>Inevitability</b> 'now it's a 100% chance I end up like gma' 'Well I'm obviously going to get Alzheimer's' 'that's me screwed' 'I'm f#*ed already showing signs of it with my bad memory 😞😞 never sleep 😞😞' 'We haven't got a hope in hells chance of escaping Alzheimer's (tagged user)'	<b>Rejection</b> 'Can't be true or every mother would have it' 'Then I should be showing full symptoms by now. Always have had insomnia problems and now it is even worst PLUS Alzheimers in the family'

The press release mirrors this thematic presentation of scientific communication by outlining what is 'well-founded', what aspects might engender some 'cautious confidence', and the 'tentative' nature of what remains to be established. In the press release, the ability of improved sleep to reduce risk of Alzheimer's disease is described as beyond the research. Instead, better sleep is described as generally health promoting and therefore worth striving for. The researchers describe short-term sleep loss as unlikely to increase the risk of Alzheimer's disease: Lead researcher Ju is quoted as saying 'it is unlikely that a single night or even a week of poor sleep, miserable though it may be, has much effect on overall risk of developing Alzheimer's disease'. This minimizes the clinical implications of the research and introduces the complexity of the pathways from sleep loss to the development of disease. The original scientific findings and press release have comparatively little relatability for general audiences as they reference unfamiliar terms ('soluble amyloid-b') and point to the limited clinical

implications of the findings as the protein levels 'probably go back down the next time the person has a good night's sleep'.

The rhetoric significantly shifted in the media article; research findings were reported as 'established' knowledge using phrasing such as 'researchers find' and causal links were used: 'it causes tangles in the brain'. The media article built sensationalist messages from more tentative research findings. In contrast to the institutional press release, the media article focused on the 'damage' caused by a single night of restless sleep: 'Just one night of poor sleep is enough to trigger a spike in a brain chemical linked to Alzheimer's disease, a study has shown'. In the media article, the incomplete knowledge of science is still presented as a 'work in progress', but possible future findings are framed as scientists fears: 'scientists fear that continued sleep deprivation could allow an unhealthy build-up of brain plaque which eventually kills off neurons and wipes memory'. Metaphoric language was used to support the sensationalist formulation

with memory described as a computer whose contents can be lost. This content markedly departs from the original source and is the content that social media audiences have access to.

### Instruction and reassurance

When audiences engaged with science as resolved and well-founded, they tended to use the research as the basis for instruction to improve sleep or reassurance that their sleep habits meant they were safe from Alzheimer's disease. Audiences who interpreted the message as instructional, responded in terms of the importance of sleep health and described renewing their attempts at better sleep: 'Oh my ... I will try to sleep more'. Others reinforced this interpretation by replying 'Yes you must!'. Similarly, the instructional nature of the response was used to direct others to improve their sleep: 'Go to bed please'. Those who slept well found the information reassuring, with the instructional tone of the messaging producing a positive affective response; audience reassurance was possible because the simplistic argument of poor sleep equalling Alzheimer's disease is used to infer that regular, high-quality sleep means no risk: 'im good, i sleep like a panda'. For both the instruction and reassurance responses, the message was received and accepted in alignment with the framing of the media article that sleep status is instrumental in cognitive outcomes.

### Fear and inevitability

The media article began with sensationalist reporting of the links between sleep and Alzheimer's disease before shifting to more nuanced reporting later in the article, downplaying the limited applicability of the research to clinical outcomes. Later in the media article, it is acknowledged that poor sleep is linked to two specific chemicals rather than causing dementia in clinical studies, but the misleading link between acute sleep loss and Alzheimer's disease is prioritized. The use of sensationalist language is also evident in the media article's descriptions around issues such as the 'killing of neurons', 'wiping of memory', the 'lack of a cure for dementia' as well as describing people with sleep disturbance as having been 'starved of sleep'.

Themes of 'fear and inevitability' are therefore understandably present when readers accept the link between sleep disruption and cognitive health posed by the media article. Commenters describing having Alzheimer's disease as worse than death: 'And bloody hell please shoot me if I'm the first in the family to get Alzheimer's 😞😞'. The specific descriptor of being 'screwed' was used repeatedly across the comments to refer to the severity and inevitability of the outcome for themselves or others: 'we're actually screwed aye'. The affective fear response is based on the accuracy and inevitability of the links presented. The inevitability was used to suggest that no attempt at improvement was worthwhile: 'i giv up' and 'Rip oh well #healthscithings', which was endorsed with 'So true'.

Humour was used to lighten the emotional tone of the message, to counter the fearful nature of the messaging, and to draw others into commenting. A version of the comment 'Who are you sorry?' (Laugh) was used three times in the Facebook comments to respond to being tagged. References to popular culture included movies and songs, hashtags, and aligning Alzheimer's disease with humorous moments of memory loss: 'You know I'm already 50 first dates, it has begun'. Laugh emojis were commonly included after the comments, indicative of minimizing the fear messages.

