
Professor Robert Clark AO

Chair, Energy Strategy and Policy
The University of New South Wales
Former Chief Defence Scientist of Australia and
CEO Defence Science and Technology Organisation

26 June 2014

Professor Jill Trehwella
Deputy Vice-Chancellor (Research)
Level 6, Room 646
G02 Jane Foss Russell Building
The University of Sydney NSW 2006

**INITIAL INQUIRY REPORT: COMPLAINT BY MR RORY ROBERTSON AGAINST
PROFESSOR JENNIE BRAND-MILLER AND DR ALAN BARCLAY**

1. INTRODUCTION

I was nominated by the Deputy Vice-Chancellor (Research) at the University of Sydney to conduct an initial inquiry into a complaint by Mr Rory Robertson ('the Complainant') against Professor Jennie Brand-Miller and Dr Alan Barclay. In accordance with clause 23 of the University of Sydney *Research Code of Conduct* 2013, the purpose of the initial inquiry is to determine how to respond to the complaint.

This report is a written record of my Inquiry.

2. BACKGROUND

Professor Brand-Miller holds a Personal Chair in the School of Molecular Bioscience and the Boden Institute of Obesity, Nutrition, Exercise & Eating Disorders at the University of Sydney. She is a past-President of the Nutrition Society of Australia, immediate-past Chair of the National Committee for Nutrition of the Australian Academy of Science, and President of the Glycemic Index Foundation Ltd.

Dr Barclay is the Chief Scientific Officer at the Glycemic Index Foundation Ltd, and part-time Head of Research at the Australian Diabetes Council.

The Complainant is a member of the public and economist. He has publicly expressed interest in issues related to sugar consumption.

On 20 April 2011, the online journal *Nutrients*, published a paper titled '*The Australian Paradox: A Substantial Decline in Sugars Intake over the Same Timeframe that Overweight and Obesity Have Increased*', Alan W. Barclay and Jennie Brand-Miller ('**the Australian Paradox paper**') (**Attachment 1**).

On 30 March 2012, *Nutrients* published a second paper (in its Correspondence section), titled '*The Australian Paradox Revisited*', Jennie Brand-Miller and Alan W. Barclay ('**the Australian Paradox Revisited**') (**Attachment 2**).

3. ALLEGATIONS AGAINST PROFESSOR BRAND-MILLER AND DR BARCLAY

The Complainant alleges that:

1. In the Australian Paradox paper, which impacts the public health debate on the origins of obesity, the statement that "This analysis of apparent consumption, national dietary surveys and food industry data indicates a consistent and substantial decline in total refined or added sugar consumption by Australians over the past 30 years" is false. The Complainant alleges that there is evidence of an increase rather than a decline.
2. In the Australian Paradox paper, the statement that "Food industry data indicate that per capita sales of low calorie (non-nutritively sweetened) beverages doubled from 1994 to 2006 while nutritionally sweetened beverages decreased by 10%." is incorrect. The Complainant alleges that, according to the data presented in the paper, there was actually an increase of 30% in the per capita sales of nutritively sweetened beverages.
3. In the Australian Paradox paper, Professor Brand-Miller and Dr Barclay have acted with intent to make sugar appear healthier or less of a threat than it is, have included falsified data, and have not taken sufficient action to verify that the data they have used is correct or accurate.
4. The Australian Paradox paper contains technical errors as follows:
 - a. An inconsistency is evident in the paper with regard to the statements "The prevalence of obesity has increased 3 fold in Australians since 1980" (p491) and "prevalence of obesity (increasing by ~300%)" (p502). The complainant points out that a 3 fold increase is 200% (not 300%).

- _____
- b. An incorrect calculation has been included in the paper with regard to the statement "Overall there was a decrease in sugar contribution from nutritively (sugar) sweetened carbonated soft drinks to the Australian food supply amounting to 12,402 tons (approx. 600 g per person per year, Figure 6) from 2002 to 2006". The Complainant alleges that, according to the data presented, the decrease is 150 g per person per year.
 5. Professor Brand-Miller and Dr Barclay, in subsequent publications, were wrong to defend the Australian Paradox paper against criticism. Professor Brand-Miller and Dr Barclay have shown recklessness and intent in failing to correct their paper when concerns were raised, have caused harm or risk to public health and have gained personally through their conduct.
 6. Co-author [REDACTED] name was removed from the authorship of the Australian Paradox paper, and Professor Brand-Miller's name was added (because of her influence). The Complainant notes also that the paper was based on a Master's student project [REDACTED] [REDACTED]
 7. Professor Brand-Miller and Dr Barclay have a relationship with the sugar industry, which creates a real or perceived conflict of interest. The Complainant implies that this conflict of interest has not been appropriately managed, and has resulted in Professor Brand-Miller and Dr Barclay deliberately including incorrect information (that benefits the sugar industry) in the Australian Paradox paper.

4. INQUIRY FINDINGS AND RECOMMENDATIONS

Taking into account all of the evidence, I find that a prima facie case of a breach of the University of Sydney *Research Code of Conduct* ('**Research Code of Conduct**') and the *Australian Code for the Responsible Conduct of Research* ('**Australian Code of Conduct**') has not been established.

I also find that a prima facie case of research misconduct as defined in the Research Code of Conduct and the Australian Code of Conduct has not been established.

In accordance with paragraph 23(8)(a) of the Research Code of Conduct, I recommend, on balance, that the University dismiss the allegations against Professor Brand-Miller and Dr Barclay.

I have, however, identified a number of 'lessons learnt' from this case and I recommend that these be considered by the University and discussed with Professor Brand-Miller and Dr Barclay at Faculty level. In particular, I recommend that the University consider requiring Professor Brand-Miller and Dr Barclay to prepare a paper for publication, in consultation with the Faculty, that specifically addresses and clarifies the key factual issues examined in this Inquiry. This new paper should be written in a constructive manner that respects issues relating to the data in the Australian Paradox paper raised by the Complainant.

5. SCOPE OF INQUIRY

The scope of the initial inquiry is defined by clause 23 of the University of Sydney *Research Code of Conduct* 2013, which states:

- (1) Upon receipt of an allegation and after collection of all relevant materials, the Director of Research Integrity will designate one of the following to conduct an initial inquiry into the allegation:
 - (a) the Pro Vice-Chancellor (Academic Affairs);
 - (b) the Director, Research Development;
 - (c) the Deputy Vice-Chancellor (Education);
 - (d) the Provost; or
 - (e) in exceptional circumstances, another appropriate person nominated in writing by the DVC(R).
- (2) The purpose of the initial inquiry is to determine how to respond to the allegation.
- (3) As far as possible, all affected persons will be afforded confidentiality.
- (4) The initial inquiry may include interviewing the people involved, inspecting research facilities or records or examining relevant documents.
- (5) The Director of Research Integrity may obtain appropriate expertise from within or outside the University to assist in the initial inquiry, provided that appropriate precautions are taken to ensure that no real or perceived conflict of interests exists.
- (6) The initial inquiry must be conducted as expeditiously as possible.
- (7) At the conclusion of the initial inquiry, the designated person will provide the DVC(R) with a report which:
 - (a) states whether or not a prima facie case has been established; and
 - (b) recommends how the matter should proceed.
- (8) The options for proceeding available to a designated person in making a recommendation under subclause (7) are:
 - (a) dismissing the allegation(s);
 - (b) instructing the relevant faculty or department on how to deal with the allegations, and referring the matter back to that faculty or department;
 - (c) initiating a research misconduct investigation; or

- _____
- (d) referring the matter elsewhere in the University (for example, Audit and Risk Management, Human Resources or the Privacy Officer) to be dealt with under other relevant provisions.

6. ANALYSIS OF THE EVIDENCE AND PRELIMINARY FINDINGS OF FACT

The allegations against Professor Brand-Miller and Dr Barclay are a summary of numerous issues raised in multiple documents by the Complainant. In this Inquiry I have focussed on allegations linked to published papers, in particular the Australian Paradox paper central to the complaint. Rather than deal narrowly with each allegation in turn in a piecemeal manner, I was concerned to look at the case holistically from an objective basis to get to the core of the matter. I have therefore approached this with a level of independence from the specificity of the allegations.

I have sought independent factual advice from the Australian Bureau of Statistics, Canberra. I have also had the benefit of more general comment from an independent subject matter expert, _____, organised at my request by the University of Sydney. This permitted me to check my understanding of various scientific details. It should be noted that _____ was independently chosen by the Director of Research Integrity and Ethics Administration at the University of Sydney, following her identification of a number of subject matter experts and consideration of any real or perceived conflicts of interest.

Additionally I have sought and received material from Professor Brand-Miller and Dr Barclay that I thought to be of relevance after reading the initial file, including their written clarification on points of factual detail post-interview (**Attachment 3**). The Complainant was given and accepted the invitation to check the completeness of material from which the summary of allegations was assembled by the University of Sydney, and to submit additional material clarifying his allegations (**Attachment 4**).

Having read the large volume of paperwork concerning this case, and separately interviewed Professor Brand-Miller, Dr Barclay _____ to my mind the inquiry breaks down into three core pillars of examination: firstly the scientific integrity of the data, data analysis and interpretation within the Australian Paradox paper and related publications (broadly speaking the '*content*' of the paper); secondly issues surrounding *authorship* of the Australian Paradox paper (particularly the unusual absence from the authorship of Masters student _____

who conducted the basic research); and thirdly *conflict of interest* issues in relation to the authors (in particular their industry associations).

Each of these three pillars are first dealt with below, and my preliminary factual findings are then mapped to the specific allegations. My complete file of the substantial body of written material examined, including email exchanges and notes of interview, has been lodged with the University of Sydney.

6.1 CONTENT

6.1.1 DATA AND DATA ANALYSIS

The Australian Paradox paper: FAO Apparent Consumption of Sugar Data 1980-2003 (kg/capita/yr) 'consistent and substantial decline' [Figure 2]

Australian Bureau of Statistics data: ABS Apparent Consumption of Sugar Data 1975-1999 (kg/capita/yr)

At the centre of the debate is whether or not, in Australia, there has been a consistent and substantial decline in sugar intake over the same timeframe that obesity has increased. The authors of the Australian Paradox (AP) paper arrived at the conclusion that there has been a decline in sugar intake from three lines of evidence: apparent consumption of sugar data from the UN Food and Agricultural Organisation (FAO) representing the averaged total sugar intake per capita per year; sweetened beverage consumption data from national sales figures; and national nutrition survey data. It is the authors' evaluation of the first two of these three data sets in particular that has been challenged. The data for obesity trends over time in Australia, from a variety of sources listed in AP Section 2.2, showing increasing obesity for both adults (AP Figure 1a, 1980 – 2007/8) and children (AP Figure 1b, 1985-2004), has not be questioned.

Apparent consumption of sugar data for Australia, from the UN Food and Agricultural Organisation (FAO) - Figure 2 of the Australian Paradox paper, is perhaps the most important of the three and shows an overall decline from 1980-1999 with a small rise on this falling background from 1999-2003. It is important to understand this data, in particular whether or not it captures the full spectrum of sugar intake and any limitations there might be.

A paper by Rikkers et al, 'Trends in sugar supply and consumption in Australia: is there an Australian Paradox?' makes the claim that it doesn't, stating: '*The Australian Paradox assertion*

is based on incomplete data, as it excludes sugar contained in imported processed foods, which have increased markedly.'

The Rikkers et al paper also states: *'We contacted senior methodologists at the FAO head office and confirmed that when calculating per capita sugar consumption, the FAO does not include imported, highly processed foods and beverages which contain added sugar.'*

However, Professor Brand-Miller and Dr Barclay state the opposite in Attachment 3, namely: *'Most importantly, recent correspondence with FAOStat personnel (25 Feb 2014) has confirmed directly that FAOStat Apparent Consumption data series for added sugars in Australia reports intake of primary and processed sugar products ie from refined sucrose (and other nutritive sweeteners) and manufactured goods containing sucrose (and other nutritive sweeteners) in both imports and exports.'*

The FAO data closely match (but are not identical to) similar data produced by the Australian Bureau of Statistics (ABS) for the period 1980-1999 – which is not surprising given that the FAO would have used ABS data collections in their assessment. The ABS has provided its data to me directly, and has clarified details of its methodology (**Attachment 5**), which includes both refined sugar and manufactured goods containing sugar available for domestic consumption. A steady decline (from around 55 kg/capita/yr in 1980) of approximately 10 kg/capita/yr over this nearly 20 year period is evident. I asked the ABS directly for their view on what the data are telling us about the trend in per capita consumption of sugar in the period 1980 to 1998-99. They responded: *'The ABS Apparent Consumption of Foodstuffs data for the period 1980 to 1998-9 show an overall slight decline in the per capita consumption of sugar'.*

Importantly, the ABS methodology includes sugars contained in highly processed foods, including the factoring in of imports and exports of manufactured goods containing sugar in addition to domestic sugar deliveries to manufacturers – as is the case for the refined sugar component calculation. In short, the data methodology is designed to capture the full spectrum of sugar intake.

On this basis it appears that the core assertion of the Rikkers et al paper is incorrect in relation to Australia. The possibility that it might be correct for other nations is acknowledged by the authors in their response to the Inquiry, in which they state: *'but may well be true of less developed nations'.*

However, in response to my question as to why the ABS ceased collecting this data in 2000, the ABS cite two important caveats related to the limitations of the data.

Firstly, *'The decision to discontinue the publication Apparent Consumption of Foodstuffs was taken in 2000 by the ABS after an internal methodological review. The unpublished review concluded that the methodology for estimating virtually all foodstuffs in the collection needed updating. Improvements to the methodology for sugar, like most other foodstuffs, were recommended. At the time, the ABS was unable to secure public funding to update the methodology for the entire collection and continue to publish data about apparent foodstuffs. The decision was therefore taken to discontinue publication.'*

Secondly, *'While (these) highly processed foods were included in the calculations, it must be noted that the factors had not been updated to account for changing consumption patterns or changes in production.'*

In summary: AP Figure 2 data are assembled via a total sugar consumption methodology that includes manufactured goods and allows for imports and exports, and the data *do* exhibit a steady decline over the period 1980-1999, but the data were not collected by ABS beyond this point due to an unfunded need to update the methodology to account for changing consumption and production factors that were not captured (and which could presumably affect the accuracy of data points in years approaching this cessation point).

At interview it appeared that the Australian Paradox authors weren't sure about the detailed methodology underpinning the FAO data in Figure 2, and had 'assumed' that it accounted for total sugar intake from their earlier research leading up to publication. I indicated that we both needed to check the facts. In their subsequent confidential written response to the Inquiry they provide a convergence with the above summary on total sugar intake methodology, but cite that they were informed *'ABS data collection ceased in 2000 due to resource issues, not lack of reliable data'*. As discussed above, from my email exchange with ABS, I believe the ABS data collection ceased due to lack of resources to address an emerging data reliability issue.

Nevertheless, on balance it would appear that it was reasonable to discuss a nationally-averaged per capita decline in total sugar intake in Australia from the FAO data shown in Figure 2.

There is however an interesting observation with regard to key messages drawn from this, raised by [REDACTED], which goes some way to understanding the two sides of the debate

– namely that whilst the national trend is in decline, this may not at all reflect what is happening in certain demographics – such as specific socio-economic and indigenous sectors of the population. In simple terms, whilst the averaged total sugar intake is falling, in certain population groups it may well be rising and contributing to obesity. In other population groups where total sugar intake is falling, a rise in obesity may be due to factors such as displacement of bad habits in relation to sugar across to other foods and lifestyle issues such as reduced physical activity. The Australian Paradox paper discusses the latter, but only lightly touches on the former, and it is interesting to note that under the Complainant's Strathburn Cattle Station address there is a statement '*Strathburn Cattle Station is a proud partner of YALARI, Australia's leading provider of quality boarding-school educations for Aboriginal and Torres Strait Islander teenagers*'. Whilst I have no knowledge of the Complainant's work with the indigenous community, this might be a factor in his response to the paper and his genuine interest in this subject.

The Australian Paradox paper: FAO Apparent Consumption of Sugar Data 2000-2003
[Figure 2]

The Complainant draws specific attention to FAO data points shown in the Australian Paradox paper Figure 2 for the years 2000-2003, beyond the time at which the ABS ceased to publish apparent consumption of sugar data. This is the so-called 'flat line' data, also described as 'falsified' and 'erroneous' data by the Complainant; the implication being that the FAO simply re-issued the 1999 figure for these years in the absence of new ABS data, and that Professor Brand-Miller and Dr Barclay should have realised and checked this issue as part of their due-diligence.

I referred this issue to the ABS for comment, but was informed that its employees are only able to comment on ABS data (which is reasonable).

