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Representations of obesity in Australian and UK news coverage: A diachronic comparison

Abstract: The number of adults living with obesity in both Australia and the UK has been increasing over the last 30 years (AIHW, 2023). Although policy has emphasised 'community-based interventions' in Australia (AIHW, 2017) and 'system-wide approaches' in the UK (Ulijaszek and McLennan, 2016) for overcoming the challenges of obesity, previous research has shown that media representations have been dominated by representations promoting individual responsibility (e.g., Kim & Willis, 2007). In this paper, we report our observations of representations documented in corpora of media coverage from Australia and the UK between 2008-2017. The corpora amount to 16.4 million tokens and 36 million tokens, respectively. We identify key semantic domains for each year of the corpora and discuss both consistent and shifting themes in the data. Our findings show that the Australian coverage provides a more sustained focus on responses to obesity at the society level, referring to practices in the food industry and differences between communities that can lead to health disparities. By comparison, while there is an increase in the amount of coverage in the UK press referring to obesity, the content became more narrowly focussed on food consumption and weight loss over the study period. The findings demonstrate how media coverage contributes to public understanding of how to respond to the challenges of obesity.

Keywords: obesity; news; keyness; diachronic; semantic annotation; applied corpus linguistics

1. Obesity in Australia and the UK

The Australian Institute of Health and Welfare (AIHW, 2023) reports that 75% of men and 60% of women in Australia are living with overweight or obesity. The proportion of adults aged 18 and over living with overweight or obesity has increased from 57% in 1995 to 67% in 2017–18 (ibid.). Compared with non-Indigenous Australians, Indigenous adults are more likely to be overweight or obese, Indigenous children and adolescents are also more likely to be obese, and those living outside major cities – or who are in the lower socioeconomic groups – are more likely to be overweight or obese than others (ibid.). Recognition of such disparities led the AIHW, in an earlier report, to advocate population health approaches to addressing obesity, including "laws and regulations, tax and price interventions, community-based interventions – including those in schools and workplaces – and public education through platforms such as social marketing campaigns" (AIHW, 2017, p. vii).

¹ The AIHW (2023) explains that: "[e]stimates of Body Mass Index (BMI) are based on nationally representative measured height and weight data from the Australian Bureau of Statistics (ABS) 2017–18 National Health Survey (NHS). Due to the COVID-19 pandemic, physical measurements (including height, weight and waist circumference) were not taken at the time of the most recent NHS 2020–21".

There is also public support for government regulation of the systems that contribute to the prevalence of obesity in Australia. The results of an online survey of 2135 participants, broadly representative of the population of Australia, found that 92.5% of respondents recognise obesity as a serious problem and over 70% agree that the government should regulate advertising of unhealthy foods and beverages on television (78.9%), online (75.8%) and in public spaces (70.3%) (Sainsbury et al. 2018).

Despite concerns about rates of obesity, Swinburn and Wood (2013, p. 65) have been critical of the 'little progress' shown in terms of specific policy actions in Australia and New Zealand since the 1980s, although they do recognise "some excellent examples of community-level actions, especially in Australia under COAG's high level policy direction for a greater preventive health effort to reduce obesity and its health consequences". Swinburn and Wood (2013, p. 66) attribute the relative inaction towards preventing obesity to "the government having a worldview dominated by individual responsibility and choice" and determine that policy support to support people's healthy choices i.e., by cultivating healthy food environments, has been minimal.

The growing challenges of obesity in Australia are comparable with those faced within the context of the UK. In England, the proportion of adults with overweight or obesity rose from 52.9% in 1993 to 64.3% in 2019 (Baker, 2023, p. 6) and there are comparable results reported in surveys from Scotland (Scottish Government, 2022), Wales (Welsh Government, 2021) and Northern Ireland (Corrigan and Scarlett, 2021). Collectively, the reports have found that rates of obesity are higher: among men compared with women; in the most deprived areas compared with the least deprived areas; among those with disabilities compared with those without disabilities; among Black ethnic groups compared with other ethnic groups; and among those with no additional education qualifications compared with those with level 4 qualifications or higher (e.g. a university degree) (Baker, 2023, p. 9). These findings highlight health inequalities and the need for localised action, as opposed to a uniform national strategy for tackling the challenges that can be caused by obesity.

Ulijaszek and McLennan (2016, p. 398) explain that UK political interest in the challenges of obesity developed significantly in the late 1990s and that under a UK Labour government such challenges were reframed as "a complex issue that required new system-wide approaches and multiple sites of intervention well beyond the range of personal responsibility". However, with the subsequent UK Conservative-Liberal Democrat coalition government (2011 to 2015), Ulijaszek and McLennan (2016) observed a return to a focus on individual responsibility in UK policy documents concerning obesity measures.

Researchers have shown the influence that the media can have on shaping perspectives on obesity. A focus on individual responsibility has been found to dominate Australian news samples (Bonfiglioli et al., 2007; Inthorn & Boyce, 2010; Kim & Willis, 2007; Lawrence, 2004; Puhl and Heuer, 2010), with Bonfiglioli et al. (2007) finding that two-thirds of television news reports blamed individuals for their weight. Bastian (2011, p. 138) argues that the interests of disadvantaged groups are not well-represented, while "the interests of powerful bodies such as the food industry are". Furthermore, based on an analysis of childhood obesity in the early part of 2009, Bastian (2011, p. 138) asserts that a focus on individual and parental responsibility deflects attention away from "structural issues such as the food supply, economic pressures to

work long hours, urban design, poor public transport, lack of parks, recreational facilities and cycle ways".

We can also see evidence of this 'individual responsibility' framing in the UK news media; Brookes and Baker (2021, p. 258) found that "[t]he discourse of personal responsibility is central to the press's representation of obesity" in their investigation of ten years' worth of obesity coverage in the UK press, 2008-2017. This discourse of personal responsibility was found to be particularly characteristic of articles from the right-leaning tabloids, "especially in the context of narratives about people who have lost weight through diet and exercise" (Brookes and Baker, 2021, p. 258). Brookes and Baker's (2021) observations highlight the variability in representations that readers of the UK press will encounter, depending on which news publication(s) they read and also that these may shift over time. When considered alongside the observations made by Ulijaszek and McLennan (2016), this may also reflect changing policy and the interactions between the political ideologies of the government and the editorial stance of media institutions, including their perspectives on the government.