### Scepticism and rejection

In response to scientific knowledge as progressive and incomplete, commenters responded with scepticism and rejection. These findings were viewed as undermining the accuracy of previous scientific research. One commenter questioned the links reported by enquiring: 'I thought it was Type 3 diabetes now?'. Media dissemination of scientific findings is experienced as cumulative; media articles are received by audiences who have been exposed to earlier research findings that, through their loss of subtlety or nuance, may appear to contradict one another. Rejection is also achieved by suggesting that incorporating all scientific advice is so unattainable that the logical response should be cynicism: 'Something else to worry about...bacon, wine...sleep 😊'. Scientific uncertainty was used as the springboard for humorous suggestions of health promoting activities which resist the scientific knowledge paradigm: 'Take up table tennis [tagged user]. It's meant to prevent Alzheimer's according to my massage therapist'. Juxtaposing science with general understandings of health improvement challenges the power of science to make claims to knowledge. Humour is used to undermine the scientific basis of the links being made in the media article.

At times, commenters responded with scepticism to suggest scientific knowledge is deliberately manufactured to distract attention from other possible explanations. This included links between Alzheimer's disease and water fluoridation, vaccines, 'Or just government chemtrails'. Comments also argued for the logical impossibility of the claims or presented personal evidence to overturn it. The logical impossibility argument was built on the claim that one night's poor sleep was sufficient to alter brain chemistry. Commenters responded that Alzheimer's disease would be ubiquitous if such simple causal links existed: 'Can't be true or every mother would have it'. Counter evidence was also presented through personal accounts of poor sleep or drawing on family history: 'Then I should be showing full symptoms by now. Always have had insomnia problems and now it is even worst PLUS Alzheimer's in the family'. Personal examples of dementia-free status make sense given the causal link that a single night's sleep disruption is linked to Alzheimer's disease. Consequently, media communication designed to encourage engagement through sensationalist reporting and fear appeals contributed to scepticism and rejection of the knowledge presented.

## DISCUSSION

This paper examines a media report of a scientific study linking sleep disturbances with Alzheimer's disease and analyses how the report was responded to by social media audiences. In reporting the links between sleep and Alzheimer's disease and dementia, the media selectively present results and quotes from researchers to bolster sensationalist messaging on the clinical implications of these findings. One response to this was instructional; people tagged others to inform them of the urgency of sorting out their sleep or described how their own sleep needed improvement. Others focussed on the inevitability of disease outcomes and fear for the future. Some commenters responded with scepticism, particularly focusing on changing scientific messaging over time or the logical impossibility of the argument presented. Media reporting style sets up these kinds of responses. By focusing on a single night of sleep disruption as linked to poor outcomes, the media presented it as impossible to avoid the links between sleep and disease.

Audience reactions to the messages depend on both personal experience of the topic and acceptance of the premise of scientific certainty. Audience reactions can be grouped into dominant, connoted, and oppositional readings. Dominant readings occur when the audience perceives the message as intended and the meaning is accepted (Hall 1980). In the present example, this occurs when the media article is seen as instructional or as providing reassurance that one will be safe from Alzheimer's disease. Connoted meaning occurs when the audience accepts the dominant messages but responds to them in unexpected ways (Hall 1980); here, this occurs when acceptance of the message produces fear and inevitability. Rather than impetus to self-improvement, the audience responds with fatalism. Oppositional reading occurs when the audience understands the message but undermines or rejects the meaning presented (Hall 1980). This appears as scepticism and rejection of the connections presented in the media article and the value of science generally. Audience members are active in evaluating evidence. Gabe *et al.* (2017) found that audiences tended to prioritize their own experiences or the experiences of people they knew when evaluating the risks and benefits sleeping pills reported in the media. Audiences responding with dominant, connoted, or oppositional readings have implications for the acceptance of scientific research, but all reflect successful engagement with social media audiences and therefore meet journalistic imperatives.

Social media imperatives of simplicity, brevity, and relatability can limit the capacity to acknowledge nuance or tentativeness, particularly in the context of online platform constraints and audience attention spans. These imperatives encourage reporting which provokes affective responses to scientific findings, which have the potential to undermine trust in the story and the science (Gabe *et al.* 2017). The commonality of poor sleep and cultural fears of cognitive decline and dementia are used to heighten the affective response of audiences (Behuniak 2011). Mellor (2015) describes omissions in scientific reporting as implicit values that such aspects are 'non-news'; provisionality and contingency are non-news values identifiable in the media article analysed here. The provisional and contingent nature of scientific research findings are misrepresented in favour of simple causal links and relatability. In reporting scientific findings in this way, journalists set up the public to be sceptical of science communication. Bogren (2019) found that audiences conflate the journalistic representation of science with the production of science, which may lead them to see poor reporting as poor science. In this way, the boundaries between science and the media are blurred (Franzen *et al.* 2012) and audiences respond with disbelief.