In Attachment 3, the authors state: '*FAOStat have continued to publish data for Australia and other nations beyond 1998-9. Their sources both before and after 1999 include ABS, the International Sugar Organisation, and Australia's trading partners. The FAOStat methodology accounts for stocks, production, imports, exports and other utilisations to derive intake estimates.*'

There are a few points to make here. The first is that the data points for 2000-2003 are at the tail of a two-decade long data set presented in Figure 2 and don't significantly influence the

overall observations. The second is that the data points (for total nutritive sweeteners) aren't in fact 'flat' but show some scatter and a slightly upward trend on the overall falling background extrapolated from the 1980-1999 data set. The third is that it is a quite serious statement to publicly allege that a UN agency would falsify its data in this way. On balance I believe it reasonable for the authors to have included the FAO data for these years in Figure 2.

The Australian Paradox paper: Sweetened Beverage Consumption Data: Sales 1994-2006 (litres/capita) [Figure 5], Contribution to total added sugar in Australian food supply 1997-2006 (kg/capita/yr) [Figure 6]

The Australian Paradox paper discussion of data on sugar sweetened beverage consumption (a sub-set of total sugar consumption), Figures 5 and 6, is not tightly written and has led to considerable confusion.

My understanding is that the intent of this section of the paper is to show that whilst the averaged amount (litres per capita) of sugar sweetened beverage sales has *increased* over the period 1994-2006 (peaking around 2004, AP Figure 5a), because the amount of added sugars in the specific beverages consumed has *decreased* over time in Australia, this has backed off the effect of increased sales volume and has in fact led to a steady *decrease* in the contribution to total sugar in the Australian food supply over the period 1997/8-2005/6 (Figure 6).

This net decrease, of significance to the evaluation, has been confused in the debate by the Australian Paradox paper Figure 5b, which shows a net decrease in *market share* of sugar sweetened beverages, due to increased sales of other beverage types, that is of no consequence to the evaluation but which has considerably muddied the waters. The Australian Paradox authors at interview expressed a view that, in hindsight, it would have been better to simply discuss Australian Paradox paper Figure 5a and Figure 6 as a combined figure, and to have been more explicit.

A clearer description of the authors' intent is given in section 3 of Attachment 3, where the example of *Pepsi Next* containing 30% less sugar than regular *Pepsi* is cited. At interview the authors also pointed out that the sugar content of Australian beverages is often less than that of US beverages of the same brand, being tuned to national 'tastes' by the manufacturers. This can be relevant to differences in Australian and US trends in the sugar-obesity study.

Data from national nutrition surveys of representative samples of Australians (1983, 1985, 1995 and 2007) in the Australian Paradox paper have not been questioned. A summary provided by the authors in their response to the Inquiry states that whilst the intake of total sugars increased slightly over the survey years, food category trends indicate that this is not due to increased intake of added sugars but rather increased intake of foods naturally containing sugars such as fruit and dairy.

[REDACTED]

[REDACTED]
[REDACTED]
[REDACTED]
[REDACTED]

[REDACTED]
[REDACTED]
[REDACTED]
[REDACTED]
[REDACTED]
[REDACTED]
[REDACTED]

[REDACTED]
[REDACTED]
[REDACTED]
[REDACTED]
[REDACTED]
[REDACTED]
[REDACTED]

11

presumably be worse. This issue is arguably where the 'emotion' of the debate surrounding the Australian Paradox paper lies.

I believe, from a careful reading of the paper and from the interviews, that Professor Brand-Miller and Dr Barclay understand this point. In fairness, it is openly addressed within the Discussion (Section 4) of their paper in a reasonable way. However, a reading of only the Abstract and the Conclusion sections could be taken by some readers as sending a message that sugar and obesity aren't linked. Although I don't think this was the intent, given the importance of this issue the Abstract and Conclusion should have been more tightly written to avoid this misunderstanding. Combined with the fact that the averaged data doesn't account for what is happening in specific sectors of the population (discussed above), where sugar intake could in certain instances be increasing not declining, this becomes a cause for concern for some readers in relation to the message being delivered.

This issue was a factor in respect of the authorship of the paper, as outlined below.

6.1.3 NUMERIC ERRORS

As correctly raised by the Complainant, the Australian Paradox paper contains two 'arithmetic' errors, namely:

- An inconsistency is evident in the paper with regard to the statements '*the prevalence of obesity has increased 3 fold in Australians since 1980*' (p491) and '*prevalence of obesity (increasing by ~300%)*' (p502). From Figure 1A of the paper the increase in obesity is 3 fold, or 200%, in Australian adults.
- The paper makes the statement '*Overall there was a decrease in sugar contribution from nutritively (sugar) sweetened carbonated soft drinks to the Australian food supply amounting to 12,402 tons (approx. 600g per person per year, Figure 6) from 2002 to 2006*'. The decrease per person is miscalculated and is closer to 150g per person per year.

The above inconsistency and error of calculation don't materially affect the accuracy of the conclusion of the Australian Paradox paper, but have been focussed on by the Complainant as indicators that the paper as a whole lacked quality control. [REDACTED]

[REDACTED]

[REDACTED]

6.2 AUTHORSHIP

From the outset of the Inquiry I was most concerned about the unusual absence from the authorship of the Australian Paradox paper of the Masters student who conducted the underpinning research – [REDACTED]. However, having looked into the authorship issue in detail, I am satisfied that it does not involve any issues of impropriety.

The University of Sydney Masters of Nutrition and Dietetic degree is a two-year course involving three semesters of coursework, followed by a one-semester (13 week) research project. Supervisors offer projects and students apply for them. Professor Brand-Miller, a staff member of the University of Sydney, offered the project in 2009 that became entitled 'The Australian Paradox'. [REDACTED]

[REDACTED]

[REDACTED]
[REDACTED]
[REDACTED]
[REDACTED]

[REDACTED]
[REDACTED]
[REDACTED]
[REDACTED]
[REDACTED]
[REDACTED]
[REDACTED]

[REDACTED]
[REDACTED]
[REDACTED]
[REDACTED]
[REDACTED]

[REDACTED]
[REDACTED]
[REDACTED]

[REDACTED]

[REDACTED]
[REDACTED]

[REDACTED]
[REDACTED]
[REDACTED]
[REDACTED]

[REDACTED]
[REDACTED]
[REDACTED]
[REDACTED]
[REDACTED]
[REDACTED]

[REDACTED]
[REDACTED]
[REDACTED]
[REDACTED]
[REDACTED]
[REDACTED]
[REDACTED]
[REDACTED]
[REDACTED]

[REDACTED]
[REDACTED]
[REDACTED]
[REDACTED]
[REDACTED]

6.3 CONFLICTS OF INTEREST

6.3.1 AUTHORS' INTERNAL AND EXTERNAL INTERESTS

As a University of Sydney staff member, Professor Brand-Miller is also the Director of the Glycemic Index (GI) Foundation, a not-for-profit University of Sydney spin-off company. Professor Brand-Miller manages the university's GI testing service. Dr Barclay is employed by the Australian Diabetes Council and is also a consultant to the GI Foundation. A summary of the function and activities of GI Foundation, including the GI symbol and the nutritional criteria required for this food endorsement, can be found at www.gisymbol.com.

Professor Brand-Miller explained during her interview that the GI Foundation revenue comes from royalties and from license fees paid by its members, which include both large and small food industry companies (with a 'proportional' fee arrangement across some 100 licences). Professor Brand-Miller said that 'sugary' food companies represent only a small percentage of the membership.

Professor Brand-Miller stated that revenue of less than \$1 million per annum is almost entirely spent on administrative costs and fees for 3-4 consultants. Dr Barclay is one of these consultants, and 3 days per week of his salary is paid by the GI Foundation (the Australian Diabetes Council bills the GI Foundation for this component). Accumulated royalties last year totalled some \$180k. Professor Brand-Miller stated that she does not personally receive any royalties from the food and beverage industry, and that last year was the first time she had received a payment linked to license fees, in accordance with normal university practices. The university's GI testing service employs around 11 staff and is funded from contracts.

At interview Dr Barclay indicated that, in addition to these declared conflicts of interest, he had presented his work at a large number of conferences including a webinar for the Coca Cola company, for which he received an honorarium. He indicated that at the time he *'didn't think anything of it'* and that the honorarium was small compared to the time he gave to this presentation. He noted that he gave the presentation after the Australian Paradox paper was published.

In my opinion, Professor Brand-Miller and Dr Barclay both appropriately declared their links to the GI Foundation and GI testing service in the Australian Paradox paper. This appears in the 'Acknowledgement' section, where there is a paragraph for each author relating to declared conflicts of interest. Whilst Dr Barclay's acceptance of an honorarium for the preparation and

delivery of a webinar to the Coca Cola company might not have demonstrated good judgement, I feel, on balance, that this must be kept in proportion. I am satisfied that it was seen by Dr Barclay as a straightforward payment for his time and effort.

In summary, I am satisfied that potential, perceived and actual conflicts of interest were appropriately declared by Professor Brand-Miller and Dr Barclay in the Australian Paradox paper, in accordance with standard academic practice.

6.3.2 'NUTRIENTS' SPECIAL EDITION GUEST EDITOR AND REFEREEING

The Australian Paradox paper was published as a special edition of the on-line, open-access journal '*Nutrients*', for which Professor Brand-Miller was Guest Editor. The paper was anonymously peer-reviewed. The Editor-in-Chief of *Nutrients*, Mr Peter Howe, has responded to allegations made by the Complainant regarding the professionalism of this arrangement. Mr Howe's response through an Editorial article of *Nutrients* and related correspondence posted on the *Nutrients* website are relevant.

The publication of co-authored papers within a journal special edition, for which the Guest Editor is also an author, is not uncommon and anonymous peer review is appropriately used to remove perceived conflicts of interest in this situation. I am comfortable that this is not a cause for concern in relation to the Australian Paradox paper and its authorship.

Perhaps the real issue underlying criticism of the editorial and refereeing arrangements is that the Australian Paradox paper contains a 'big' public policy result that has been published through a 'soft' channel. There is some substance to this criticism, but based on my interviews with Professor Brand-Miller and Dr Barclay, I do not consider that this was a deliberate strategy on their part. It seems more likely that they were busy responding to a special edition deadline, and hadn't really considered this as an issue.

6.4 PRELIMINARY FINDINGS OF FACT

The Complainant alleges that:

1. *In the Australian Paradox paper, which impacts the public health debate on the origins of obesity, the statement that "This analysis of apparent consumption, national dietary surveys and food industry data indicates a consistent and substantial decline in total*

refined or added sugar consumption by Australians over the past 30 years" is false. The Complainant alleges that there is evidence of an increase rather than a decline.

This allegation is not substantiated.

2. *In the Australian Paradox paper, the statement that "Food industry data indicate that per capita sales of low calorie (non-nutritively sweetened) beverages doubled from 1994 to 2006 while nutritionally sweetened beverages decreased by 10%" is incorrect. The Complainant alleges that, according to the data presented in the paper, there was actually an increase of 30% in per capita sales of nutritively sweetened beverages.*


This allegation, whilst technically accurate, is associated with a miscommunication arising from loose presentation in the Australian Paradox paper. The real issue is whether per capita sugar intake from sweetened beverages is falling or increasing, and on this issue the allegation is not substantiated.

3. *In the Australian Paradox paper, Professor Brand-Miller and Dr Barclay have acted with intent to make sugar appear healthier or less of a threat than it is, have included falsified data, and have not taken sufficient action to verify that the data they have used is correct or accurate.*

This allegation is not substantiated. More detailed discussion on the limitations of the AP Figure 2 data would however have been appropriate.

4. *The Australian Paradox paper contains technical errors as follows:*
 - a. *An inconsistency is evident in the paper with regard to the statements 'the prevalence of obesity has increased 3 fold in Australians since 1980' (p491) and 'prevalence of obesity (increasing by ~300%)' (p502). The complainant points out that a 3 fold increase is 200% (not 300%).*
 - b. *An incorrect calculation has been included in the paper with regard to the statement "Overall there was a decrease in sugar contribution from nutritively (sugar) sweetened carbonated soft drinks to the Australian food supply amounting to 12,402 tons (approx. 600g per person per year, Figure 6) from 2002 to 2006". The Complainant alleges that, according to the data presented, the decrease is 150g per person per year.*

This allegation is substantiated.



- _____
4. *Professor Brand-Miller and Dr Barclay, in subsequent publications, were wrong to defend the Australian Paradox paper against criticism. Professor Brand-Miller and Dr Barclay have shown recklessness and intent in failing to correct their paper when concerns were raised, have caused harm or risk to public health and have gained personally through their conduct.*

This allegation is not substantiated.

6. *Co-author [REDACTED] name was removed from the authorship of the Australian Paradox paper, and Professor Brand-Miller's name was added (because of her influence). The Complainant notes also that the paper was based on a Master's student project [REDACTED]*

To the extent that it concerns the removal of [REDACTED] name and the inclusion of Professor Brand-Miller as an author, this allegation is not substantiated.

7. *Professor Brand-Miller and Dr Barclay have a relationship with the sugar industry, which creates a real or perceived conflict of interest. The Complainant implies that this conflict of interest has not been appropriately managed, and has resulted in Professor Brand-Miller and Dr Barclay deliberately including incorrect information (that benefits the sugar industry) in the Australian Paradox paper.*

This allegation is not substantiated.

6.5 DEFINITION OF RESEARCH MISCONDUCT

It is my view that, at interview, both Professor Brand-Miller and Dr Barclay presented as open, honest, and well-intentioned academics. [REDACTED]

The stress resulting from the impact of the Complainant's allegations on their scientific integrity was apparent. They each expressed the view that over the past few years they had effectively undergone 'trial by internet' due to the manner in which the Complainant had aired the allegations in the public domain.

Whilst I can see how this debate has arisen, and why the Complainant has gone public, having digested the facts surrounding this case I do not feel that there has been any wilful attempt by Professor Brand-Miller and Dr Barclay to act deceptively or to misrepresent the science. The Australian Paradox paper is indeed not tightly written, there are errors of a simple arithmetic

nature, and the Abstract and Conclusion sections could certainly have done with additional statements clarifying and limiting the interpretation of the data and data analysis.

Further, I can understand a level of frustration evident in the narrative of the Complainant's complaints, which no doubt results from the authors' failure to directly answer his questions and clearly state the facts. A good example is their published response to the Rikkers *et al* paper. In their response, Professor Brand-Miller and Dr Barclay spend considerable time debating detail of the methodology by which Rikkers *et al* calculate sugar intake from highly processed foods, rather than simply bringing certainty to the key point of whether their own Figure 2 in the Australian Paradox paper includes this or not. As explained above, my own correspondence with the ABS confirms that the contribution from processed foods is indeed included.

However, this does not take the actions of Professor Brand-Miller and Dr Barclay into the realm of research misconduct. In my opinion, their actions lack the intent and deliberation, recklessness or gross and persistent negligence, and the serious consequences that are required to meet the definition of research misconduct in the University's Research Code of Conduct. Further, there is no evidence of a prima facie breach of the Research Code of Conduct by Professor Brand-Miller and Dr Barclay.

7. ALLEGATIONS AGAINST THE UNIVERSITY AND OTHERS

In addition to the allegations made against Professor Brand-Miller and Dr Barclay, the Complainant makes a number of allegations against the University of Sydney, the journals 'Nutrients' and 'Biomed Central Public Health', the UN Food and Agriculture Organisation (FAO) and the Australian Bureau of Statistics (ABS).

The Complainant alleges that:

1. The University of Sydney has no competent quality control on scientific output.
2. The University of Sydney has not responded appropriately to the Complainant's complaint/concerns.
3. The relationship between the University of Sydney and the sugar industry creates a conflict of interest. The Complainant implies that the conflict has not been appropriately managed by the University.

-
4. The University of Sydney campaigned against an NHMRC initiative to introduce dietary advice regarding sugar.
 5. The journal 'Nutrients' has allowed the Australian Paradox paper to be 'self-published' and has not performed peer review. The Complainant implies that this occurred because an author of the paper (Professor Brand-Miller) was a guest editor of the journal.
 6. The journal 'Nutrients' peer-review process is flawed, because it allowed second and third faulty publications (in defence of the Australian Paradox paper) to be published by Professor Brand-Miller and Dr Barclay.
 7. The Food and Agriculture Organisation falsified data in the early 2000's.
 8. The Australian Bureau of Statistics and Green Pool published data collected using broken methodologies that were out-dated and unreliable.
 9. The journal 'Biomed Central Public Health's peer review process is flawed.

Whilst these allegations are outside the scope of my Inquiry, I would make the following points.

Quality control of scientific output across the university research sector is primarily provided by the peer review of publications. Where points of contention arise, these are most effectively addressed within the peer-reviewed literature – as distinct from internet postings and media coverage. With a few notable exceptions involving deliberate and clever fraud (such as the US Bell Laboratory organic conductor saga), the system generally 'polices' itself effectively. Faulty or poor quality papers are generally not recommended for publication, and a researcher's publication record is a major factor in attracting research funding. Where faults make it into publication they are then challenged and highlighted by other publications and the discourse is on the published record (forever). Universities can influence institutional quality through their research staff appointments and the research culture of the organisation, but detailed control of individual publication quality by a university administration is not only impractical but inadvisable for an array of reasons. In my opinion, expanding criticism of a specific research publication to the host university administration shows a lack of understanding of the peer review process, and is not appropriate.