With these concerns about the representation of obesity in mind, and with comparable challenges relating to the prevalence of obesity in the UK and Australia, in this paper we examine media representations of obesity in corpora of news coverage from Australia and the UK. In doing so, we set out to demonstrate how obesity is defined, in part, according to what aspects are discussed in the news. Subsequently, we highlight the important role that those who produce the news have in shaping discussions of obesity. Following the analysis, we consider the extent to which the news coverage on obesity reflects the socio-political context and culture in which those representations are produced, and situate our findings in relation to observations from previous research. Our data and analytical approach are introduced in the following section.

2. Methods

2.1. Obesity news corpora

To investigate media representations of obesity in Australia and the UK, we compare two existing, purpose-built corpora of news articles referring to 'obese' or 'obesity' over the period 2008-2017. The compilation of the UK corpus is described in Brookes and Baker (2021, pp. 27-8) and a matched corpus of Australian obesity coverage, compiled according to the same principles, is described in Bednarek et al. (2023). The Australian Obesity Corpus includes articles from: the *Advertiser*, *Age*, *the Australian*, *Brisbane Times*, *Canberra Times*, *Courier Mail*, *Herald Sun*, *the Mercury (Hobart)*, *Northern Times*, *Sydney Morning Herald*, *Daily Telegraph* and *West Australian*. The publications represented in the UK Obesity Corpus include: *the Daily Express*, *Daily Mail*, *the Daily Mirror*, *Daily Star*, *Guardian*, *the i*, *the Independent*, *the Morning Star*, *the Sun*, *the Telegraph* and *the Times*. Table 1 indicates that while the number of articles and tokens in the UK Obesity Corpus has generally increased over time, the number of articles and tokens in the Australian Obesity Corpus has generally decreased and there is less coverage overall.

	Australia: Corpus	n Obesity	UK Obesity Corpus				
Year	Texts	Tokens	Texts	Tokens			
2008	3,000	2,140,339	3,248	2,432,838			
2009	2,472	1,754,027	2,784	2,170,349			
2010	2,394	1,674,461	2,577	2,105,320			
2011	2,245	1,515,833	2,564	2,069,310			
2012	2,162	1,470,017	4,028	3,226,134			
2013	2,620	1,867,730	4,653	3,687,357			
2014	2,219	1,459,397	5,389	4,357,218			
2015	2,265	1,843,854	6,093	5,320,295			
2016	1,829	1,334,875	6,734	5,831,165			
2017	1,791	1,294,825	5,808	4,853,235			
Total	22,997	16,355,358	43,878	36,053,221			

Table 1. Number of texts and tokens for annual sub-corpora of the Australian and UK Obesity news corpora (generated using CQPweb).

2.2. Keyness comparisons

We carried out keyness analyses of matched annual sub-corpora in the Australia and UK data i.e., comparing the coverage from 2008-Australia to 2008-UK, etc. This generated ten keyness comparisons – one for each year – that we collated to track key features that were consistently key over the period, or that were otherwise key for a limited but contiguous period. Consistent key domains are those that were key across all the year-comparisons, for one corpus compared with the other. As such, they reflect themes that have been characteristic of either the Australian news coverage or the UK coverage. We refer to initiating key domains as those that have come to reflect significant differences in the datasets part-way through the study period and continue to be key thereafter, while conversely, terminating key domains are those that reflect significant differences in the early part of the coverage but cease to be key part-way through. As such, initiating and terminating key domains point to shifts in the focus of the news coverage and potentially convergences/divergences between the two corpora, as topics become less prevalent or gain prevalence over the course of the study period.

Keyness analysis was carried out at the level of semantic domains, as defined by the UCREL Semantic Analysis System (USAS). The USAS assigns tags to tokens in the data based on a pre-defined semantic lexicon, indicating coarse-grained word senses (Rayson 2008). The USAS lexicon contains 21 major semantic fields (e.g., 'Arts & Crafts', 'Food and Farming', 'Life and Living Things') with 232 sub-classes; for example, the field of 'The Body & the Individual' comprises the semantic domains, 'Anatomy and physiology', 'Health and disease', 'Medicines and medical treatment', 'Cleaning and personal care' and 'Clothes and personal belongings'. The full tagset is outlined at https://ucrel.lancs.ac.uk/usas/. The USAS was designed to be relatively 'coarse-grained' and provide pre-determined categories that are general enough to be applied in relation to a range of (language) topics and across contexts. Here, the USAS

supports us in observing trends that are "invisible at the word level" (Rayson, 2008, p. 542) and which can direct us to shifts in the national coverage of obesity, which are interpreted in relation to the wider sociocultural context.

We applied a log likelihood significance filter at 0.01% (p<0.0001) with Šidák correction using the CQPweb corpus analysis tool (Hardie, 2012).² Key semantic domains are returned in order of the effect size measure Log Ratio (Hardie, 2014). These measures are reported according to a binary logarithm, in which a feature that is 2 times more common in one corpus compared with another has a Log Ratio value 1.0; a feature that is 4 times more common in one corpus compared with another has a Log Ratio value 2.0 etc. We do not have space to discuss the finer distinctions according to differences in or rank positions of effect sizes, which fluctuate for each key domain list; rather, it was sufficient for our purposes to establish that the differences in relative frequency values met the threshold for statistical significance according to the confidence measure (i.e., Log likelihood). Log Ratio values are therefore reported to provide an indication of how big the difference is between corpora.

The concept of keyness is fundamentally relative; significance is determined through a comparative value in the normalised frequency of a feature in two (or more) corpora. What will be shown through our analytical discussion is that a feature can appear to be key where there is no rise in the relative frequency in the target data, but rather a drop in the relative frequency of the same feature in the comparison corpus. Thus, relative frequency values, in terms of words per million (wpm), are used to report observed changes in the coverage.

One way of discerning notable changes in the relative frequencies is to look at both negative and positive keywords. However, this would still require running keyness analyses of both corpora. In this direct, two-corpus comparison, a key negative feature in one corpus is, by definition, a key positive feature in the comparison corpus. Thus, our focus on positive key semantic domains only still directs us to instances of significant underuse (i.e., negative key semantic domains) when we look at the relative frequencies for both the Australian and the UK data.