Whilst science communication has an opportunity to increase public engagement with science and deliver progress to society, the present study illustrates how this can function when personal relevance is highlighted and complexity minimized. Media processes prioritize simple messaging and real-world impact and ignore or downplay complexities or limitations in research findings as being less newsworthy (Mellor 2015). Making claims about the relevance of pure science to disease rates may overplay the applicability of research findings to everyday health practices (Välvirronen 2008). In the context of reporting on Alzheimer's disease, which is frequently represented as an outcome worse than death (Behuniak 2011, Peel 2014), these findings engender strong affective responses. These responses are not uniform, however, with rejection and

fatalism present alongside acceptance of instructional messaging. Franzen *et al.* (2012) question whether no coverage at all is better than sensationalist media coverage, particularly when it encourages unsatisfactory public engagement. Topics that produce strong affective responses, such as research on incurable and feared diseases, may be disproportionately selected for public dissemination *because* engagement is high. However, such engagement may entrench fear of Alzheimer's disease and undermine attempts to promote balanced and nuanced discussions of living well with dementia (see Quinn *et al.* 2022, Kim and Shin 2023), discussions that are likely to have broader applicability for general audiences.

### Limitations

This research used a single case study of scientific research on the link between sleep and Alzheimer's disease to explore social media audience response. The online media article and public comments submitted on Facebook were analysed alongside the scientific publication and institutional press release. This provided a useful data set to explore the patterns of acceptance and rejection of media messaging. However, the patterns and themes presented here may not generalize to other topics or modes of responding. Comments on Facebook do not represent audience reception in a broad sense; they prioritize brevity and connection to others. Furthermore, other audience platforms will have different affordances which shape the depth and detail of the audience reaction. Audience reactions may follow different patterns of engagement and response beyond social media (Nelson 2021). Media messaging often lacks nuance, and the social media version of audience responding also lacks subtlety.

### Future directions

Future research may seek alternative interpretations and reactions to media reporting (Gibson 2025). Such reactions may differ according to audience characteristics such as age. In particular, the fear response may be unique to Alzheimer's disease; other health conditions associated with less stigma and anxiety may provoke very different audience responses. Research focus groups may be a useful method to demonstrate how interactional moments are part of a complex set of reactions to media dissemination of scientific research. For example, Gabe *et al.* (2017) examined focus group reflections on prescription hypnotics and found that people were active in their reaction to and resistance of media messaging. People made distinctions between different kinds of medication users and acknowledged personal circumstances that might justify use. Similarly, Bogren's (2019) qualitative interview study found that audiences display provisional or contextual trust in newspaper reports of science. They are active in interpreting and evaluating claims and integrating them with their own lived experiences. These suggest methodological avenues for future research in the space of science communication and the medialization of sleep and ageing.

### CONCLUSION

Audiences increasingly use social media as a source of news content and have limited access to science through other avenues. Presenting science communication as personally relevant messages through social media platforms is designed to increase audience engagement; audiences respond in terms of their personal circumstances and specific beliefs. Attempts

to engage audiences with media messages that are cognitively simplistic and affectively powerful and personal may end up complicating understandings of scientific knowledge.

Contemporary audiences are familiar with science communication on health topics as instructional; science provides lessons on the best way to maximize health and minimize disease risk (Seo et al. 2021). Health practices are regularly described as underpinned by scientific findings, which are themselves under constant development. The dissemination of scientific research as advice may persist because it aligns with the priorities of different actors within the science communication sphere. It meets the imperatives of newsworthiness valued by journalists, academic institutions, and social media platforms. It also demonstrates the value of science for improving health, which aligns with scientists' beliefs. However, presenting science simplistically as personally relevant advances discounts the potential for more nuanced understanding of research findings and ironically may undermine audience trust. This discounts the ability of audiences to weigh evidence and understand how it might contribute towards understanding complex phenomenon such as the development of disease.

### Author Contributions

M.B. was involved in conceptualization, methodology, analysis, draft writing, review, and editing. I.R. was involved in project administration and analysis. R.G. was involved in funding acquisition, project administration, supervision, conceptualization, draft writing, and review.

### Conflict of interest

The authors declare no conflict of interest regarding the research, authorship, or publication of this article.

### Funding

This work was supported by the Royal Society of New Zealand Marsden Fund (grant number 22-MAU-071—Sensationalising sleep: Discourses and practices of sleep in Aotearoa) to R.G. and M.B. All data used for these analyses are in the public domain.

### Ethical approval

The data were derived from sources in the public domain. The research was conducted according to the ethical principles of the Massey University Human Ethics Committee. The comments were anonymized by removing user data and any potentially identifiable content. Quotes were paraphrased or fragmented to reduce searchability.

### Data availability

The data sets were derived from sources in the public domain: Published scientific article (<https://pubmed.ncbi.nlm.nih.gov/28899014/>), institutional press release (retrieved <https://medicine.washu.edu/news/sleep-alzheimers-link-explained/>), Stuff.co.nz Media article (<https://www.stuff.co.nz/science/94634788/brain-plaque-researchers-find-alzheimers-link-to-a-poor-nights-sleep>), and the publicly submitted comments on Stuff.co.nz Facebook page.

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