The Glycemic Index (GI) Foundation and GI testing facility associated with the University of Sydney do not, in my opinion, constitute a relationship that places the University by definition 'in

bed with' the sugar industry. Such inferences are easy to make, but are difficult to justify objectively given the professional function of these entities and the governance surrounding them.

With regard to the management of conflict of interest, the most important thing (be they real or perceived conflicts) is that they are properly declared. Such declarations were appropriately made in the Australian Paradox paper.

The Editor-in-Chief of the journal 'Nutrients' has responded to allegations regarding the journal's peer review process in a published editorial within that journal and through information on the journal's website.

Statements made by the Complainant alleging that the United Nations FAO has falsified data are serious, and do not appear to be based on detailed evidence or inquiry (see analysis of evidence above).

Statements made by the Complainant regarding ABS published data being based on broken methodology that was out-dated and unreliable need to be kept in balance. The ABS (responsibly) ceased publishing Apparent Consumption of Foodstuffs data when public funding was not available to update their methodology across all foodstuffs to reflect changes in production and consumption patterns. However, there is a valid point here with regard to qualifying the limitations of data around this cessation time, as identified by my exchange with the ABS on apparent consumption of sugar in particular (see analysis of evidence above).

8. LESSONS LEARNT

I have reflected on what the University of Sydney might usefully consider from this case.

All universities rely on the peer review process for quality control of the published work of their staff. The Australian Paradox paper was subject to peer review, but the selection of an appropriate journal to first publish a 'big' public policy conclusion might have been given more thought by the authors. It is relatively common practice to first publish important new results in high-impact, rigorously peer reviewed journals and subsequently further discuss the results in special edition publications or conference journal format.

The University might also consider the formality surrounding supervision and publication of research carried out by Masters students in single semester research projects. [REDACTED]

[REDACTED]

[REDACTED]

[REDACTED] There are background questions I haven't raised concerning the requirements of how such research data is documented and stored if it underpins important published work (laboratory notebooks, electronic files, correspondence, data and data analysis), and the issue of informal co-supervision.

The issue of how a University responds to an on-line campaign that goes to the integrity of its staff and its reputation is clearly sensitive. Obtaining legal advice on a set of 'standard operating procedures' relevant to this digital age might be worthwhile, and indeed this case might be a good benchmark to look at how to be better prepared for future cases. To my mind, there is a sense of a tilted playing field, in that public allegations even if well intended can seriously damage reputations before objective appraisals can be made and acted on. A fast-response mediation process that involves a balanced consideration of both sides of the debate, and some established legal boundaries, might well be worth considering to limit unfair damage whilst not being dismissive of criticism.

9. INQUIRY PROCESS

On 13 December 2013, Professor Trehwella nominated me to conduct the initial inquiry.

On 13 December 2013 I spoke by phone with Dr Rebecca Halligan, Director of Research Integrity and Ethics Administration, University of Sydney, regarding the inquiry.

On 20 January 2014 I met with Dr Halligan and Ms Sarah Heesom, Consultant Solicitor to the University of Sydney's Office of General Counsel.

On 31 January 2014 I spoke via teleconference with Dr Halligan and Ms Heesom.

On 12 February 2014, I met with Professor Brand-Miller, in the company of [REDACTED] (Professor Brand-Miller's [REDACTED] support person) and Ms Heesom.

On 21 February 2014, I met with Dr Barclay in the company of [REDACTED] (Mr Barclay's [REDACTED] support person) and Ms Heesom.

On 24 February 2014, I contacted [REDACTED]
[REDACTED] at the Australian Bureau of Statistics by telephone, for
advice on the Apparent Consumption of Foodstuffs: Historical Statistical Data for Sugar.

On 25 February 2014, I sent an email to [REDACTED] clarifying my request for advice.

On 4 March 2014, [REDACTED] responded to my email.

On 6 March 2014, [REDACTED] responded to my further email enquiries.

On 6 March 2014 Dr Halligan sent an email to the Complainant, inviting him to add any
additional material to the initial inquiry.

On 7 March 2014, I spoke by phone with [REDACTED]
[REDACTED]
[REDACTED] Ms Heesom also joined this
call.

On 7 March 2014 Dr Halligan advised that [REDACTED]
[REDACTED] had agreed to provide expert advice.

On 11 March 2014 I spoke by phone with [REDACTED]

Following email correspondence with Dr Halligan and Ms Heesom, the University of Sydney
provided relevant information to [REDACTED]

On 19 March 2014 the Complainant responded to the 6 March 2014 invitation to add any
additional material to the initial inquiry.

On 21 March 2014 the Complainant submitted an updated version of his 19 March 2014
response.

On 10 April 2014 I spoke again by phone with [REDACTED] regarding the material sent to
her.

On 16 April 2014 I met with Dr Halligan and Ms Heesom and provided a summary of my written
report rationale.

On 19 May I provided the draft report of my findings to Ms Heesom and the University of Sydney. The draft inquiry report was subsequently provided to Professor Brand-Miller and Dr Barclay for comment as previously agreed with them by the University of Sydney.

On 2 June 2014 a written response to my draft inquiry report from Professor Brand-Miller and Dr Barclay was received by the University of Sydney (**Attachment 6**). This response was forwarded to me whilst on leave overseas (I returned from leave on 16 June 2014).

On 26 June 2014 I submitted my final inquiry report to Ms Heesom and the University of Sydney.

Throughout the course of my Inquiry I had regard to a bundle of documents relating to the complaint. Those documents included:

A. University of Sydney initial information pack which contained:

1. Relevant codes

- University of Sydney Research Code of Conduct 2013
- NHMRC/ARC Australian Code for the Responsible Conduct of Research

2. Allegations made by the Complainant, including

- the Complainant's '*Quick Quiz on Research Integrity*', retrieved 17 January 2014
- the Complainant's '*Letter to the Academic Board*', dated 11 November 2013
- the Complainant's '*The Australian Paradox: A critical analysis*', retrieved 9 January 2014

3. Informal assessment of allegations conducted by _____ dated 20 November 2013.

4. Publications

- '*The Australian Paradox: A Substantial Decline in Sugars Intake over the Same Timeframe that Overweight and Obesity Have Increased*'
- *The Australian Paradox Revisited*
- The Australian Paradox editorial

-
- The Australian Paradox correction
 - Rikkers, Lawrence, Hafekost and Mitoru, '*Trends in sugar supply and consumption in Australia: is there an Australian Paradox?*'
5. Communications relating to the initial inquiry
- Appointment of Professor Robert Clark as a designated person
 - Communications between Professor Stephen Simpson (CPC) and the Complainant
 - Communications between Professor Jill Trehwella and the Complainant
- B. Information from Professor Brand-Miller describing the history of the research and papers resulting in the publication of '*The Australian Paradox*' in the journal *Nutrients* including:
- [REDACTED] research report
 - An abstract presented at the Nutrition Society of Australia Annual Scientific Meeting, 2010
 - [REDACTED]
 - [REDACTED]
- C. theaustralianparadox.com.au website material
- D. ABC Radio National interview transcript
- E. Other publications and papers
- *Apparent Consumption of Foodstuffs*: ABS
 - *Australian Dietary Guidelines*: NHMRC
 - *Australian Paradox author admits sugar data might be flawed*: SMH, 2014
 - *A Critique of the Barclay and Brand-Miller Australian Paradox*: Kieron Rooney, 2014 (unpublished)
 - *Consumption of Intense Sweeteners in Australia and NZ*: Food Standards Aust NZ, 2004

-
- *Intakes & sources of a range of dietary sugars in various Australian populations:* Baghurst et al, 1989
 - *Nutrient Criteria:* GI Ltd, 2010
 - *Quenching Australia's thirst: A trend analysis of water-based beverage sales from 1997-2011:* Levy & Shrapnel, 2014
 - *Response to: Rikkers et al. Trends in sugar supply and consumption in Australia: is there an Australian Paradox?:* McNeill, 2013
 - *Shifts in purchasing patterns of non-alcoholic, water-based beverages in Australia, 1997-2006:* Levy & Tapsell, 2007
 - *Sweet truths: Is increasing fructose consumption an underlying cause of the obesity epidemic?:* Sim & Barclay (PowerPoint Presentation)
 - *Trends in sugar supply and consumption in Australia: is there an Australian Paradox? Correspondence:* Barclay & Brand-Miller.

F. Confidential response from Dr Barclay and Professor Brand-Miller to the inquiry into The Australian Paradox.

10. STANDARD OF PROOF

The standard of proof to be satisfied in civil proceedings, and therefore in this investigation, is 'on the balance of probabilities'. It is generally accepted that 'on the balance of probabilities' requires satisfaction on the evidence that the matter found to have occurred is more likely than not to have occurred.

11. UNIVERSITY OF SYDNEY RESEARCH CODE OF CONDUCT

Part 1 of the Research Code of Conduct deals with 'Proper Conduct of Research'. It relevantly states:

7 Principles of responsible research

(1) Responsible research is characterised by:

- (a) honesty and integrity;
- (b) respect for human research participants, animals and the environment;
- (c) good stewardship of public resources used to conduct research;

- (d) appropriate acknowledgement of the role of others in research, and
- (e) responsible communication of research results.
- (2) The University acknowledges its responsibility to:
 - (a) promote the responsible conduct of research;
 - (b) establish good governance and management practices;
 - (c) provide appropriate training;
 - (d) promote mentoring and effective supervision of researchers and research trainees; and
 - (e) ensure a safe research environment.

8 General responsibilities of researchers

- (1) Researchers must foster and maintain high standards of responsible research. This includes:
 - (a) respecting truth;
 - (b) respecting the rights of those affected by their research;
 - (c) appropriately referencing and attributing the work of others;
 - (d) managing conflicts of interests appropriately, so that ethical and scholarly considerations are not compromised;
 - (e) adopting methods appropriate for achieving the aims of each research proposal;
 - (f) following proper practices for safety and security;
 - (g) citing awards, degrees conferred and research publications accurately, including the status of any publication such as "under review" or "in press";
 - (h) using and managing resources responsibly;
 - (i) promoting compliance with this policy and any other applicable laws, regulations, and codes; and (j) compliance with the terms of contracts relating to the research.
- (2) Researchers should report research findings responsibly.

Part 11 of the Research Code of Conduct deals with 'Publication and Dissemination of Research Findings. It relevantly states:

11 Publication and dissemination of research findings

- (1) This clause applies to all forms of dissemination, including for example:
 - (a) academic journals or books;
 - (b) non-refereed publications such as web pages;
 - (c) other media such as exhibitions or films; and
 - (d) professional or institutional repositories.
- (2) Researchers have a responsibility to their colleagues and the wider community to disseminate a full account of their research as broadly as possible.
 - (a) Publication activities must take account of any restrictions relating to intellectual property, confidentiality, privacy or culturally sensitive data.
 - (b) Researchers must, where feasible, also provide research participants with an

appropriate summary of the research results.

- (3) Researchers must take all reasonable steps to ensure that their findings are accurate and properly reported. If they become aware of misleading or inaccurate statements about their work, they must correct the record as soon as possible.
- (4) Researchers must cite other relevant work appropriately when disseminating research findings. The University regards plagiarism very seriously, and staff and students must take responsibility for ensuring that their work includes accurate and complete references to the work of others.

...

- (6) A publication must include information on all sources of financial and in-kind support for the research and any potential conflicts of interest. Researchers must also comply with the requirements of the University's *External Interests Policy 2010*.

...

Part 12 of the Research Code of Conduct deals with 'Authorship'. It relevantly states:

- (3) The University acknowledges the importance of disseminating research outcomes. The provisions of this clause apply to all forms of publication, including web-based publications, conference publications, presentations, media such as exhibitions or films, as well as professional and institutional repositories.
- (4) To be named as an author, a researcher must have made a substantial intellectual contribution to the published work in one or more of:
 - (a) conception and design of the project;
 - (b) analysis and interpretation of research data or of the eligibility or suitability of potential subjects of research;
 - (c) drafting significant parts of the work or critically revising it so as to contribute to the interpretation.

Note: Authorship requirements vary according to discipline, journal requirements and funding provisions; they may be more stringent in some cases. International best practice guidelines may also apply (e.g. ICMJE: Authorship and Contributorship). Researchers should seek advice when planning publication.

...

- (5) The following are not relevant considerations for the purposes of attribution of authorship:
 - (a) the position or profession of a proposed author;
 - (b) the existence of a personal relationship between the author(s) and a proposed author;

-
- (c) whether or not a contribution was paid or voluntary;
 - (d) the provision of materials or equipment;
 - (e) the provision of access to study participants or data;
 - (f) the provision of routine assistance in some aspect of the project;
 - (g) the provision of, or assistance with acquisition of, funding for the project;
 - (h) general supervision of the research team; or
 - (i) having made the measurements on which the publication is based, without other intellectual input to the project or publication.
- (6) A person who qualifies as an author must not be included or excluded as an author without their permission, which should be recorded in writing where possible.

...

- (10) Researchers should:
- (a) adhere to the authorship requirements of this policy, and follow guidelines issued by any applicable funding body or journal publisher;
 - (b) when working in collaboration with others, agree on authorship of a publication at an early stage and review their decisions periodically; and
 - (c) offer authorship to all people, including research trainees, who meet the criteria for authorship listed in sub-clause 12(5).
- (11) Contributions other than authorship must be properly acknowledged. Such contributors may include, for example, research assistants and technical writers.
- (12) The department of the executive or corresponding author should retain any written acknowledgements of authorship received in relation to a project, preferably in the form of an original document with hand-written signature.

Clause 14 of the Research Code of Conduct deals with 'Conflicts of Interest'. It states:

- (1) A conflict of interests will exist when there is a divergence between the duties or interests of a person and their professional responsibilities, including but not limited to their duties to the University.
- (2) The University's expectations in relation to the declaration and management of conflicts of interests are set out in the *External Interests Policy 2010*.
- (3) Conflicts of interests in the research area are common and it is imperative that they are disclosed and dealt with properly. An individual researcher should expect to be conflicted from time to time, and be ready to acknowledge, disclose and manage the conflict as appropriate.

- _____**
- (4) The University's expectations in relation to approval and management of outside earnings activities by academics, which are additional to the requirements of the *External Interests Policy 2010*, are set out in the *Outside Earnings of Academic Staff Policy 2011*
 - (5) Researchers must:
 - (a) familiarise themselves, and comply, with the requirements of the *External Interests Policy 2010*;
 - (b) maintain records of activities or interests that may lead to conflicts;
 - (c) when invited to join a committee or equivalent, review current activities and interests for actual and apparent conflicts, and bring possible conflicts to the attention of those running the process; and
 - (d) disclose any actual or apparent conflict of interests as soon as it becomes apparent.
 - (6) Conflict management plans relating to research matters should provide for a person with a conflict of interest to take no part in decision making processes affected by that conflict of interest. This includes presence in the room, even if silent, while the matter is debated and decided.

12. AUSTRALIAN CODE FOR THE RESPONSIBLE CONDUCT OF RESEARCH

The Australian Code for the Responsible Conduct of Research has been developed by the National Health and Medical Research Council, the Australian Research Council and Universities Australia. It is a guide for responsible research conduct in Australia, providing a basic reference for the development of appropriate policies and procedures. It is written specifically for universities and other public sector research institutions. Compliance with the Code is a prerequisite for NHMRC and ARC funding.

The meaning of 'research' for the purposes of the Code, is 'original investigation undertaken to gain knowledge, understanding and insight.'

Clause 1.6 states that researchers must maintain high standards of responsible research, as follows:

Researchers must foster and maintain a research environment of intellectual honesty and integrity, and scholarly and scientific rigour. Researchers must:

- respect the truth and the rights of those affected by their research
- manage conflicts of interest so that ambition and personal advantage do not compromise ethical or scholarly considerations
- adopt methods appropriate for achieving the aims of each research proposal

-
- follow proper practices for safety and security
 - cite awards, degrees conferred and research publications accurately, including the status of any publication, such as under review or in press
 - promote adoption of this Code and avoid departures from the responsible conduct of research
 - conform to the policies adopted by their institutions and bodies funding the research.

Part 4 of the Australian Code for the Responsible Conduct of Research deals with 'Publication and Dissemination of Research Findings'. It relevantly states:

4.4 Disseminate all research findings

Researchers have a responsibility to their colleagues and the wider community to disseminate a full account of their research as broadly as possible.

4.4.1 The account should be complete, and, where applicable, include negative findings and results contrary to their hypotheses.