Through the analysis, then, we investigate positive semantic key domains in both the UK and the Australian news coverage to identify the ways in which the coverage differs, as a way of understanding how media representations are informed by the socio-political context.

3. Findings

The keyword lists generated from the direct comparison of the Australian and UK coverage for each year identified 120 key semantic domains in the Australian data and 98 key semantic domains in the UK coverage that met the statistical threshold for keyness. In their investigation of the UK data, Brookes and Baker (2021) and Baker et al. (2020) highlighted the growing prominence of discourses that emphasise individual responsibility and, through our analysis, we

² The Šidák correction is applied to account for the number of comparisons that are made. The greater the number of comparisons that are tested, the higher the p-value cut-off and subsequently, the higher the corresponding Log likelihood cut-off value. This means that higher frequency search terms are tested to a higher level of confidence above the minimum threshold.

similarly identified key semantic domains that refer to behaviours managed at the individual level, or otherwise referred to wider social factors. We structure our discussion according to the themes that capture corresponding key semantic domains, namely: food consumption; food production; weight loss; 'risk' discourses; place; and health inequalities. Within each theme, we highlight which of the key domains proved to be consistently overrepresented in the data and those which were statistically overused for part of the study period, in terms of initiating and terminating key semantic domains.

3.1. Food consumption

Our comparative analysis showed that discussions of themes related to food consumption were characteristic of the UK data, compared with the Australian coverage. Furthermore, the identification of consistent key domains and initiating key domains indicated that the topic of (restricting) food consumption appeared to grow in prevalence in the UK coverage, consistent with the findings of Baker et al. (2020) and Brookes and Baker (2021). The relevant semantic domains are shown in Table 2, which also indicates where there were statistically significant differences in the relative frequency of constituent terms, compared with the Australian coverage.

Semantic										
domain	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
<u>UK coverage</u>										
Measurement	√	√	√	√	√	√	√	√	√	√
Numbers	√	√	√	√	√	√	√	√	√	√
Substances and materials generally								√	V	V
Measurement: Length & Height									√	V

Table 2. Key domains referring to the theme of Food consumption observed in the UK Obesity Corpus compared with the Australian Obesity Corpus.

In the UK coverage, the semantic domain 'Measurement' was consistently key and primarily consisted of the terms 'calories', 'calorie', 'low-calorie' and 'calorific', which collectively accounted for 98.23% of occurrences of terms in this domain. The prevalence of this category indicates that the UK coverage consistently discussed food in terms of its calorie content. Although references to numbers occurred in various contexts, the counting of calories certainly contributed to the corresponding prevalence of the 'Numbers' semantic domain, which was also consistently key in the UK coverage. The following example demonstrates the numeration of calories and other measures in the data:

A 50g bar of chocolate contains 15g of fat and over 200 calories – a significant proportion of energy and fat. (*Guardian UK*, April 2008)

Relative frequency values indicate that references to 'Measurement' gradually increased in the UK coverage over time. The relative frequency of 333.77 wpm in 2008 was sufficient to be key in contrast to the occurrence of related terms in the Australian data (155.58 wpm) and this rose to 749.60 wpm in 2017. This is all the more significant given that there was an increase in number of texts and the raw frequency of terms in this category increased from 812 in 2008 to 3,638 in 2017. The increasing degree of difference between rates of the terms in this data and the Australian coverage is indicated in the effect size measure, with a Log Ratio value of 1.10 in 2008 and 1.66 in 2017.³ In short, readers of UK newspapers were presented with a higher number of occurrences of 'calories' and the focus on calories became increasingly characteristic of the UK coverage over the course of the period of study.

In terms of specific publications, the discussion of 'calories' was particularly favoured by the *Daily Star* (1510.17 wpm), occurring almost twice as frequently as the publication with the next most-frequent occurrences (*Daily Mail*, 886.18 wpm). A recurrent pattern in the *Daily Star* was to list different types of foods, their calorie content and the type and amount of exercise that would be required to 'burn' those calories. This presents food consumption as something to be undone, creating an equivalence between portions of food and exercise activities e.g., "NETBALL. Calories burned: 450 per hour. Same as: A large sausage roll" (*Daily Star*, July 2014). Furthermore, this emphasises individual responsibility, reducing the challenges of obesity to practices of balancing food intake and physical exercise, which is valued only in terms of how it relates to energy consumption. Comparable discussions of 'burning calories' were found in the Australian coverage, however this occurred with a much lower frequency.

Alongside the increase in mentions of 'calories', the initiating key domain 'Substances and materials generally' reflects discussions of the 'fat' and 'cholesterol' content of certain foods. These are often reported as occurring in 'high levels' and, as such, often co-occur with terms in the initiating key domain 'Measurement: Length & height'. Readers are advised to "Cut out the treats, as these can be very high in calories" (*Telegraph UK*, May 2016) and along with reports that explain that "cheese contains high levels of saturated fats" (*Daily Mail*, December 2017), we are also informed that "Overweight people are more likely to have high cholesterol" (*Daily Mail*, December 2017), linking individual food consumption with the health risk discourses to be discussed in Section 3.4.

3.2. Food production

While (individual) food consumption was shown to be characteristic of the UK coverage, in the Australian coverage there was more frequent consideration of the food industry, in terms of both contributing and responding to high rates of obesity across society. The key semantic domains related to the topic of the food industry are shown in Table 3.

Semantic domain	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Comand acman			0.0			0.0		0.0		

³ A Log ratio value of 1 indicates that the feature is twice as common in corpus A, compared with corpus B (Hardie, 2014).

Australian coverage	<u>.</u>							
Farming & horticulture		1	√	1	√	√	√	√
Business:				√	√ √			
Generally				,	,	,	,	,

Table 3. Key domains referring to the theme of Food production in the Australian Obesity Corpus compared with the UK Obesity Corpus.