4.4.2 Publication activities must take account of any restrictions relating to intellectual property or culturally sensitive data.

4.4.3 Researchers must, where feasible, also provide research participants with an appropriate summary of the research results; see, for example, the Statement on Consumer and Community Participation in Health and Medical Research (see Appendix 3).

4.5 Ensure accuracy of publication and dissemination

Researchers must take all reasonable steps to ensure that their findings are accurate and properly reported. If they become aware of misleading or inaccurate statements about their work, they must correct the record as soon as possible

4.6 Cite the work of other authors fully and accurately

Researchers must ensure that they cite other relevant work appropriately and accurately when disseminating research findings. Use of the work of other authors without acknowledgement is unethical.

...



4.9 Disclose research support accurately

A publication must include information on all sources of financial and in-kind support for the research and any potential conflicts of interest. Researchers must acknowledge the host institution and funding sources of the research.

Part 5 of the Australian Code for the Responsible Conduct of Research deals with 'Authorship'. The Introduction relevantly states:

The outcomes of research may be disseminated in a variety of ways but enduring forms, such as journal articles, are particularly important and to be an author for such a form is meritorious. To be named as an author, a researcher must have made a substantial scholarly contribution to the work and be able to take responsibility for at least that part of the work they contributed.

Attribution of authorship depends to some extent on the discipline, but in all cases, authorship must be based on substantial contributions in a combination of:

- conception and design of the project
- analysis and interpretation of research data
- drafting significant parts of the work or critically revising it so as to contribute to the interpretation.

The right to authorship is not tied to position or profession and does not depend on whether the contribution was paid for or voluntary. It is not enough to have provided materials or routine technical support, or to have made the measurements on which the publication is based. Substantial intellectual involvement is required.

A person who qualifies as an author must not be included or excluded as an author without their permission. This should be in writing, and include a brief description of their contribution to the work.

The responsibilities of researchers include:

5.2 Follow policies on authorship

Researchers should adhere to the authorship criteria of this Code and their institution's policies.

5.3 Agree on authorship

Collaborating researchers should agree on authorship of a publication at an early stage in the research project and should review their decisions periodically.

5.4 Include all authors

Researchers must offer authorship to all people, including research trainees, who meet the criteria for authorship listed above. Those offered authorship must accept or decline in writing.

5.5 Do not allow unacceptable inclusions of authorship

Authorship should not be offered to those who do not meet the requirements set out above. For example, none of the following contributions, in and of themselves, justifies including a person as an author:

- being head of department, holding other positions of authority, or personal friendship with the authors
- providing a technical contribution but no other intellectual input to the project or publication
- providing routine assistance in some aspects of the project, the acquisition of funding or general supervision of the research team
- providing data that has already been published or materials obtained from third parties, but with no other intellectual input.

5.6 Acknowledge other contributions fairly

Researchers must ensure that all those who have contributed to the research, facilities or materials are properly acknowledged, such as research assistants and technical writers. Where individuals are to be named, their written consent must be obtained.

5.7 Extend the authorship policy to web-based publications

Authors of web-based publications must be able to take responsibility for the publication's content and must be clearly identified in the publication.

Part 7 of the Australian Code for the Responsible Conduct of Research deals with 'Conflicts of Interest'. It relevantly states:

7.2 Disclose conflicts of interest

Researchers frequently have a conflict of interest that cannot be avoided. Decision-making processes in research often need expert advice, and the pool of experts in a field can be so small that all the experts have some link with the matter under decision. An individual researcher should therefore expect to be conflicted from time to time, and be ready to acknowledge the conflict and make disclosures as appropriate.

7.2.1 Researchers should use the following approach to manage conflicts of interest:

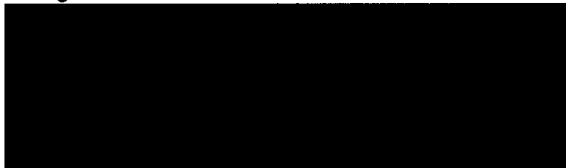
- read and understand the policy of the institution
- maintain records of activities that may lead to conflicts, for example: consultancies; membership of committees, boards of directors, advisory groups, or selection committees; and financial delegation or in receipt of cash, services or equipment from outside bodies to support research activities

-
- when invited to join a committee or equivalent, review current activities for actual or apparent conflicts and bring possible conflicts of interest to the attention of those running the process
 - disclose any actual or apparent conflict of interest as soon as it becomes apparent.

7.2.2 While there is no requirement to disclose the details of a conflict of interest, for example, because of a confidentiality agreement or for personal reasons, the existence of the conflict must be declared, followed by withdrawal from the situation.

Dated: 26 June 2014

Signed:

A large black rectangular box redacting the signature.

Attachment 1

*'The Australian Paradox:
A Substantial Decline in Sugars Intake over the Same Timeframe that
Overweight and Obesity
Have Increased', Alan W. Barclay and Jennie Brand-Miller ('the
Australian Paradox paper')*

Article

The Australian Paradox: A Substantial Decline in Sugars Intake over the Same Timeframe that Overweight and Obesity Have Increased

Alan W. Barclay¹ and Jennie Brand-Miller^{2,*}

¹ Australian Diabetes Council, 26 Arundel Street, Glebe, NSW 2037, Australia;

E-Mail: awbarclay@optusnet.com.au

² School of Molecular Bioscience and Boden Institute of Obesity, Nutrition and Exercise, University of Sydney, NSW 2006, Australia

* Author to whom correspondence should be addressed; E-Mail: j.brandmiller@mmb.usyd.edu.au; Tel.: +61-2-9351-3759; Fax: +61-2-9351-6022.

Received: 4 March 2011; in revised form: 14 April 2011 / Accepted: 19 April 2011 /

Published: 20 April 2011

Abstract: Ecological research from the USA has demonstrated a positive relationship between sugars consumption and prevalence of obesity; however, the relationship in other nations is not well described. The aim of this study was to analyze the trends in obesity and sugar consumption in Australia over the past 30 years and to compare and contrast obesity trends and sugar consumption patterns in Australia with the UK and USA. Data on consumption of sugar in Australia, the UK and USA were obtained from the Food and Agriculture Organization for the years 1980–2003. The prevalence of obesity has increased 3 fold in Australians since 1980. In Australia, the UK and USA, per capita consumption of refined sucrose decreased by 23%, 10% and 20% respectively from 1980 to 2003. When all sources of nutritive sweeteners, including high fructose corn syrups, were considered, per capita consumption decreased in Australia (−16%) and the UK (−5%), but increased in the USA (+23%). In Australia, there was a reduction in sales of nutritively sweetened beverages by 64 million liters from 2002 to 2006 and a reduction in percentage of children consuming sugar-sweetened beverages between 1995 and 2007. The findings confirm an “Australian Paradox”—a substantial decline in refined sugars intake over the same timeframe that obesity has increased. The implication is that efforts to reduce sugar intake may reduce consumption but may not reduce the prevalence of obesity.

Keywords: sugars; sucrose; obesity; epidemiology; Australia

1. Introduction

The prevalence of overweight/obesity continues to rise around the globe, in both developed and developing nations. The World Health Organization estimates that there are currently more than 700 million overweight adults, and at least 300 million obese adults [1]. The health consequences of overweight/obesity are well documented, and include increased risk of cardiovascular disease, cancer (endometrial, breast, and colon), type 2 diabetes, respiratory problems and osteoarthritis [2]. The economic costs of overweight/obesity are as equally grave as the health consequences, but not as well described. However, in several developed countries, obesity has been estimated to account for 2–7% of the total health care costs [3].

The most recent population health surveys in Australia determined that in 2007–2008, 62% of Australia's 15 million adults [4] and 23% of Australia's 5 million children [5] were either overweight or obese. The direct financial cost of obesity was estimated to be AUD\$8.283 billion in Australia in 2008. In addition to this, the cost of lost wellbeing due to obesity was valued at AUD\$49.9 billion, bringing the total cost of obesity in Australia in 2008 to AUD\$58.2 billion [6].

While the cause of this pandemic of overweight/obesity is complex, multi-factorial, and likely to vary from region-to-region, researchers continue to look for common environmental factors to help explain the phenomenon. Increasing consumption of sugars [7], and in particular sugar-sweetened beverages [8], has been identified as a plausible etiological factor in the United States. Little is known about the relationship between sugars consumption and obesity in other nations, however.

The aim of this study was to examine in detail trends in obesity in Australia, and to analyze concurrent trends in sugars and sugar-sweetened beverage consumption, and to compare these to those in the United Kingdom (UK) and the United States of America (USA).

2. Methods

2.1. Literature Search

A systematic literature review was undertaken to obtain sources of Australian sugar intake data. Key words used in the search included: sugars, sucrose, dietary carbohydrate, consumption, intake, sugar-sweetened beverages, sweeteners, refined sugar, obesity, adiposity, body weight, body mass index (BMI) with Australia. The term "blood glucose" was excluded in the search strategy. The databases searched were MEDLINE, Cinahl, Embase and the Cochrane library. Full papers were retrieved if they included a healthy population as the sub-group and were relevant in the Australian context and published within the last 30 years (since 1980).

In addition to the peer-reviewed literature, publications and data issued by government, academia and industry were also explored. The websites of the World Health Organization (WHO) [9], Food and Agriculture Organization (FAO) of the United Nations [9], Australian Bureau of Statistics [10], Australian Food and Grocery Council [11], Australian Retailers Association [12], Commonwealth

Scientific and Industrial Research Organization (CSIRO) [13] and the Australian Government [14] were searched for relevant information. The Australian food industry including the Australian Beverage Council (Ltd.) [15], CSR (Ltd.) [16], Coles [17] and Woolworths [18] supermarkets were also contacted for relevant data.

For this analysis, water based beverages were categorized as nutritively sweetened or non-nutritively sweetened. Nutritively sweetened beverages included all sugar-sweetened (cane or fruit sugar) beverages such as soft drinks, sports drinks, iced tea drinks and flavored waters, but Non-nutritively sweetened beverages were defined as plain still/mineral waters or beverages sweetened with non-nutritive sweeteners.

2.2. Prevalence of Obesity

Obesity statistics describing the percentage of obesity in the study population using BMI ≥ 30 kg/m² in adults and a BMI greater than or equal to the 95th percentile, using age and sex dependent reference values in children, were obtained.

Annual trends in obesity prevalence were obtained for Australia, the UK and the USA from a variety of sources. In Australia, data were sourced from the Australian Institute of Health and Welfare Risk Factor Data [18] store which was based on an analysis of the 1980, 1983 and 1989 Risk Factor Prevalence Surveys [19]; the 1995 National Nutrition Survey [20]; the 1999–2000 Australian Diabetes, Obesity and Lifestyle study [21]; the Australian Bureau of Statistics National Health Survey's of 2004–2005 [22] and 2007–2008 [4] and the 2007 Australian National Children's Nutrition and Physical Activity Survey [5]. In the UK, data were obtained from the Health Survey for England 2007 Latest Trends [23] and for the USA, from the National Health and Nutrition Examination Survey data (NHANES) [24].

2.3. Sugars Consumption

Data on annual apparent consumption of sugar were obtained for Australia, the UK and the USA from the FAO [25]. Average population sugar, sugary foods and beverages intake estimates were obtained from the 2007 Australian National Children's Nutrition and Physical Activity Survey [5,26] and food and nutrient intakes from the 1983, 1985 and 1995 National Nutrition Surveys [19]. Australian Bureau of Statistics population estimates [27] were used to obtain data for total per capita beverage sales.

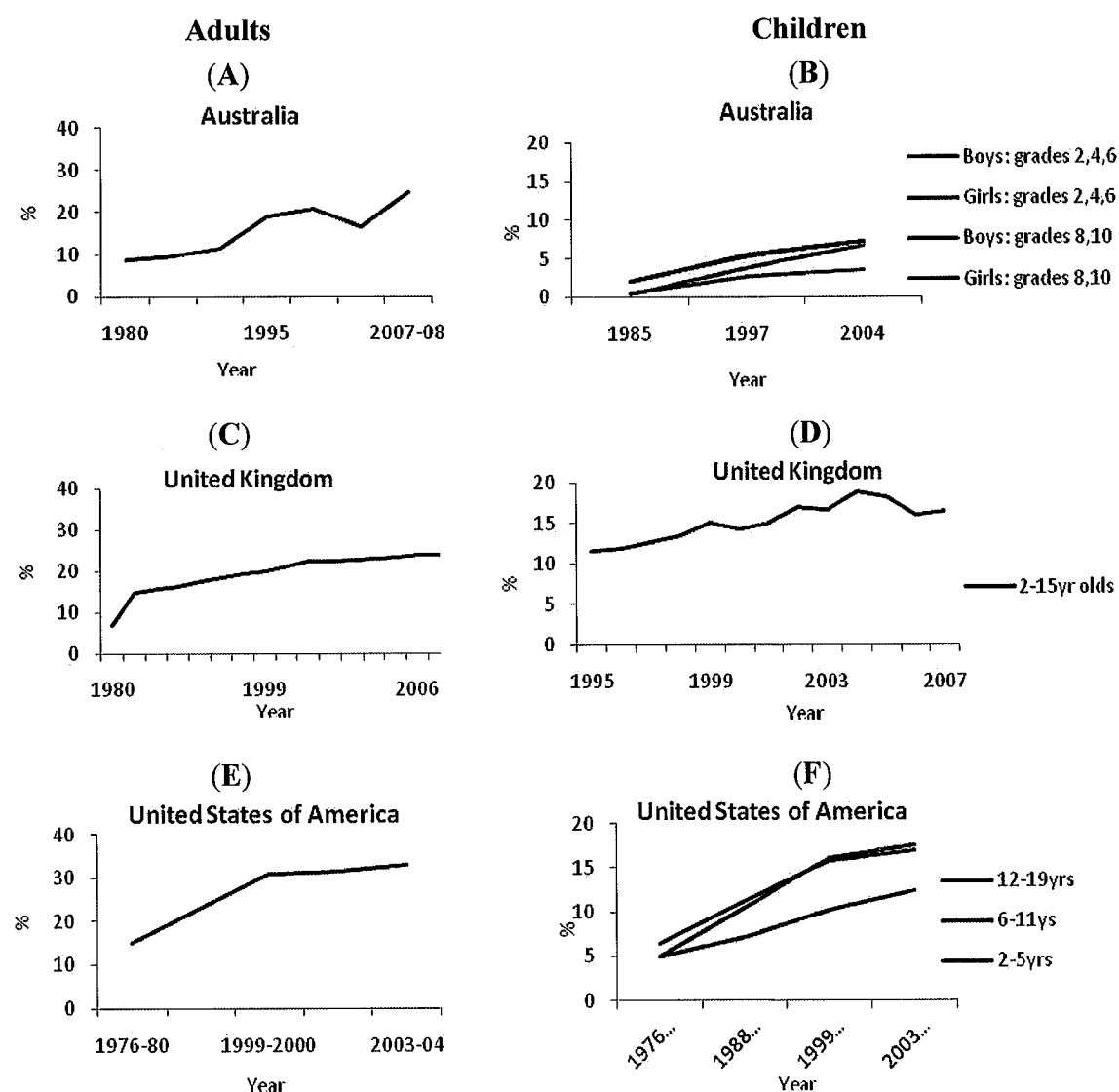
Dr. Gina Levy [28] provided supplementary water-based beverage volume sales data for the years 2005 and 2006. The Australian Beverage Council Ltd. [15] representing major water-based beverage companies such as Coca-Cola Amatil Australia, Pepsico Australia, Cadbury Schweppes Australia and Unilever Australasia, provided volume sales data for the 10 year period from 1994 to 2004. This sales data was formerly from AC Nielsen Scan Track Data [29].

3. Results

3.1. Obesity Prevalence

Obesity rates increased in Australia [18], the UK [23] and the USA [24], for adults, adolescents and children (Figure 1).

Figure 1. Prevalence of obesity (%) in (A) Australian adults, (B) Australian children, (C) adults in the United Kingdom, (D) children in the United Kingdom and (E) American adults (F) and children [18,23,24].



3.2. Apparent Consumption of Sugar

Figure 2 shows the refined and added sugars consumption (kg/capita/year) for Australia, the UK and the USA from 1980 to 2003 [25]. Over the period 1980–2003 in Australia, consumption of total nutritive sweeteners fell 16% (9 kg, or 25 g per day), refined sucrose consumption dropped 23% (11 kg) and consumption of other sweeteners (glucose, dextrose, fructose, lactose, isoglucose, maltose, maple sugar or similar) increased from a small baseline to 3 kg per capita (8 g per day). Over this same

period in the UK, consumption of total nutritive sweeteners fell 5% (2 kg, or 6 g per day), refined sucrose consumption dropped 10% (4 kg) and consumption of other sweeteners increased to 1 kg per capita from zero consumption in 1980. In the USA, from 1980 to 2003, consumption of total nutritive sweeteners increased 23% (13 kg = 37 g per day), refined sucrose consumption dropped 20% (7 kg) while consumption of other sweeteners (primarily high fructose corn syrups in the USA) increased 138% (22 kg). In all three countries, the consumption of refined sucrose showed a downward trend [25].

Figure 2. Intake of added sugars (kg/capita/year) in (A) Australia, (B) the United Kingdom and (C) the United States of America [25].

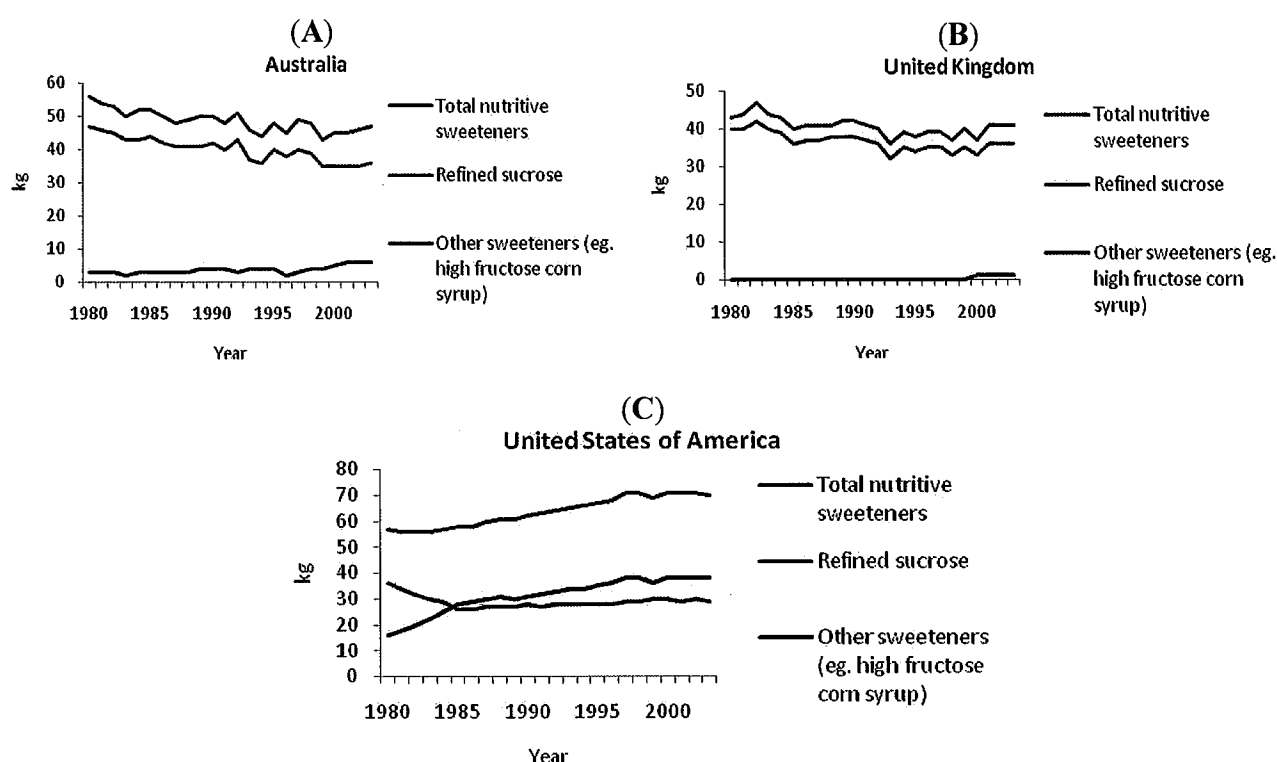
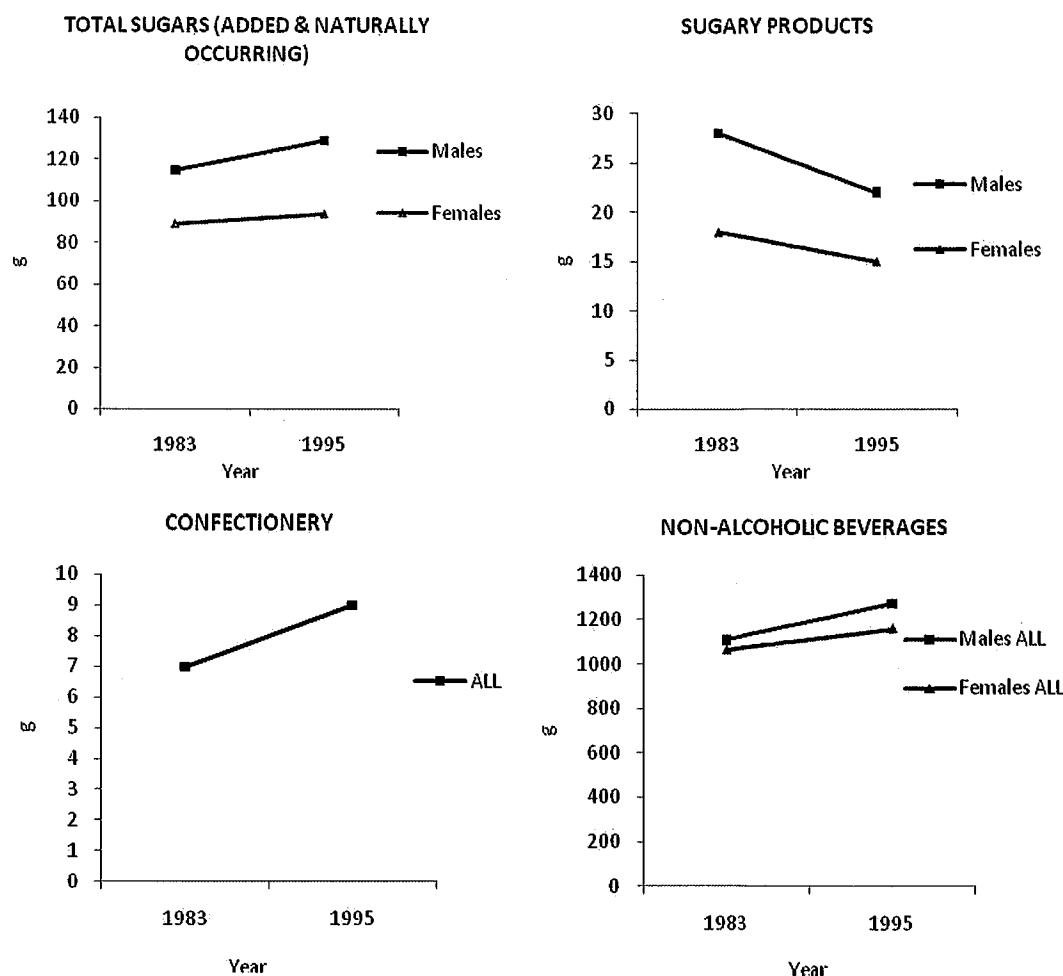


Figure 3 shows an historical comparison of the 24 h sugars intakes from various sources for Australian adults in 1983 and 1995 (most recent data available) [19]. For men, intake of total sugars (added and naturally occurring sugars in fruit, fruit juices, *etc.*) increased by 12% to 129 g from 1983 to 1995. For women, intake of total sugars increased by 6% to 94 g over this period. With regard to confectionery mean 24 h intake increased from 7 g to 9 g for both men and women from 1983 to 1995. Although the intake of confectionery showed an upward trend, absolute intake was small (<10 g) in comparison with the other sources. Intake of sugary products (e.g., cakes, cookies) decreased from 28 g to 22 g and 18 g to 15 g for both men and women respectively. For men, intake of all non-alcoholic beverages (including fruit and vegetable juices, cordials, tea and coffee, mineral waters, electrolyte drinks, sugar and non-nutritively sweetened soft drinks) increased by 15% to 1274 g from 1983 to 1995. For women, intake of all non-alcoholic beverages (including non-nutritively sweetened varieties) increased by 9% to 1159 g over the same time period.

Figure 3. 24 h mean intake (g) of total sugars, sugary products, confectionery and non-alcoholic beverages * by Australian adults (25–64 years) in 1983 and 1995 [19].

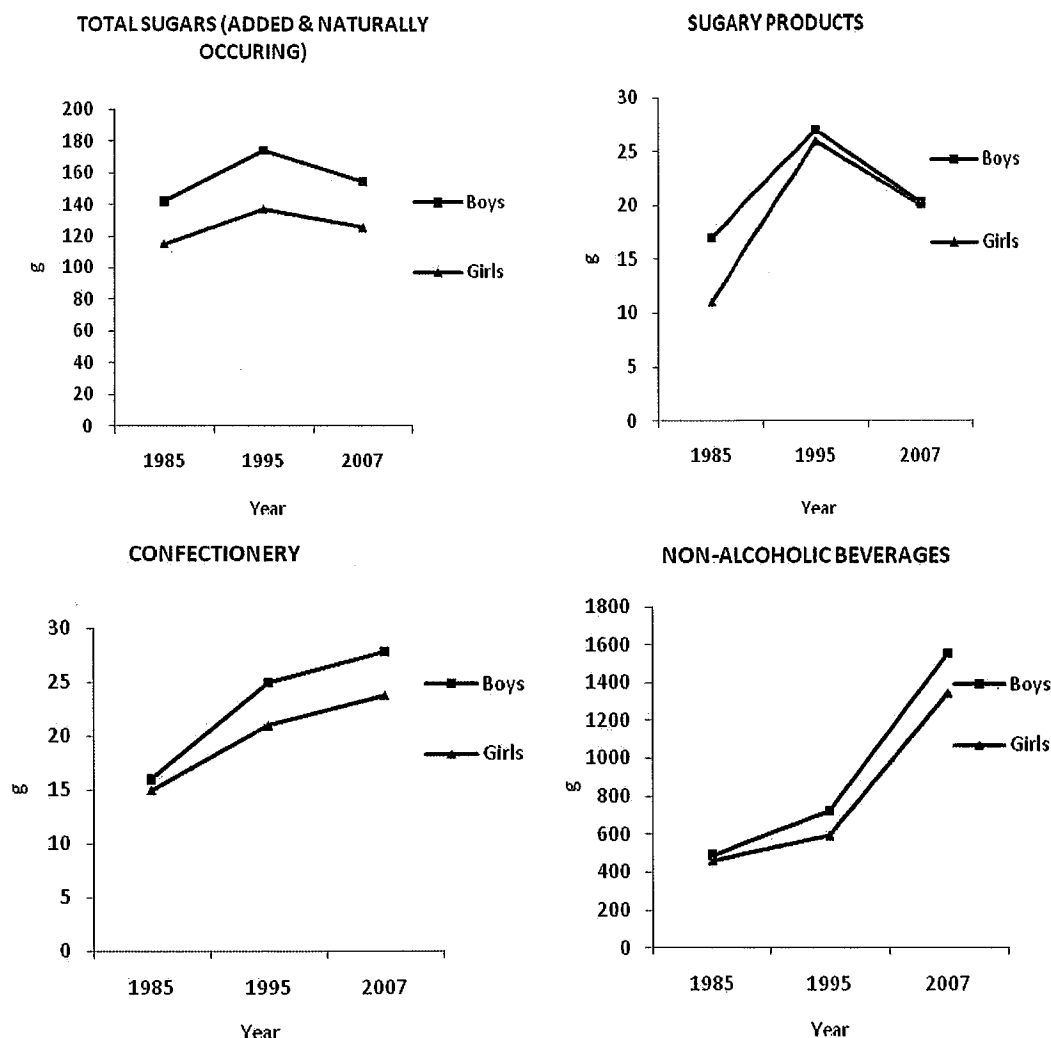


* Including coffee, tea and low joule soft drinks.

Figure 4 shows a comparison of the 24 h mean sugars intakes for children. For boys, intake of total sugars (added and naturally occurring) increased from 142 g in 1985 to 174 g in 1995 [19], but then declined to 154 g in 2007 [5]. Girls showed a similar pattern of intake of total sugars, with an increase from 115 g in 1985 to 137 g in 1995, then a fall to 125 g in 2007. In boys, intake of confectionery showed an increasing intake (16 g to 25 g to 28 g) for the years 1985, 1995 and 2007 respectively. Girls showed a similar increasing intake (15 g to 21 g to 24 g) across 1985, 1995 and 2007.

In boys, the intake of sugary products increased from 17 g in 1985 to 27 g in 1995 but decreased to 20 g in 2007. Girls' intake increased from 11 g in 1985 to 26 g in 1995 but decreased to 20 g in 2007. For boys, intake of non-alcoholic beverages (including fruit and vegetable juices, cordials, tea and coffee, mineral waters, electrolyte drinks, sugar and non-nutritively sweetened soft drinks) increased from 490 g to 724 g to 1555 g across 1985, 1995 and 2007. For girls, intake of non-alcoholic beverages (non-nutritively sweetened varieties) increased from 459 g to 592 g to 1342 g across 1985, 1995 and 2007.

Figure 4. 24 h mean intake (g) of total sugars, sugary products, confectionery and non-alcoholic beverages * by Australian children in 1985, 1995 and 2007 [5,19]. Note: the age categories used for comparison where 10–15 year old children in years 1985 and 1995, the 2007 figure is an average between intakes of 9–13 year and 14–16 year categories.



* Including coffee, tea and low joule soft drinks.

3.3. Nutritively Sweetened Beverage Consumption from Sales Data

Figure 5 shows the time trend in sales of nutritively sweetened and non-nutritively sweetened beverages in Australian grocery stores, expressed as total volume per capita [15,28–30]. Nutritively sweetened beverages made up the largest share of total water-based beverage sales, but during the period 2002–2006 there was a downward trend, with an absolute reduction in sales of nutritively sweetened beverages by 64 million liters. For nutritively sweetened beverages, sales were 96 mL/day/person in 1994, increasing to 129 mL/day/person in 2004, then decreasing to 125 mL/day/person in 2006. The sales of non-nutritively sweetened (diet/low-joule) beverages increased by 34% from 1997 to 2006 [30]. Per capita, non-nutritively sweetened beverages sales doubled from 41 mL/day/person in 1994 to 82 mL/day/person in 2006 [15,28].

Figure 5. Time trends in sales of nutritively sweetened beverages and non-nutritively sweetened beverages in grocery stores, expressed as (A) per capita volume sold in liters and as (B) a percentage of total volume sold [15,28–30].

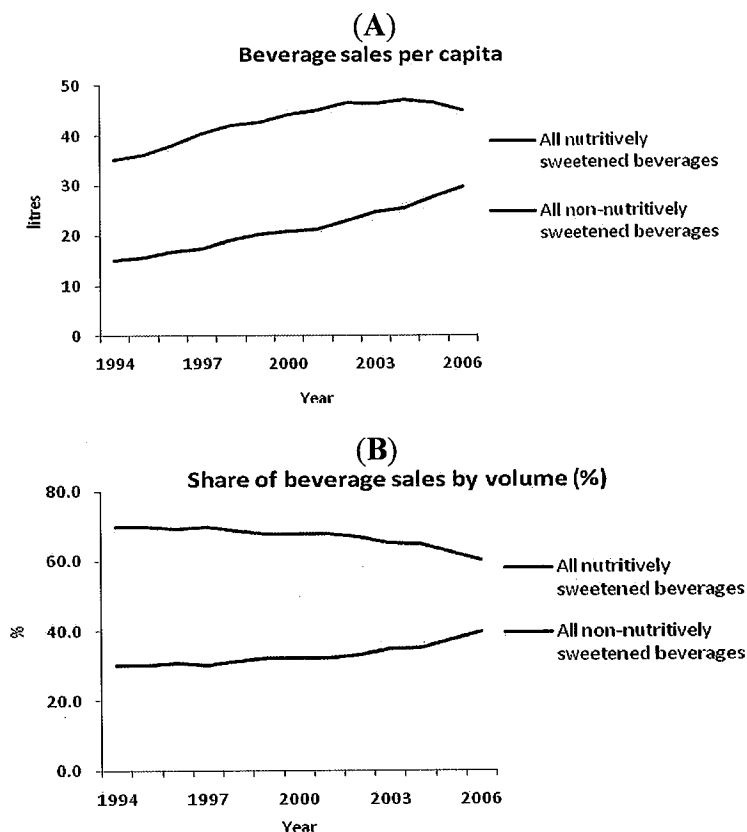
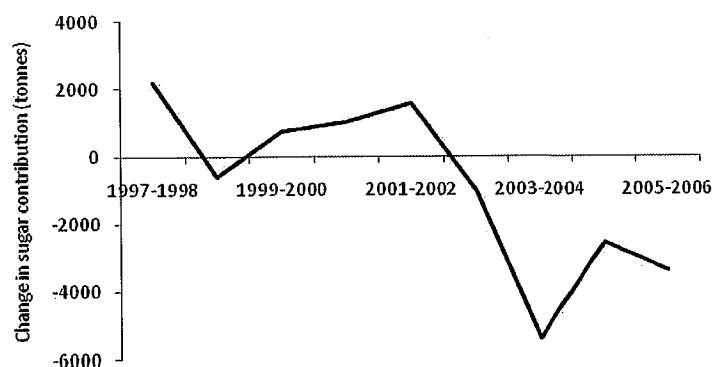


Figure 6 shows the annual change in the contribution of sugar from nutritively sweetened carbonated soft drinks (sugar-sweetened soft drinks) to the Australian food supply [30]. Levy and Tapsell [30] reported a concurrent increase in sugar from other nutritively sweetened beverages (e.g., sports drinks, flavored waters and iced teas). However, the increase in sugar contribution to the food supply from these beverages did not contribute enough volume to match the decline in nutritively sweetened carbonated soft drinks. Overall, there was a decrease in sugar contribution from nutritively sweetened carbonated soft drinks to the Australian food supply, amounting to 12,402 tons (~600 g per person per year, Figure 6) from 2002 to 2006.