The attention given to industry in the Australian coverage is reflected in the initiating key domain 'Business: generally'. Investigation of the most frequent terms, namely 'business' (17.71%) and 'company' (11.14%), highlighted some of the tensions between commercial interests and advances towards healthier living. The commercial drives behind dieting programs, bariatrics and 'pharma', for example, were often discussed as guiding actions in response to the challenges of obesity. Insurance 'companies' also featured in discussions that debated whether health interventions that target obesity should qualify for coverage. In terms of food production, references to the social responsibilities of 'food companies' specifically concerned the nutritional value of their food products and the selective distribution of advertising materials for their products. Policymakers were also implicated in these discussions, given their role in regulating – or otherwise – the practices behind food production.

The continuity between individual consumer choices and the food industry was reflected in the domain 'Farming & horticulture', specifically through references to 'dairy', which in the Australian coverage, constituted 9.00% of occurrences of terms in this domain. Readers were advised to be more discerning in their selection of dairy produce, for example:

The most important dietary change people with high cholesterol can make is to eliminate as much saturated fat from their diet as possible by always choosing low-fat dairy foods and the leanest cuts of meat.

(Courier Mail, May 2010)

Readers were discouraged from abandoning dairy altogether, however, given the importance of the dairy farming industry and the nutritional benefits of their produce:

Dairy Farmers products contain both A1 and A2 [proteins] (*Advertiser*, July 2014)

References to 'farmers' also highlighted the work and produce of small-scale 'farmers', specifically 'farmer's markets', which was cited as a healthy and sustainable option for consumers. In the UK coverage, there are likewise discussions of the value of reducing one's consumption of dairy products, counterarguments from representatives in the industry and concerns about the declining British dairy farming industry, though these are not as frequent.

The keyness of both 'Business: generally' and 'Farming & horticulture' in the Australian coverage reflects the concurrent (relative) decrease in the use of these terms in the UK coverage. The relative frequency of 'Business: generally' terms fell from 1,504.37 wpm in 2011 to 847.48 wpm in 2017 in the UK data. Similarly, the relative frequency of terms from the domain 'Farming & horticulture' in the UK data underwent a steady decline from 603.82 wpm in 2008 to 430.64 wpm in 2017. The raw frequency of 'Farming & horticulture' terms in the UK data

actually increased from 1,469 occurrences in 2008 to 2,090 in 2017 and so the relative decrease is the result of there being a greater amount of 'obesity' coverage. These findings indicate that the increase in UK coverage gives greater prominence to individual responsibility at the level of food consumption, which is evidenced in the increase in terms referring to calorie intake. This occurs in tandem with a shift away from the wider social context of obesity in the UK news.

3.3. Weight loss

Both the UK coverage and the Australian coverage discussed the potential benefits and processes of losing weight; however, the key semantic domains identified through the analysis, and shown in Table 4, reflect differences in the way that weight loss was contextualised within individual lifestyle behaviours and wider, social activities.

Semantic										
domain	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Australian coverag	<u>e</u>									
Information										
technology and	√	√	√	√	√	√	√	√	√	√
computing										
Money: Debts	√	√	√	√	√	√	√	√	√	√
UK coverage										
Measurement:						V	1	V	1	1
Area						\ \ \	V	\ \ \	V	\ \ \

Table 4. Key domains referring to the theme of Weight loss.

The semantic domain 'Measurement: Area' was characterised by the terms 'lose/losing' and 'weight', which account for 77.05% of occurrences of terms in this category in the UK coverage. The increase in relative frequency – from 563.54 wpm in 2008 to 1,028.59 in 2017 – of terms in this initiating key domain attests to a growing focus in the UK coverage on losing weight, consistent with our findings in relation to food consumption. Reference to 'loss' could also be categorised according to the semantic domain 'Money: Debts', which was a consistent key domain in the Australian coverage. Furthermore, Maci (2022) found that instances of 'loss', which when examined in context were found to refer to weight loss, could also be categorised as 'Ability: success and failure'.

We investigated the different semantic domains in which references to (weight) loss could be categorised, considering whether this reflected variations in how the topic was articulated in the news coverage. In addition to the key semantic domains, 'Measurement: Area' and 'Money: Debts', we also investigated the semantic domains 'Ability: Success & failure' and 'Location and direction', which were not identified as one of the consistent, initiating or terminating key domains, but did contain references to 'loss'. The distribution of forms of 'loss' across these semantic domains – prior to checking references to weight loss, specifically – is shown in Table

5. Significance tests were conducted to determine if the differences in the use of these individual terms was key, as shown in the final column.

	Australian Obesity Corpus (wpm)	UK Obesity Corpus (wpm)	Key
Money: Debts			
loss	5288 (323.320)	15625 (433.387)	√ (UK)
losses	231 (14.124)	354 (9.819)	√ (Aus)
Ability: Success & failure			
lost	3770 (230.506)	13344 (370.119)	√ (UK)
lose	2083 (127.359)	6441 (178.653)	√ (UK)
losing	996 (60.897)	3492 (96.857)	√ (UK)
loses	156 (9.538)	950 (26.350)	√ (UK)
Measurement: Area			
lose	2506 (153.222)	8963 (248.605)	√ (UK)
losing	609 (37.236)	2523 (69.980)	√ (UK)
loses	21 (1.284)	50 (1.387)	Not key
Location and direction			
lost	20 (1.223)	29 (0.804)	Not key
losing	7 (0.428)	2 (0.055)	Not key
lose	4 (0.245)	10 (0.277)	Not key
loses	2 (0.122)	1 (0.028)	Not key

Table 5. Occurrences of forms of 'lose/loss' according to semantic domain.

In the Australian coverage, 3692 (69.82%) of references to 'loss' captured in the domain 'Money: Debts' were directly pre-modified by 'weight'. In addition, weight loss was topicalised in references to measurements, as in 'a loss of 2kg'. Similarly, in the UK coverage, 11,967 (76.59%) instances of 'loss' were pre-modified by 'weight'. These results indicate that the sematic category largely captures references to weight loss when 'loss' is used as a singular or mass noun i.e. "[t]here is too much hype and not enough facts out there about weight loss and exercise" (*Advertiser*, January 2008). This form also appears as a premodifier e.g., 'weight loss surgery', 'a weight loss expert', 'the weight loss journey'. Australian reporters favoured references to 'weight loss' as a noun, compared with reports and guidance on 'losing weight' in the UK coverage.