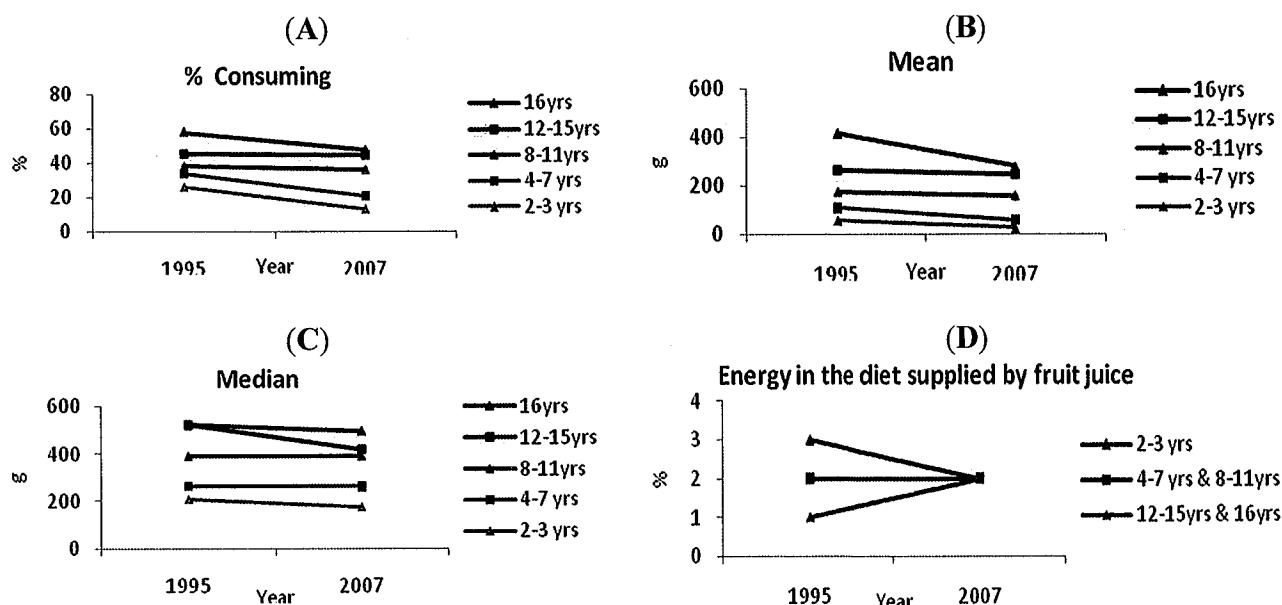
Figure 6. Annual change in contribution of nutritively-sweetened carbonated soft drinks to total added sugar in the Australian food supply [30].



3.4. Consumption of Soft Drinks, Flavored Waters, Electrolyte Drinks and Fruit Juice by Children

Overall, the percentage of children who consumed soft drinks, flavored waters and electrolyte drinks (both sugar and non-nutritively sweetened) declined from the 1995 NNS to the 2007 Australian National Children's Nutrition and Physical Activity Survey [5,26] (Figure 7A). Among consumers, mean and median intakes of soft drinks, flavored waters and electrolyte drinks also decreased (Figure 7B). In the 16–18 year age group, mean intake fell by 33% to 278 g. In the 12–15 year age group, mean intake fell by 6% to 247 g in 2007. In the 8–11 year age group, mean intake fell by 10%. In the 4–7 year age group mean intake fell by 45%. For the 2–3 year age group, mean intake fell by 55% to 26 g in 2007.

Figure 7. (A) Percent consuming, (B) mean intakes and (C) median intakes of soft drinks, flavored waters and electrolyte drinks by children in 1995 and 2007, and (D) percentage of energy supplied by fruit juice in the diets of children [5,26].



Similarly, median intake (in grams) of soft drinks, flavored waters and electrolyte drinks decreased across all age groups apart from the 8–11 year group which remained static at 391 g/day.

Fruit juice consumption is also of interest because, like soft drinks, they represent sugars in an acidic solution. The percentage of energy supplied by fruit juice was small (of the order of 1–3% depending on age group) and changes between 1995 and 2007 were small.

4. Discussion

This analysis of apparent consumption, national dietary surveys and food industry data indicates a consistent and substantial decline in total refined or added sugar consumption by Australians over the past 30 years. In this respect, Australia may be unique, although FAO statistics suggest a modest reduction in refined sugar intake has also occurred in the UK. These trends contrast with a sizeable increase in the intake of total nutritive sweeteners in the USA, attributable to increased intake of high

fructose corn syrup. Notably, Australia is a major grower and exporter of sugar cane, and the majority of nutritive sweetener use is in the form of refined sucrose [31].

Over the same timeframe, like other developed nations, Australia has experienced a 3-fold increase in the prevalence of obesity among adults and children. Hence in this ecological analysis, trends in refined sugar consumption are inversely related to incremental weight gain in the population as a whole. These findings support the supposition that once total energy intake has been accounted for, per capita changes in energy from sweeteners do not explain changes in the incidence of obesity [32]. Studies using individual dietary intakes have also reported inverse associations between sugar intake and body weight [33,34]. In Australia, two independent analyses of the most recent National Nutrition Survey reported no significant associations between intakes of sugars and health status, including body fatness, BMI and blood pressure [35,36]. Finally, while Australia already has some of the highest rates of overweight/obesity in the world [4,5], we are unable to rule out the possibility that rates may have been higher if consumption of sugars had not decreased over the past few decades.

Our findings suggest that Australians have taken seriously public health recommendations to decrease sugars, particularly sugar-sweetened beverages. Food industry data indicate that per capita sales of low calorie (non-nutritively sweetened) beverages doubled from 1994 to 2006 while nutritively sweetened beverages decreased by 10%. At present, one in three soft drinks sold in Australia are non-nutritive [15,28–30]. Indeed, Australians have willingly adopted many other public health recommendations, including universal wearing of seat belts (the “click clack, front and back” campaign) and sunscreens (the “slip, slop, slap” campaign).

Evidence for an association between sugars consumption and weight gain from clinical trials and epidemiological studies has been inconclusive. There have been four systematic reviews that have included evidence from a large range of clinical trials, cohort studies and cross-sectional analyses, that have investigated the role of sugar sweetened beverages in the development of obesity in humans aged 1–99 years [8,37–39]. Of these, only one [8] supported an independent role for sugar sweetened beverages in the etiology of overweight/obesity. Similarly, there have been two systematic reviews investigating the role of added sugars in the development of obesity in men and women [40,41]. When sucrose, glucose, or starch was replaced with >100 g of fructose/day, a weight gain of 0.44 kg/week was observed in adults [40], whereas there were inconsistent associations when sugars were replaced with non-nutritive sweeteners, starch and fat [41]. Larger, well designed clinical trials are needed to further investigate this relationship.

A limitation common to all ecological studies is that relationships observed for groups do not necessarily hold for individuals. In the national population surveys, the dietary methodologies employed varied from food frequency questionnaires to 24 h recall of food intake. Recall data are only a crude estimate of actual intake, especially in children where there is high day-to-day variability. For adults, the most recent nationally representative food intake data are now 15 years old. Recall precision accuracy, low response rates, reporting and classification errors were relatively common and may have introduced confounding. Per capita consumption data are useful in determining upward or downward trends over time and for filling gaps by describing current levels of sugar intake for the entire population. Like all apparent consumption data, there are limitations in describing individual intake due to losses that occur when foods are actually prepared and consumed (e.g., plate wastage). Indeed, Baghurst and colleagues found that intake data from several population surveys indicated that the

mean level of consumption of refined sugars was not as high as was estimated from apparent consumption [42]. Nonetheless, in the case of refined sugar, individuals may consciously or unconsciously underestimate intake of a substance that is considered unhealthy. Because refined sugar is a highly controlled commodity that is not grown for personal use, apparent consumption data are perhaps the most objective way to assess trends over time. Per capita food consumption statistics from FAO have compared favorably with energy and macronutrient intake estimated from population surveys [32,43].

Finally, data generated by the food and beverage industry for its own purposes may not be entirely reliable because there is no independent monitoring or peer review. However, industry makes financial decisions based on consumer demand and buying patterns and there is no reason to believe that it does not reflect the true state of affairs. Their data provide information on product usage that, combined with direct intake data, provide useful insights into the food environment.

Our findings do not support the widely held belief that reducing the consumption of refined sugars, and increasing the availability and preference for low-joule beverages, will help to reverse societal trends in obesity. Most recently, the American Heart Association stated that “added sugars are an important factor in the obesity crisis” and set strict guidelines for added sugar intake [44]. Specifically the guidelines recommend that Americans should eat or drink no more than 5 teaspoons (25 g) of added sugar per day for most women and 9 teaspoons (45 g) per day for the majority of men.

Clearly, overconsumption of energy relative to needs must be addressed to halt the obesity epidemic. However, a recent analysis of Australian children’s dietary intakes from 1995 to 2007 revealed a substantial decrease in sugar-sweetened beverage (halved as a percentage of energy) consumption over the past decade, but increased consumption in the proportion of energy from chocolate, cakes and cookies, pizza and packet chips [33]. Furthermore, the 2007 National Children’s Nutrition and Physical Activity Survey showed that sugar and sugary beverages were not predominant “extra” foods in the diets of Australian children. Therefore, the question of whether there is much to be gained by focusing public health policy on the removal of sugar and sugar-sweetened beverages remains. The concern is that potentially more important determinants of obesity are being overlooked by the current emphasis on sugars and soft drinks.

Questioning the priority of public health messages is relevant. It is possible that less emphasis has been given to disseminating the message of lowering total energy intake, while avoidance of particular nutrients, such as sugars, has been the primary focus. In practice, many individuals over-consume “fast” foods along with a diet drink. Interestingly, research by WHO found that the Australian energy supply has increased almost exclusively as a result of an increase in intake of fat [32]. Likewise, strategies aimed at reduction of added sugars consumption alone will not automatically improve overall dietary quality [45]. Indeed, lower relative fat consumption was obvious in the high added sugars consumers (the sugar fat seesaw), which would suggest that a reduction in added sugars might lead to increased fat consumption. Logic tells us that an inappropriately high intake of any energy source (alcohol, fat, protein, starch or sugar) will result in weight gain.

Indeed, a literal interpretation of our findings would suggest that reductions in sugar intake may have contributed to the rise in obesity. Lowering the sugar content of foods may be counterproductive for weight management if there is replacement of sugars with refined or high glycemic index starches, saturated fats or alcohol.

5. Conclusions

The present analysis indicates the existence of an Australian Paradox, *i.e.*, an inverse relationship between secular trends in the prevalence of obesity prevalence (increasing by ~300%) and the consumption of refined sugar over the same time frame (declining by ~20%). The findings challenge the implicit assumption that taxes and other measures to reduce intake of soft drinks will be an effective strategy in global efforts to reduce obesity.

Acknowledgements

This study was a Masters of Nutrition and Dietetic project conducted by Laura Owens and co-supervised by AWB and JBM.

AWB is a co-author of one of the books in The New Glucose Revolution book series (Hodder and Stoughton, London, UK; Marlowe and Co., New York, NY, USA; Hodder Headline, Sydney, Australia and elsewhere): Diabetes and Pre-diabetes handbook, and is a consultant to a not-for-profit GI-based food endorsement program in Australia.

JBM is a co-author of The New Glucose Revolution book series (Hodder and Stoughton, London, UK; Marlowe and Co., New York, NY, USA; Hodder Headline, Sydney, Australia and elsewhere), the Director of a not-for-profit GI-based food endorsement program in Australia and manages the University of Sydney GI testing service.

References

1. World Health Organization. *Global Strategy on Diet, Physical Activity and Health*; WHO: Geneva, Switzerland, 2004.
2. National Heart, Lung, and Blood Institute. *Clinical Guidelines on the Identification, Evaluation, and Treatment of Overweight and Obesity in Adults: The Evidence Report*; NHLBI: Bethesda, MD, USA, 1998.
3. World Health Organization. *Consultation on Obesity*; WHO: Geneva, Switzerland, 1999.
4. Australian Bureau of Statistics. *4364.0—National Health Survey: Summary of Results, 2007–2008*; ABS: Canberra, Australia, 2009.
5. Commonwealth Scientific Industrial Research Organisation (CSIRO), Preventative Health National Research Flagship, the University of South Australia. *2007 Australian National Children's Nutrition and Physical Activity Survey—Main Findings*; CSIRO: Clayton South, Australia, 2008.
6. Access Economics. *The Growing Cost of Obesity in 2008: Three Years on*; Diabetes Australia: Canberra, Australia, 2010.
7. Gross, L.S.; Li, L.; Ford, E.S.; Liu, S. Increased consumption of refined carbohydrates and the epidemic of type 2 diabetes in the United States: An ecologic assessment. *Am. J. Clin. Nutr.* **2004**, *79*, 774–779.
8. Malik, V.S.; Schulze, M.B.; Hu, F.B. Intake of sugar-sweetened beverages and weight gain: A systematic review. *Am. J. Clin. Nutr.* **2006**, *84*, 274–288.
9. World Health Organization, United Nations, 2009. Available online: <http://www.who.int/en/> (accessed on 1 September 2009).

10. Australian Bureau of Statistics, Commonwealth of Australia, 2009. Available online: <http://www.abs.gov.au/> (accessed on 1 September 2009).
11. Australian Food and Grocery Council, 2009. Available online: <http://www.afgc.org.au/> (accessed on 1 September 2009).
12. Australian Retailers Association, 2009. Available online: <http://www.retail.org.au/> (accessed on 1 September 2009).
13. Commonwealth Scientific and Industrial Research Organization, Commonwealth of Australia, 2009. Available online: <http://www.csiro.au/> (accessed on 1 September 2009).
14. Australian Government, Commonwealth of Australia, 2009. Available online: <http://australia.gov.au/> (accessed on 1 September 2009).
15. Australian Beverages Council Ltd., 2009. Available online: <http://www.australianbeverages.org/home.html> (accessed on 1 September 2009).
16. CSR Ltd., 2009. Available online: <http://www.csr.com.au> (accessed on 1 September 2009).
17. Wesfarmers Coles Supermarkets, 2009. Available online: <http://www.coles.com.au/> (accessed on 1 September 2009).
18. Woolworths Ltd., 2009. Available online: <http://www.woolworthslimited.com.au> (accessed on 1 September 2009).
19. Cook, P.; Rutishauser, I.H.E.; Allsopp, R. *The Bridging Study—Comparing Results from the 1983, 1985 and 1995 Australian National Nutrition Surveys*; Commonwealth Department of Health and Aged Care: Canberra, Australia, 2001.
20. McLennan, W.; Podger, A. *National Nutrition Survey Nutrient Intakes and Physical Measurements, Australia, 1995*; Catalogue No. 4805.0; Australian Bureau of Statistics: Canberra, Australia, 1998.
21. Cameron, A.J.; Welborn, T.A.; Zimmet, P.Z.; Dunstan, D.W.; Owen, N.; Salmon, J.; Dalton, M.; Jolley, D.; Shaw, J.E. Overweight and obesity in Australia: The 1999–2000 Australian diabetes, obesity and lifestyle study (AusDiab). *Med. J. Aust.* **2003**, *178*, 427–432.
22. Australian Bureau of Statistics. *National Health Survey 2004–05*; Commonwealth of Australia: Canberra, Australia, 2006.
23. The Health and Social Care Information Centre, UK. Health Survey for England 2007, Latest Trends, 2008. Available online: <http://www.ic.nhs.uk/webfiles/publications/HSE07/Health%20Survey%20for%20England%202007%20Latest%20Trends.pdf> (accessed on 1 September 2009).
24. National Centre for Health Statistics. Third National Health and Nutrition Examination Survey (NHANES III) Public-Use Data Files, 2004. Available online: http://www.cdc.gov/nchs/products/elec_prods/subject/nhanes3.htm (accessed on 20 April 2006).
25. The Food and Agriculture Organization of the United Nations, Food consumption quantities, 2009. Available online: <http://faostat.fao.org/site/368/DesktopDefault.aspx?PageID=368#ancor> (accessed on 11 August 2009).
26. Cobiac, L.; Mortensen, A.; Baghurst, K. *The Role of Beverages in the Diet of Australian Children*; Australian Beverages Council Ltd.: Rosebery, Australia, 2010.
27. Australian Bureau of Statistics. Census of population and housing, 2009. Available online: <http://www.abs.gov.au/websitedbs/D3310114.nsf/Home/Census> (accessed on 11 August 2009).

28. Levy, G. Food Logic, 2009. Available online: <http://www.foodlogic.com.au/> (accessed on 14 August 2009).
29. AC Nielsen ScanTrack, 2009. Available online: http://au.nielsen.com/products/crs_scantrack.shtml (accessed on 14 August 2009).
30. Levy, G.; Tapsell, L. Shifts in purchasing patterns of non-alcoholic, water-based beverages in Australia, 1997–2006. *Nutr. Diet.* **2007**, *64*, 268–279.
31. National Health and Medical Research Council. *Dietary Guidelines for Children and Adolescents in Australia*; Commonwealth of Australia: Canberra, Australia, 2003.
32. Silventoinen, K.; Sans, S.; Tolonen, H.; Monterde, D.; Kuulasmaa, K.; Kesteloot, H.; Tuomilehto, J. Trends in obesity and energy supply in the WHO MONICA Project. *Int. J. Obes. Relat. Metab. Disord.* **2004**, *28*, 710–718.
33. Gibney, M.; Sigman-Grant, M.; Stanton, J.L., Jr.; Keast, D.R. Consumption of sugars. *Am. J. Clin. Nutr.* **1995**, *62*, 178S–193S.
34. Hill, J.O.; Prentice, A.M. Sugar and body weight regulation. *Am. J. Clin. Nutr.* **1995**, *62*, 264S–273S.
35. Cobiac, L. Sugars in the Australian diet: Results from the 1995 National Nutrition Survey. *Nutr. Diet.* **2003**, *60*, 152–173.
36. Bell, A.C. Contribution of “noncore” foods and beverages to the energy intake and weight status of Australian children. *Eur. J. Clin. Nutr.* **2005**, *59*, 639–645.
37. Forshee, R.A.; Anderson, P.A.; Storey, M.L. Sugar-sweetened beverages and body mass index in children and adolescents: A meta-analysis. *Am. J. Clin. Nutr.* **2008**, *87*, 1662–1671.
38. Gibson, S. Sugar-sweetened soft drinks and obesity: A systematic review of the evidence from observational studies and interventions. *Nutr. Res. Rev.* **2008**, *21*, 134–147.
39. Wolff, E.; Dansinger, M.L. Soft drinks and weight gain: How strong is the link? *Medscape J. Med.* **2008**, *10*, 189.
40. Livesey, G.; Taylor, R. Fructose consumption and consequences for glycation, plasma triacylglycerol, and body weight: Meta-analyses and meta-regression models of intervention studies. *Am. J. Clin. Nutr.* **2008**, *88*, 1419–1437.
41. Vermunt, S.H.; Pasman, W.J.; Schaafsma, G.; Kardinaal, A.F. Effects of sugar intake on body weight: A review. *Obes. Rev.* **2003**, *4*, 91–99.
42. Baghurst, K.I.; Record, S.J.; Syrette, J.A.; Crawford, D.A.; Baghurst, P.A. Intakes and sources of a range of dietary sugars in various Australian populations. *Med. J. Aust.* **1989**, *151*, 512–518.
43. Sasaki, S.; Kesteloot, H. Value of food and agriculture organization data on food-balance sheets as a data source for dietary fat intake in epidemiologic studies. *Am. J. Clin. Nutr.* **1992**, *56*, 716–723.
44. Johnson, R.K.; Appel, L.J.; Brands, M.; Howard, B.V.; Lefevre, M.; Lustig, R.H.; Sacks, F.; Steffen, L.M.; Wylie-Rosett, J. Dietary sugars intake and cardiovascular health: A scientific statement from the American Heart Association. *Circulation* **2009**, *120*, 1011–1020.
45. Baghurst, K.I. Demographic and nutritional profiles of people consuming varying levels of added sugars. *Nutr. Res.* **1992**, *12*, 1455–1465.

Attachment 2

'The Australian Paradox Revisited', Jennie Brand-Miller and Alan W.
Barclay ('**the Australian
Paradox Revisited**')

The Australian Paradox Revisited

Jennie Brand-Miller^{1,*} and Alan W. Barclay²

¹ School of Molecular Bioscience and Boden Institute of Obesity, Nutrition and Exercise, University of Sydney, Sydney, NSW 2006, Australia

² Australian Diabetes Council, 26 Arundel Street, Glebe, NSW 2037, Australia;
E-Mail: alan@australiandiabetescouncil.com

* Author to whom correspondence should be addressed; E-Mail: jennie.brandmiller@sydney.edu.au;
Tel.: +61-2-9351-3759; Fax: +61-2-9351-6022.

Received: 25 March 2012 / Published: 30 March 2012

The *Australian Paradox* reported the observation that upward changes in the prevalence of overweight and obesity in Australia run counter to changes in *refined* sugars intake [1]. Economist, Rory Robertson claims there is no Australian Paradox, just unreasonable treatment of the available data [2]. Unfortunately, there are factual errors in Mr. Robertson's essay and misinterpretation of the distinctions between total sugars vs. refined sugars, sugar availability vs. apparent consumption, sugar-sweetened and diet soft drinks, and other nutrition information. While the terminology, strengths and limitations of various nutrition data are readily understood by individuals trained in nutrition, some confusion may have been avoided if our original paper had referred to refined sugars in its title and described the terminology used.

Our peer-reviewed published analysis argued the case for a decline in refined sugar (sucrose) consumption by Australians over past decades. By several indicators, it has decreased over the same timeframe that the prevalence of overweight and obesity has risen strongly. This paradox challenges the current focus on sources of refined sugar, sucrose or fructose as primary players in the development of overweight and obesity in Australia.

The Australian Paradox relied on three independent lines of evidence: national dietary surveys, apparent consumption data from the United Nations Food and Agricultural Organisation (FAO) and beverage industry data.

National Dietary Surveys provide the most reliable estimates of food intake and therefore *total sugars*, but they do not tell us exactly what proportion is refined sugar. Total sugars intake includes the naturally-occurring sugars in fruits, vegetables, milk and dairy products as well as "added" sugars. Australian Dietary Guidelines recommend two serves of fruit a day, equivalent to ~20–30 g natural sugar, and 5 serves of vegetables, providing ~20–25 g. A glass of milk contains 12 g natural milk sugar, and 2–3 serves are recommended. A healthy diet could contain 90 g of naturally-occurring sugars.

In the last National Nutrition Survey in 1995 [3], 95% of Australian adults consumed less than 115 g of total sugars per day, a level well within international guidelines of <25% energy [4]. Although there were small increases in *total* sugars from 1983 to 1995, there were sharper declines in "sugary products" that contribute *refined* sugar to the diet. Importantly, intake of fruit and vegetables

increased [5], implying that the absolute intake of refined sugars had declined. The percentage of energy from total sugars remained either the same or decreased from 1983 to 1995, depending on the age group. Knowledge of food composition is critical to interpretation of the data.

In the 2007 national survey of Australian children [6], total sugars (naturally-occurring and added) amounted to 99, 112, 135 and 145 g per day for children aged 2–3, 4–8, 9–13 and 14–16 years, respectively. On average, they consumed ~16 g/day *less* sugar from all sources in 2007 compared to 1995 [5,6]. In 1995, they consumed 3.3% of energy as sugar-sweetened beverages; in 2007, the figure across all age groups was only 1.6% [7]. This stands in stark contrast to ~18% of energy from *added* sugars alone in American adolescents, a level that *is* a cause of concern.

The Australian Paradox also utilised statistical information provided by the website FAOStat [8]. Compiled by trained professionals and accessed by business and governments for economic analysis and policy setting, FAO data permit the analysis of time trends in apparent consumption of food commodities within and between countries. Australian data on FAOStat are supplied by the Australian Bureau of Statistics using information gathered by the Australian Bureau of Agricultural and Resource Economics (ABARE). This line of evidence indicated that while per capita refined sugars consumption has steadily declined in Australia since 1970 [8,9], the USA displays a marked increase [8].

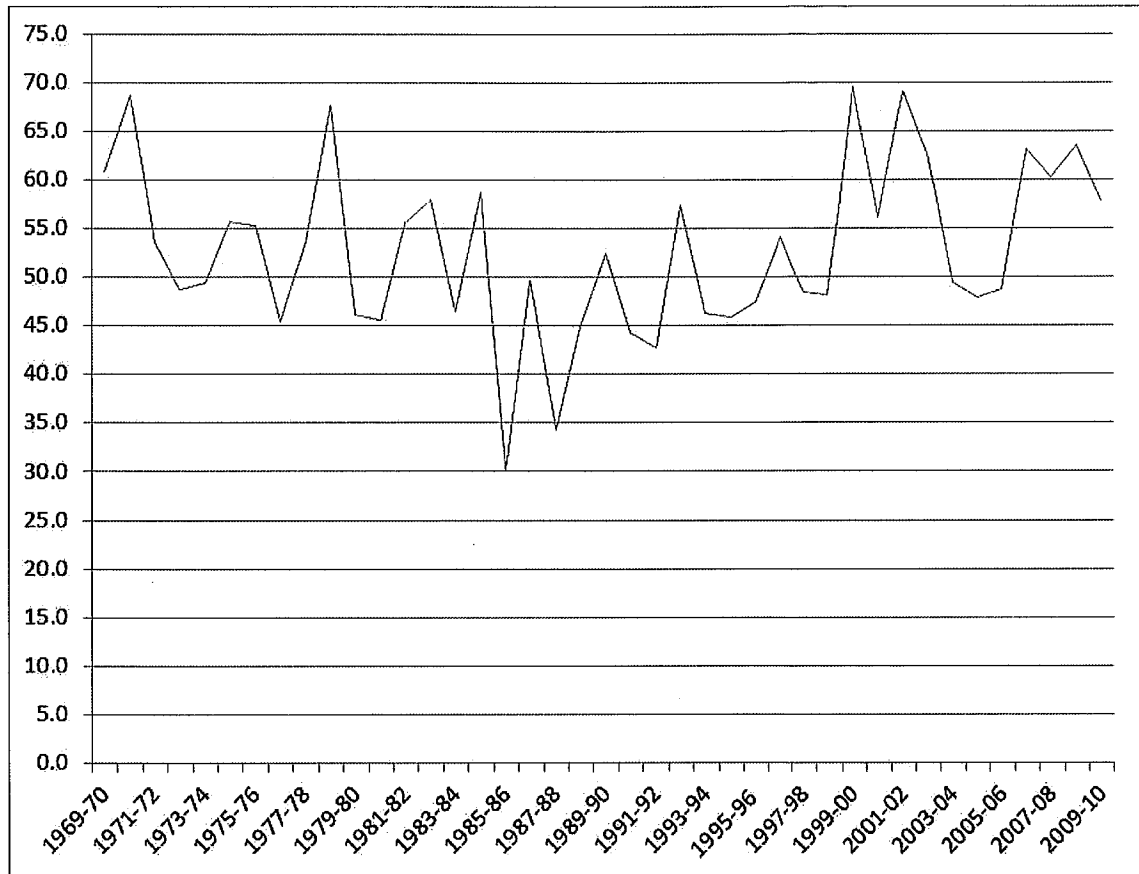
“Apparent” consumption data are estimates of food intake based on considering a country’s production, imports, exports, wastage and non-food uses of particular commodities. It is at best only a crude approximation of actual food intake but every student of nutrition learns its limitations. However, applied over time and across countries, it provides valuable information about *trends* in consumption. This was the rationale for using it as one line of evidence.

Curiously, Mr. Robertson dismisses the FAOStat data, citing ABARE data instead [10] as “the only timely official information on Australia-wide ‘sugar availability’”. He equates sugar availability with sugar consumption (real or apparent). He makes adjustments for population increases and concludes that “the trend over the past 22 years has been up and not down”. He fails to mention the trend for the previous ~20 years (1969 to 1989) where sugar availability dropped from a peak of nearly 69 kg per person per year to a low of 30 kg per capita (Figure 1). Therefore, using only ABARE data, we can conclude that overall availability of refined sugar varied widely but shows no significant trend ($p = 0.46$) during a period when rates of obesity climbed dramatically. Sugar availability, however, is not the same as consumption. Sugar availability takes no account of food wastage, use in animal food, beer and alcohol fermentation, or in non-food industrial use, and we cannot assume that a *steady* portion is lost in this way.

Australian Bureau of Statistics Apparent Consumption data are congruent with FAOStat data indicating sugar consumption peaked just after World War 2 (54 kg per person per year) and reached its lowest point in 1998–1999 (38 kg per person per year) [9]. However, rates of overweight/obesity nearly doubled from 37% in the 1980s [11] to 60% in 2000 [12].

Mr. Robertson also fails to note that per capita availability and consumption figures for virtually all food products (poultry, seafood, dairy, cereals, fruit and vegetables), are up in the past 22 years [9]. That is not surprising because the average Australian is now significantly older, taller and heavier than they were 30 years ago [13,14]. More food energy from protein, fat and carbohydrate is required just to maintain weight. If we eat more of everything, then the proportion of energy contributed by refined sugar will not change.

Figure 1. Changes in availability of refined sugar from sugar cane (production minus exports) in Australia per capita from 1969–1970 to 2009–2010. Data were derived from statistics published by the Australian Bureau of Agricultural and Resource Economics and Sciences, ABARE [10]. Sugar availability does not account for food wastage, use in animal food, beer and alcohol fermentation, or in non-food industrial use. From 1998–1999, the Australian Bureau of Statistics no longer derived apparent consumption statistics for any foodstuff, including sugar.



Mr. Robertson claims that total *volume* sales of soft drinks have increased but fails to distinguish soft drinks that are sugar-sweetened from those that are “diet” or low-joule flavoured waters. Diet soft drinks have increased markedly, now representing 1 in 3 soft drinks sold according to beverage industry data. Sales of “nutrient waters” with lower concentrations of sugars have also increased. In the Australian Paradox [1], we documented that sugar-sweetened sales per capita have declined *since 2003*, a period during which the prevalence of obesity continued to climb.

Considered together, these three lines of evidence are consistent with a decline in the consumption of refined sugar in Australia in recent decades.

Is Fructose a Toxic Carb?

Mr. Roberston expresses concerns about fructose intake in particular. The primary refined sugar used in Australia is sucrose, which yields 50% fructose by weight. Fructose also represents about ~50% of the natural sugars in fruit, vegetables and grains [15]. The large majority (95%) of

Australians consume less than 70 g of total fructose per day from all sources. Intakes greater than 100 g/day of pure *added* fructose have been suggested to cause weight gain and adverse effects on metabolism [16,17].

Two recent systematic literature reviews of all available human research on fructose [16,17] make similar conclusions “*Fructose does not seem to cause weight gain when it is substituted for other carbohydrates in diets providing similar calories. Free fructose at high doses [>104 g per day, or 25 teaspoons] that provided excess calories modestly increased body weight, an effect that may be due to the extra calories rather than the fructose.*” [17]. This evidence does not support the claim that “*sugar is toxic*”.

We agree that there is no shortage of refined sugars. We agree that they can be a source of unwanted kilojoules. However, we and many other nutritionists believe refined sugar can be consumed in moderation (up to 10% of energy or ~50 g) as part of a healthy balanced diet. Often overlooked is the fact that refined starches (cornstarch, modified starches, maltodextrins) and foods high in starch such as white flour and white breads, rice, rice crackers, corn chips and crisps, can be a source of unwanted kilojoules, as well as salt and saturated fat, and devoid of essential nutrients unless fortified. There is little logic to dietary recommendations that emphasise restriction of refined sugars but ignore refined starches.

Fructose Was Not “Scarce”

From an evolutionary perspective, fruit and therefore fructose, was an important component of intelligent primate diets. Recent data show that mountain gorillas derive over 20–40% energy from fruit for 6 months of the year [18]. The anthropological literature shows that fruits that dried on the vine were available year round. In the 1980s, we analysed hundreds of traditional Aboriginal bushfoods sent to us from all over Australia, including sugarbag (bush honey) and dried bush fruits, such as the bush tomato *Solanum centrale* containing 80% sugars [19]. Like many animals, our ancestors adored honey (~70% sugars) and made sweet drinks using both honey and floral nectars [20]. Apiculture, the art of raising bees, was widely practiced even by the poor. Indeed at certain times in history, consumption of honey may well rivalled our current consumption of refined sugar [9,20]. Both evolution and anthropology therefore indicate that fructose consumption was a significant source of carbohydrate energy in human diets. Starch is the relative newcomer [21]. Nutritional analysis of a typical low GI menu generates 70 g total sugars/day, of which 35 g would be fructose.