By comparison, the domain 'Measurement: Area', which was an initiating key domain in the UK data, comprised formulations that involved the base form ('lose'), present participle form ('losing') or the '–s form' ('loses') of the verb 'lose' followed by 'weight', with an optional determiner i.e., 'lose (some) weight'. In the absence of references to 'weight', instances of the verb lemma {LOSE} – i.e., 'lose', losing', 'loses', 'lost' – were allocated to the domain 'Ability: Success & failure' and the formulation {LOSE} + [possessive pronoun] + way e.g., 'they lost their way', was allocated to the category 'Location and direction'.

Although 'Money: Debts' was a consistent key domain in the Australian data, Table 5 shows that 'loss/losing' terms generally occurred to a significantly higher degree in the UK data. This suggests that the semantic domain 'Money: Debts' was overrepresented in the Australian coverage on the basis of the relative frequency of other terms captured in this category. The term 'billion' accounted for 9.94% of occurrences of terms in this domain and more explicitly contextualised obesity in terms of annual national expenditure to Australians – though the actual number of billions of dollars was various. Monetary costs were cited in demonstrating the severity of the 'obesity epidemic' and reasons for developing drug treatments for obesity, for example, as well as a rationale for introducing a 'sugar tax':

We have the opportunity to hit these organisations where it hurts, and in the process save billions of dollars by reducing the devastating health impacts of their sugary drinks. (*Sydney Herald*, October 2016)

There were only 12 instances in which the term 'losses' collocated with 'weight' in the Australian coverage (compared with 38 (10.73%) co-occurrences of 'weight' and 'losses' in the UK data).⁴ Australian journalists more often referred to 'job' or 'productivity' losses and furthermore, such losses would not typically relate directly to the challenges of obesity exclusively, but rather refer to the broader navigation of the global financial crisis and the climate crisis. In this context, 'rising rates of obesity' was positioned alongside 'a price on carbon', 'land use conflicts' and 'manufacturing job losses' as factors in, for example, the development of Australia's National Food Plan.

The prevalence of the semantic domain 'Information technology and computing' directed us to discussions of organised activities designed to attend to various aspects of obesity in the Australian coverage, which was dominated by the terms 'program' (27.20%) and 'programs' (14.32%). For instance, alongside more general 'health' and 'exercise' programs, including those directed at 'children', there were references to 'weight loss/management', 'physical/outdoor education', 'fitness', 'healthy living/lifestyle' and 'school lunch/meal' programs – all discussed in relation to obesity. These programs reflect the efforts of organisations, including the government, to provide activities and guidance that support people in managing obesity, though there is still an onus on participants to enrol and engage with these various schemes.

The prevalence of the 'Information technology and computing' category, in comparison to the UK coverage, however, is also the result of differences in spelling conventions. Contributors to the Australian Obesity Corpus favoured 'program(s)' while those in the UK coverage overwhelmingly favoured 'programme(s)'. 'Programme(s)' was allocated to the domain 'Wanting; planning; choosing', alongside terms such as 'campaign', 'plan', 'policy' and 'strategy'. Despite the allocation to the domain 'Information technology and computing', occurrences of 'program(s)' in the Australian coverage were more consistent with terms in the category 'Wanting; planning; choosing'. As such, we compared the relative frequencies of 'program', 'programs', 'programme' and 'programmes' in each dataset and these are shown in Table 6, according to their allocation to either domain.

⁴ Within a collocational span of 3 tokens to the left and 3 tokens to the right of the node.

	Australian O Corpus	besity	UK Obesity	Corpus
	Frequency	RF	Frequency	RF
Information technology and computing				
program	6575	402.01	878	24.35
programs	3428	209.59	405	11.23
Wanting; planning; choosing				
programme	15	0.92	6024	167.09
programmes	10	0.61	2323	64.43
Total	10,028	613.13	9,630	267.11

Table 6. Occurrences of variations of 'program(mes)' according to semantic domain.

The results in Table 6 show that the USAS tends to allocate 'program(s)' to the domain 'Information technology and computing' and 'programme(s)' to the domain, 'Wanting; planning; choosing', in addition to demonstrating that contributors to each corpus tended to favour one over the other. Comparing the combined occurrences of these terms: references to 'program(mes)' were key in the Australian coverage, indicating a greater focus on the structured support available for responding to obesity at different levels. This focus was observed in references to individual weight loss regimens such as the 'Ultra Lite' program, government-funded initiatives for primary schools, such as the 'Eat Well Be Active' program, and a rehabilitation programme for Australian Defence Force personnel.

3.4. Risk discourses

The topic of obesity logically involves references to health and the body, as well as the study of its causes and effects in medical and social contexts. We characterise references of this kind, which were observed in both the Australian and UK coverage, as 'risk discourses'. In addition, this theme incorporates journalistic practices for legitimation, such as reporting figures and quantities.

Semantic domain	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Australian coverage										
Time: Period	√	√	√	√	√	√	√			
Quantities	√	√	√	√	√					
Time: Momentary	√	√	√	√	√					
Health and disease	√	√	√	√						

Work and employment:					V	V	V
Professionalism							
<u>UK coverage</u>							
Health and disease			√	√	√	√	√
Affect: Cause/Connected				√	√	√	√
Knowledge					√	√	√
Safety/Danger						√	√
Measurement: Length & Height						√	√

Table 7. Key domains referring to the theme of Risk discourses.

The impacts of obesity on health and its relationship with other health concerns were largely captured in the semantic domain 'Health and disease', which comprised terms such as 'health', 'healthy', 'disease', 'diabetes', 'cancer', 'heart' etc. In both the Australian and UK coverage, obesity was discussed in terms of its damaging effects, that exacerbated or were exacerbated by the co-occurrence of health conditions. This carried the implication that obesity itself was not considered to be sufficiently concerning in itself but rather that its most damaging characteristic is that it is a risk factor for other health issues.

The results shown in Table 7 indicate a swing from the domain 'Health and disease' being a key category in the Australian coverage to becoming more characteristic of the UK data. Indeed, in the Australian coverage the relative frequency of terms in this category increased from 11,301.95 wpm in 2008 to 13,264.34 wpm in 2017. However, this ceased to be a key domain in the Australian coverage because the rate of increase in relative frequency in the UK data was even higher, rising from 9,001.83 wpm in 2008 to 17,176.58 wpm in 2017.

We observed a similar pattern for terms in the category 'Quantities', which increased over time in the Australian coverage but rose even more rapidly in the UK coverage. The category 'Quantities' was characterised by the term 'per cent', which accounted for 14.72% of occurrences of terms in this domain in the Australian coverage (compared with 10.60% in the UK data). The term co-occurred with numerical values, as well as 'than', 'children', 'women', 'adults', 'more', 'people' and 'Australians', indicating that 'per cent' was used to establish comparative rates of obesity and other health concerns between particular groups of people. For example:

More than half – 56.8 per cent – of the males in the survey were overweight or obese, compared to 41.0 per cent of females. The proportion of overweight and obese persons ranged from a high of 56.1 per cent in the Gippsland region to a low of 45.8 per cent in the Southern Metropolitan region (*Age*, February 2009)

The specification of age ranges also contributed to the shifting prominence of terms in the categories 'Time: Period' and 'Time: Momentary'. The terms 'year' and 'years' were allocated to the category 'Time: Period' and appeared in descriptions of age groups, as well as describing rates, which were reported according to various timeframes e.g., "we spend nearly an hour less a week exercising than we did in 1997" (*Advertiser*, February 2008). Terms in the category

'Time: Momentary' likewise described cohorts of people; the most frequent term in this category was 'to' (14.10%), as it appeared in formulations such as "those aged 55 to 64".

In other instances, a similar formulation was used to specify a time period (e.g., "From 1998-99 to 2007-08") in which rates of obesity were studied and reported, or lifestyle behaviours that were discussed as risk factors, such as "women who drank four to seven cups of coffee a day" (*Herald Sun*, October 2008). A gradual decrease in the relative frequency of terms belonging to these categories in the Australian coverage, coupled with a rise in their relative frequency in the UK data meant that with regard to the discussion of these 'time' domains, the datasets converged. This accounts for their terminating key status in the Australian coverage.

The relationship between certain risk factors and obesity, as well as obesity and other health concerns, was most explicitly demonstrated through terms in the category 'Affect: Cause/Connected', which along with the domain 'Safety/Danger' was an initiating key domain in the UK coverage. The category 'Affect: Cause/Connected' comprised the terms, 'why', 'cause', 'linked', 'results', 'effect' and 'lead' and the use of these terms pointed to reports of a "genetic link to obesity" (*Sun*, November 2011), or how the use of artificial sweeteners "can lead to greater body weight gain" (*Guardian UK*, February 2008), for example. The category 'Safety/Danger' included terms such as '(at) risk', 'risks', 'dangerous', 'safe' etc., that often occurred in combination with 'Health and Disease' terms (i.e., specifying the health risk) and those in 'Quantities' (indicating the degree of risk). These patterns accord with those observed by Brookes and Baker (2022).

The occurrence of terms in the category 'Safety/Danger' remained relatively stable in the Australian coverage and a rise in relative frequency, from 1,722.27 wpm in 2008 to 2,932.68 in 2017, accounts for its emergence as an initiating key domain in the UK coverage. Used alongside terms denoting 'Health and disease' and 'Quantities', we observed an increasing focus in the UK coverage on rates of obesity and risk factors for other health concerns, such as diabetes, cancer and heart disease.

The degree of risk was also indicated in the growing prominence of the semantic domain 'Measurement: Length & height' in the UK data. References to 'levels' are discussed in relation to saturated fats and cholesterol as part of our consideration of food consumption (see section 3.1.); the coverage also included references to '(increased) obesity levels', the occurrence of higher 'levels of disease' in particular populations and behaviours such as drinking alcohol at 'risky levels' to account for different risk factors.

3.5. Place

Our analysis highlighted a number of domains that were consistently key for the Australian coverage and which indicated a more focused discussion of places. Such references functioned to contextualise the details being discussed at a local, national, or global level for example, thereby situating concerns about obesity alongside other social factors. References to places were most explicitly indicated in the consistent key semantic domains, 'Geographical names', 'Geographical terms' and 'Places'.

Semantic domain	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Australian coverage										
Arts and crafts	√	√	√	√	√	√	√	√	√	√
Geographical names	√	√	√	√	√	√	√	√	√	√
Geographical terms	V	√	√	√	√	√	√	√	√	√
Groups and affiliation	V	√	√	√	√	√	√	√	√	√
Places	√	√	√	√	√	√	√	√	√	√
Vehicles and transport on land	√	√	√	√	√	√	√	√	√	√

Table 8. Key domains relating to the theme of Place in the Australian Obesity Corpus compared with the UK Obesity Corpus.

References to place can be used to attend to the news value of Proximity (Bednarek and Caple, 2017) as the events described are made relevant through their locality. The most frequent terms in the domain 'Geographical names', as they appear in the Australian coverage, included 'Australian', 'Australians', 'Melbourne', 'Sydney' and 'Queensland', explicitly marking the relevance of the content to an Australian readership. However, among the top 25 most-frequent terms in the Australian corpus, we also found 'America', 'American', 'Britain', 'British', 'London', 'French' and 'New Zealand', demonstrating interest in wider global events (albeit, focusing on the Anglosphere or the cultural West).

In the UK coverage, we similarly found references to 'America', 'American', 'Europe', 'French', 'France', 'Australia', 'China' and 'Chinese' in this domain, alongside the terms, 'UK', 'Britain', 'British', 'London', 'England', 'Scotland', 'Britons', 'Scottish' and 'Wales'. However, the keyness of the category 'Geographical names' in the Australian coverage demonstrates that these occur less frequently in UK news articles in obesity. Indeed, the relative frequency of terms in both the domains, 'Geographical names' and 'Geographical terms' steadily decreased in the UK coverage, with a particularly marked decline in the rates of 'Geographical terms' from 1,359.73 wpm in 2008 to 898.37 wpm in 2017. The two most frequent terms in this category were 'global' (10.76%) and 'worldwide' (4.60%), suggesting that the UK coverage became less outwardly focused over the study period. In any case, the discussion of places, both domestic and international, was more characteristic of the Australian coverage.

The consistent key semantic domain in the Australian coverage, 'Groups and affiliation', delineated communities and organisations at various levels through the most frequent constituent terms, 'community', 'public', 'group', 'federal', 'team', 'society', 'association' etc. These terms frequently co-occurred with the term 'health' and concordance lines showed that the Australian coverage of obesity more generally discussed the activities of 'community health centres', the governance of Australia's 'Public Health Association' and guidance administered by experts from the 'World Health Organisation'. While there was reference to organisations concerned specifically with the issue of obesity, such as the Obesity Policy Coalition, the challenges of obesity were often discussed within a broader health context and the coalition itself is a partnership between Cancer Council Victoria, Diabetes Victoria, VicHealth and the Global Obesity Centre at Deakin University. This was also shown in references to the 'public', which appeared as part of discussions of the 'public healthcare/hospital' and 'public education' systems.

With respect to terms in the consistent key domain 'Places', the designation of areas relates to administrative ('national', 'international', 'countries', 'territory') and cultural boundaries ('urban', 'Indigenous', 'foreign'). These descriptors are fundamentally relative and terms in the category 'Places' referred to various health initiatives at the 'national', 'local' and even 'international' level, contextualising, for example, rates of obesity among 'local' communities against the 'national' average and thereby contributing to the news value of Superlativeness (Bednarek and Caple, 2017). These terms could also point to tensions in administration, as the state government was reported to "offload on to local government" (*Advertiser*, January 2008), for example.

These contrasts extended to the cultural delineation of places, as reporters discussed 'local', 'Indigenous' and 'rural' provisions in comparison with 'city' and 'urban' services, highlighting health inequalities and uneven distribution of resources that relate to nutrition and lifestyle activities. Examples of how such inequalities were detailed include reports of: disproportionately high rates of infant mortality among Aboriginal communities; variation in the focus in local schools on physical education and after-school programs; and recruitment drives in local areas to national-level clinical studies of weight-loss treatments.

Through the consistent key category 'Vehicles and transport on land', we get some insights into how governance in Australia has an impact on the lives of members of those communities. For instance, references to '(public) transport policies' contribute to discussions of how infrastructure facilitates healthy lifestyles. The challenges of obesity are, again, incorporated into wider conversations about public health and sustainability, as references to 'cars' point to how time spent driving not only contributes to sedentary lifestyles but also to greenhouse gas emissions. More specific to the issue of obesity were references to the 'traffic light labelling' system that places the onus on food manufacturers to provide clear nutritional guidance on their packaging. Mentions of this system in the Australian coverage ceased after 2011 however, prior to which various political representatives had been 'proposing', 'lobbying for/against' and ultimately, debated the system as just one of the proposed measures for supporting consumers in making healthy choices.

Finally, in the consistent key semantic domain 'Arts and crafts', references to various 'cultures' indexed certain lifestyle behaviours and thereby, individual actions – albeit presented as community norms – that were discussed as part of the challenge of obesity. For example, references to 'food culture' reflect views that in comparison with other nations, Australia does not have a strong cultural history with food and is therefore susceptible to the influences of e.g., French, American and Japanese traditions. Conversely, Australia is cited as having a strong '(binge) drinking culture' (*Age*, March 2008), which is criticised for its negative effects on health and society, generally. Thus, in addition to reporting on events taking place in places beyond Australia, the coverage also appears to take a critical look at the effects of different food cultures around the world and how they contribute to the issue of obesity.

3.6. Health inequalities

We observed in the previous section how the designation of places can facilitate comparisons that provide context for evaluating rates of obesity but also highlight environmental factors that

can influence community members' engagement with healthy lifestyle activities. The analysis highlighted additional categories that captured concerns for health inequalities, as indicated in Table 9.

Semantic domain	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Australian coverag	<u>je</u>									
Farming &				J	V	V	V	V	V	٦/
horticulture				\ \ \	\ \ \	\ \ \	\ \ \	\ \ \	\ \ \	\ \ \
General ethics						√	√	√	√	√
Ability: Ability,								V	V	٦/
intelligence								V	\ \ \	V

Table 9. Key domains relating to the theme of Health inequalities in the Australian Obesity Corpus compared with the UK Obesity Corpus.

Returning to the key domain, 'Farming & horticulture', the third-most frequent term in the Australian coverage belonging to this category was 'rural' (after 'field' and 'dairy'), which frequently co-occurred with the terms 'areas', 'remote', 'regional', 'health', 'communities', 'people' etc. In discussions of the rates and impacts of obesity, living in 'rural areas' was a trait that was positioned alongside other sociodemographic factors used to define groups of people e.g.: "some population groups, such as indigenous people, people of lower socioeconomic status, living in rural and remote areas, and the disabled, fare worse than others" (*Canberra Times*, June 2010). References to reduced healthcare services and limited access to high-nutrition food were cited as determinants of why such groups were disproportionately affected by obesity.

Relatedly, the most frequent term in the initiating key semantic domain 'Ability: Ability, intelligence' was 'able (to)' (16.80%), which frequently co-occurred with 'not' as journalists discussed how "disadvantaged children's parents would not be able to afford organised sport" (*Advertiser*, May 2013), how many "were not able to access timely, professional [health] support" (*Age*, September 2008), and surgical interventions for those "who had not been able to lose weight through other means" (*Canberra Times*, December 2012). While these challenges were presented in terms of the affected individuals' 'ability', our investigation of concordance lines demonstrated that social infrastructure and cultural ideologies were the target of scrutiny. Indeed, 'should' also frequently co-occurred with 'able' in the Australian coverage and highlighted where different commentators saw solutions for navigating the challenges of obesity, which implicated social actors at different levels of society e.g.:

People should be able to make an informed choice (*Courier Mail*, January 2016)

doctors should be able to write a prescription for exercise (*Age*, December 2008)

"local councils should be able to limit the density [of fast food restaurants in an area]", Professor Swinburn said. (Herald Sun, April 2008).

Such solutions variously foregrounded individual lifestyle behaviours, but largely included some discussion of how the built environment shaped those behaviours and thus, why the need for support was more urgent in some areas, compared with others.

The most frequent term in the category 'General ethics' was 'fair' (6.07%) and alongside other related terms such as 'moral', 'ethical' and 'principles', references to 'fair', in part, extended discussions of addressing the disproportionate impacts of obesity. However, more often, the discussion of what is 'fair' extended to broader health and social concerns, such as reflecting on the rights of migrants, higher tax rates, journalistic balance, and performance-enhancing drugs in sport. Nevertheless, references to 'fair' demonstrate how challenges of obesity intersect with such issues; for instance, the 'Fair Work Commission' is cited in a high-profile case of the dismissal of a fork-lift operative, prompting a discussion about whether work safety protocols deal appropriately with obesity (e.g., *Sydney Herald*, December 2015). The Fair Go campaign explicitly addressed the issue of seeking investment in Tasmanian public services to address health and education inequalities. As such, responses to the challenges of obesity are shown to be intertwined with more extensive social issues in the Australian coverage.

We have discussed health inequalities as observed in the use of terms in what were identified as initiating key categories in the Australian coverage: 'Farming & horticulture', 'Ability: Ability, intelligence' and 'General ethics'. The occurrence of equivalent terms in the UK data similarly discussed 'rural' areas in contrast with cities and highlighted how such areas might be 'underserved' by grocery stores, transport and healthcare, as well as what various social actors are 'not able' or 'should be able' to do, given the appropriate support. As we indicated in section 3.2., the emergent keyness of 'Farming & horticulture' terms in the Australian coverage was actually the result of a decrease of these terms in the UK coverage and a similar pattern was observed for terms in the categories 'Ability: Ability, intelligence' and 'General ethics'. However, as we have seen with terms in the categories 'Farming & horticulture', the raw frequency of 'Ability: Ability, intelligence' terms and 'General ethics' terms increased, demonstrating that greater coverage of, for example, calorie consumption, potentially overshadowed discussions of 'fairness' in response to the disproportionate impacts of obesity based on aspects of social infrastructure.

Discussion

Our exploration of statistically salient themes in the news coverage of Australia and the UK has highlighted a contrast in the degree to which issues associated with obesity are framed in relation to individual experience and as a social problem. In the Australian coverage, there was a more consistent focus on the challenges of obesity at the societal level, which was reflected in frequent references to places and industry practices, for example. In contrast, the UK coverage was characterised by a focus on individual weight loss, instantiated by the practice of counting calories, which was shown to occur with increasing frequency over the time period studied. Readers of UK news coverage were also confronted with prominent discussion of the health

risks associated with obesity, highlighting the individual costs but also demonstrating a framing of obesity as an economic burden (Atanasova and Koteyko, 2017), which combined with individual responsibility rhetoric contributes to weight stigma (Bednarek et al., 2023).

In the Australian coverage, individual agency was recognised as consumer choice, with readers encouraged to make choices that both minimised the fat content of their food consumption and contributed to a more sustainable food industry. This representation contributed to a more consistent positioning of the individual within their social environment, which was also discussed in 'obesogenic' terms (Baker et al. 2020; Bonfiglioli, 2007) as journalists referred to various program(me)s available and critically considered the uneven distribution of resources such as public transport systems that has contributed to health inequalities. Such resources were also discussed in terms of different levels of governance (i.e., local, national, international). Thus, while the UK coverage focused on costs in terms of individual health risks, the Australian coverage included greater consideration for the societal costs, disproportionately to marginalised groups and economically to the local and national community.

The study shows the benefit of comparing news texts from different cultural contexts as a way of helping to identify representations, frames or discourses around a topic that may have become so naturalised that they appear to be unremarkable, especially to researchers who are working with texts from their own culture. The narrower focus on individual responsibility for obesity in the UK context is potentially concerning as it is likely to increase stigma around people with obesity and it offers a reduced set of effective responses to the issue. News representations have the power to influence both individuals and government policy. In the UK, at least, understandings of obesity, as with many topics, appear to be shaped by those who have control of printing presses and limited accountability.

Our application of the USAS has shown that in some cases, there were terms that were collated within a given semantic category that attended to different themes in our exploration of obesity. For instance, the category 'Farming & horticulture' was relevant both to the discussion of food production and to health inequalities. In other instances, the labelling of the category did not quite fit with our reading of the use of the term, and we have discussed how 'loss' was variously categorised. Rayson (2008, p. 528) readily acknowledges that the coarse-grained nature of the system "may not match those required in specific studies" and considers the quantification of the tagging procedure to be only a part of an analysis that warrants manual assessment of concordances and distribution, as well as checks for mis-tags. This introduces a level of subjectivity in thematising the results and our interpretations were informed by close reading and reviewing concordance lines. Broadly, the 'coarse-grained' categories of the USAS were refined enough to direct our attention to prominent themes in the data, including those that grew or receded in significance. Furthermore, the distinctions made by the USAS in classifying 'loss' helped to highlight nuanced differences in the tendency to refer to 'weight loss' or 'losing weight'.

We were not able to account for every key category that was generated from our comparison and among what remains, there are demonstrations of the rhetorical strategies used by journalists to foreground particular positions and aspects of the debate. For instance, in the UK coverage, frequent references to scientific knowledge and the study of obesity were reflected in

the initiating key domain, 'Knowledge'. This tended to accompany advice discussed in relation to risk discourses (see section 3.4.) and food consumption (section 3.1.) and the attribution of instructive content to high-status sources is a long-established practice for creating legitimation (Conrad, 1999). Furthermore, we only minimally discussed the distribution of prevalent terms according to different publications and there is further work to be done in aligning the different representations of the debate around the challenges of obesity to the editorial perspectives of the constituent publications, in addition to how much content each newspaper contributes to the discussion.

Nevertheless, we have offered a large-scale comparison of the news coverage in Australia and UK to monitor discussions of obesity over ten years and thereby identify shifts in which aspects have risen or diminished in prominence. Although Swinburn and Wood (2013) have been critical of the extent of policy change in Australia that addresses the challenges of obesity, the news coverage does at least encourage a societal framing of the issue. The media coverage does appear to reflect, to some degree, the population health approach endorsed by the Australian Institute of Health and Welfare (2017). In the UK, readers are presented with increasing coverage of obesity but with a narrowing focus, offering representations that stress individual responsibility and risk. These findings accord with those of Brookes and Baker (2021) and demonstrate the contribution of the UK media coverage, at least leading up to 2017, to stigmatising discourses around those with obesity.

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