Conclusion

Three different, independent sources of evidence indicate that Australians’ intake of refined sugars intake has *not* increased. By several indicators, it has declined over the same timeframe that the prevalence of overweight and obesity has risen strongly. Australia is not alone in this regard. Over the last 10 years, other countries, including the United States, have also recorded reductions in intake of refined sugars [22,23]. This paradox challenges the view that concentrated sources of sugar, sucrose or fructose are primary players in the genesis of overweight and obesity.

Acknowledgements

JBM is a co-author of books about the glycemic index of foods (The Low GI Handbook, Hachette Livre Australia, The New Glucose Revolution, de Capo Press, New York), a Director of Glycemic Index Ltd., an international, not-for-profit GI-based food endorsement program based in Australia and supervises the University of Sydney GI testing service [24].

AB is a co-author of The Diabetes and Pre-Diabetes Handbook (Hachette Livre Australia) and a director of and consultant to Glycemic Index Ltd., an international, not-for-profit GI-based food endorsement program in program based in Australia.

References

1. Barclay, A.W.; Brand-Miller, J. The Australian Paradox: A Substantial Decline in Sugars Intake over the Same Timeframe that Overweight and Obesity Have Increased. *Nutrients* **2011**, *3*, 491–504.
2. Economist v nutritionists: big sugar and low-GI brigade lose. Available online: <http://www.smh.com.au/business/economist-v-nutritionists-big-sugar-and-lowgi-brigade-lose-20120307-1uj6u.html> (accessed on 6 March 2012).
3. Australian Bureau of Statistics; Department of Health and Aged Care Services. *National Nutrition Survey: Nutrient Intakes and Physical Measurements, Australia, 1995*; Catalogue No. 4805.0; Commonwealth of Australia: Canberra, Australia, 1998.
4. National Health and Medical Research Council. *Nutrient Reference Values for Australia and New Zealand including Recommended Dietary Intakes*; Commonwealth of Australia and New Zealand Government: Canberra, Australia, 2005.
5. Cook, T.; Rutishauser, I.H.E.; Allsopp, R. *The Bridging Study—Comparing Results from the 1983, 1985 and 1995 Australian National Nutrition Surveys*; Commonwealth Department of Health and Aged Care: Canberra, Australia, 2001.
6. Commonwealth Scientific Industrial Research Organisation (CSIRO); Preventative Health National Research Flagship; the University of South Australia. *2007 Australian National Children's Nutrition and Physical Activity Survey—Main Findings*; Commonwealth of Australia: Canberra, Australia, 2008.
7. Clifton, P.M.; Chan, L.; Moss, C.L.; Miller, M.D.; Cobiac, L. Beverage intake and obesity in Australian children. *Nutr. Metab. (Lond.)* **2011**, *8*, 87.
8. The Food and Agriculture Organisation of the United Nations. Food Consumption Quantities. 2 June 2010. Available online: <http://faostat.fao.org/site/368/DesktopDefault.aspx?PageID=368#ancor> (accessed on 11 August 2009).
9. Australian Bureau of Statistics. *Apparent Consumption of Food Stuffs, Australia, 1997–98 and 1998–99*; Catalogue No. 4306.0; ABS: Canberra, Australia, 1998.
10. Australian Bureau of Agricultural and Resource Economics and Sciences (ABARES) Website. Available online: <http://www.daff.gov.au/abares> (accessed on 23 March 2012).
11. Hodge, R.L. Risk factors in Australians: National Heart Foundation's Risk Factor Prevalence Study, 1980. *Aust. N. Z. J. Med.* **1984**, *14*, 395–399.

12. Cameron, A.J.; Zimmet, P.Z.; Dunstan, D.W.; Dalton, M.; Shaw, J.E.; Welborn, T.A.; Owen, N.; Salmon, J.; Jolley, D. Overweight and obesity in Australia: the 1999–2000 Australian Diabetes, Obesity and Lifestyle Study (AusDiab). *Med. J. Aust.* **2003**, *178*, 427–432.
13. Australian Bureau of Statistics. Animated Population Pyramid. Available online: <http://www.abs.gov.au/websitedbs/d3310114.nsf/home/Population%20Pyramid%20-%20Australia> (accessed on 23 March 2012).
14. Australian Bureau of Statistics. *National Health Survey: Summary of Results, 2007–2008 (Reissue)*; Catalogue No. 4364.0; ABS: Canberra, Australia, 2009.
15. Department of Health and Ageing. *NUTTAB 2006 Online*; Australian Government Publishing Service: Canberra, Australia, 2006.
16. Livesey, G.; Taylor, R. Fructose consumption and consequences for glycation, plasma triacylglycerol, and body weight: meta-analyses and meta-regression models of intervention studies. *Am. J. Clin. Nutr.* **2008**, *88*, 1419–1437.
17. Sievenpiper, J.L.; de Souza, R.J.; Mirrahimi, A.; Yu, M.E.; Carleton, A.J.; Beyene, J.; Chiavaroli, L.; Di Buono, M.; Jenkins, A.L.; Leiter, L.A.; Wolever, T.M.; Kendall, C.W.; Jenkins, D.J. Effect of Fructose on Body Weight in Controlled Feeding Trials: A Systematic Review and Meta-analysis. *Ann. Intern. Med.* **2012**, *156*, 291–304.
18. Rothman, J.M.; Raubenheimer, D.; Chapman, C.A. Nutritional geometry: gorillas prioritize non-protein energy while consuming surplus protein. *Biol. Lett.* **2011**, *7*, 847–849.
19. Brand-Miller, J.; James, K.; Maggiore, P. *Tables of Composition of Australian Aboriginal Foods*; Aboriginal and Torres Islander Studies Press: Canberra, Australia, 1993.
20. Allsop, K.A.; Miller, J.B. Honey revisited: a reappraisal of honey in pre-industrial diets. *Br. J. Nutr.* **1996**, *75*, 513–520.
21. Cordain, L.; Eaton, S.B.; Brand-Miller, J.; Lindeberg, S.; Jensen, C. An evolutionary analysis of the aetiology and pathogenesis of juvenile-onset myopia. *Acta Ophthalmol. Scand.* **2002**, *80*, 125–135.
22. Chun, O.K.; Chung, C.E.; Wang, Y.; Padgitt, A.; Song, W.O. Changes in intakes of total and added sugars and their contribution to energy intake in the U.S. *Nutrients* **2010**, *2*, 834–854.
23. Welsh, J.A.; Sharma, A.J.; Grellinger, L.; Vos, M.B. Consumption of added sugars is decreasing in the United States. *Am. J. Clin. Nutr.* **2011**, *94*, 726–734.
24. The University of Sydney GI Testing Service. Available online: <http://www.glycemicindex.com> (accessed on 23 March 2012).

Attachment 3

Written clarification from Jennie Brand-Miller and Alan Barclay post-interviews

CONFIDENTIAL RESPONSE TO THE INQUIRY INTO *THE AUSTRALIAN PARADOX*

The Australian Paradox: are the data fit for purpose?

Our stated aim was to examine trends in obesity in Australia, and to analyse concurrent trends in added sugars (also known as free sugars, refined sugars) and sugar-sweetened beverage consumption, and to compare these to those in the UK and USA (p 492 of the published paper). We cited three independent lines of evidence.

1. Apparent consumption of sugar data

The Food and Agriculture Organization is responsible for a website dedicated to providing the global community with time-series and cross sectional data relating to food and agriculture for more than 245 countries/territories (<http://faostat3.fao.org/faostat-gateway/go/to/home/E>). We chose this data set because it allowed us to compare sugar consumption in Australia to that in the UK and USA.

During 2009 as part of our research, we cross-checked the FAO data with ABS Apparent Consumption data and had discussions with ABS personnel. This confirmed that both datasets were essentially the same (although not identical) and that FAOStat data were based on ABS apparent consumption data up until 1998-99.

ABS Apparent consumption data contain estimates of sugars in both imported and exported manufactured foods, as shown in the extract from Apparent Consumption of Foodstuffs and Nutrients, Australia, 1991-92 (ABS 1994, Attachment 1). Confidentiality restrictions prevented the ABS from publishing complete details of imported and exported commodities for sugar and sugary foods (ABS, 2000, Attachment 2). We were informed that ABS data collection ceased in 2000 *due to resource issues*, not lack of reliable data.

FAOStat have continued to publish data for Australia and other nations beyond 1998-99. Their sources both before and after 1999 include ABS, the International Sugar Organisation, and Australia's trading partners. The FAOStat methodology accounts for stocks, production, imports, exports and other utilisations to derive intake estimates.

Mostly importantly, recent correspondence with FAOStat personnel (Marianna.Campaneau@fao.com 25 Feb 2014, Attachment 3) has confirmed directly that FAOStat Apparent Consumption data series for added sugars in Australia reports intake of *primary & processed sugar products* ie from refined sucrose (and other nutritive sweeteners) and *manufactured goods containing sucrose* (and other nutritive sweeteners), and takes account of refined sucrose (and other nutritive sweeteners) *in both imports and exports*.

Rikkers and colleagues' statement that '*FAO does not include imported, highly processed foods or beverages which contain added sugar*' is therefore incorrect in relation to Australia (but may well be true of less developed nations).

For countries such as Australia, USA and the UK, FAOStat data series therefore provide for a robust and meaningful comparison of trends in added sugars consumption over decades. This also allowed us to calculate and compare the percentage reduction in refined sugar intake.

2. National nutrition survey data

Representative samples of Australians were surveyed in 1983, 1985, 1995 and their typical food and beverage intakes measured and analysed by the Commonwealth Department of Health and Aged Care. An additional survey of children was undertaken by the CSIRO in 2007. Similar, but not identical survey techniques were utilised on each occasion.

Data on *total* sugars intake were collected because it is not possible to distinguish between naturally occurring and added sugars analytically. Intakes of total sugars increased marginally slightly over the

survey years. However, the food category trends indicated that the changes were not due to increased intake of added sugars, but rather to increased intakes of foods naturally containing sugars, such as fruit and dairy foods. Although the intake of some categories such as *Non-alcoholic Beverages* increased markedly, we were at pains to indicate that these comprised coffee, tea and *diet* beverages (and were therefore unhelpful indicators).

3. Beverage consumption data

AC Nielsen Scan Track Data on beverage consumption were obtained from Gina Levy for the years 1994-2006, and from Levy and Tapsell, 2007. While the total volume of beverages consumed increased over this time frame (Figure 5A, *The Australian Paradox*), the amount of added sugars they contributed to the food supply decreased (Figure 6). This is because the composition of nutritively sweetened beverages changed as manufacturers introduced new varieties and variants of existing varieties. For example, currently *Pepsi Next* contains 30% less sugar than regular Pepsi, but would have been counted as a sugar sweetened beverage in Figure 5A.

Conclusion

From our informed viewpoint, the three sources of data described in *The Australian Paradox* were fit for the purpose of identifying *population trends and changes* in consumption of refined sugars in Australia. Importantly, we were able to demonstrate contrasting trends in the USA and UK. It was the synthesis of the three lines of evidence rather than any one dataset that gave rise to our hypothesis that Australia might be unique in that intake of refined sugars was declining despite the increase in prevalence of obesity.

Why would Australia be unique among developed countries? We know that Australians have taken other public health advice seriously, eg use of seat belts, sun exposure, drink driving, dietary fat (down) and dietary fibre (up). Given the media focus on the potential risks associated with refined sugars and soft drinks, it should not be so surprising to see a decline on a population-wide basis.

Are the limitations of the study adequately discussed?

A brief summary of the major limitations is provided in the last paragraph on page 500, and the first two paragraphs on page 501.

The Australian Paradox was published in *Nutrients*, a journal whose primary audience is dietitians and nutritionists. The concept of 'apparent consumption' of foods is taught in university level human nutrition and food science courses throughout Australia. The data have long been used to analyse long term food consumption trends, and were prominently cited in the 2004 Dietary Guidelines for Australian Adults.

One of the most important trends evident in apparent consumption data over the last 50 years is the change in source of refined sugars: from retail packs purchased in supermarkets to that of manufactured foods. In other words, the food industry took over the role long held by the 'housekeeper'. Thus the sugar in manufactured foods is not 'in addition' to that prepared at home, but 'in place of'. The food industry has been replacing sugar with low calorie sweeteners, that were not available in the past.

Qualified dietitians and nutritionists are familiar with the strengths and weaknesses of the data utilised in *The Australian Paradox*.

Alan Barclay and Jennie Brand-Miller 9 March 2014



Apparent Consumption of Foodstuffs and Nutrients Australia 1991-92



TABLE 3. ESTIMATED SUPPLY AND UTILISATION OF FOODSTUFFS, AUSTRALIA, 1991-92 — continued

| | Supply | | | Utilisation | | | | Apparent consumption in Australia as human food | | |
|------------------------------------|----------------------|------------|---------------------------|-------------|----------------------------|---------|---------------------------|---|--------------------|---------------------|
| | Net change in stocks | Production | | Imports | Total supply — tonnes — | Exports | Non-food use, waste, etc. | | For processed food | Per capita per year |
| | | Commercial | Estimated home production | | | | | | | |
| OILS AND FATS— | | | | | | | | | | |
| Butter | .. | .. | .. | .. | .. | .. | .. | .. | .. | kg |
| Total margarine | -3,366 | 161,988 | .. | 1,273 | 166,627 | 18,160 | .. | .. | (c)45,471 | 2.6 |
| Table margarine | -1,576 | 116,726 | .. | 1,273 | 119,575 | 5,825 | .. | .. | 148,467 | 8.5 |
| Other margarine | -1,790 | 45,262 | .. | — | 47,052 | 12,335 | .. | .. | 113,750 | 6.5 |
| SUGARS— | | | | | | | | | | |
| Cane Sugar— | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. |
| As refined sugar | -10,849 | 738,941 | .. | 11,539 | 761,329 | 21,910 | .. | 576,854 | 162,565 | 9.3 |
| In manufactured foods | — | 576,854 | .. | 67,415 | 644,269 | 100,030 | .. | .. | 544,239 | 31.3 |
| Honey | — | 22,224 | .. | 76 | 22,300 | 9,036 | .. | .. | 13,264 | 0.8 |
| BEVERAGES— | | | | | | | | | | |
| Tea | n.a. | 1,506 | .. | 17,219 | 18,725 | 242 | .. | .. | 18,483 | 1.1 |
| Coffee | n.a. | 441 | .. | 40,297 | 40,738 | 3,488 | .. | .. | 37,250 | 2.1 |
| Aerated and carbonated waters | | | | | | | | | | |
| Beer— | n.a. | 1,666,513 | n.a. | 34,734 | 1,701,247 | 21,761 | .. | .. | 1,679,486 | 96.6 |
| Low alcohol | .. | .. | .. | (i) 415 | .. | .. | .. | .. | (i) 387,938 | 22.3 |
| Other beer | .. | .. | .. | 11,336 | .. | .. | .. | .. | 1,386,440 | 79.7 |
| Total beer | .. | .. | .. | 11,751 | .. | .. | .. | .. | 1,774,378 | 102.0 |
| Wine— | .. | .. | .. | (i) 105 | .. | .. | .. | .. | (k) 17,604 | 1.0 |
| Dessert wine | .. | .. | .. | 55 | .. | .. | .. | .. | 12,447 | 0.7 |
| Sherry | .. | .. | .. | 2,373 | .. | .. | .. | .. | 36,277 | 2.1 |
| Sparkling and carbonated wine | .. | .. | .. | 5,190 | .. | .. | .. | .. | 251,894 | 14.5 |
| Table wine | .. | .. | .. | 227 | .. | .. | .. | .. | 1,637 | 0.1 |
| Vermouth | .. | .. | .. | 752 | .. | .. | .. | .. | 3,673 | 0.2 |
| Other wine, n.e.i. | .. | .. | .. | 8,702 | .. | .. | .. | .. | 323,532 | 18.6 |
| Total wine | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. |
| Spirits— | | | | | | | | | | |
| — '000 litres alcohol — | | | | | | | | | | |
| Brandy | .. | .. | .. | (i) 662 | .. | .. | .. | .. | (i) 2,042 | litres alcohol |
| Gin | .. | .. | .. | 581 | .. | .. | .. | .. | 798 | 0.12 |
| Liqueurs (incl. flavoured spirits) | .. | .. | .. | 1,727 | .. | .. | .. | .. | 1,826 | 0.05 |
| Rum | .. | .. | .. | 485 | .. | .. | .. | .. | 2,449 | 0.10 |
| Vodka | .. | .. | .. | 562 | .. | .. | .. | .. | 903 | 0.14 |
| Whisky | .. | .. | .. | 9,800 | .. | .. | .. | .. | 9,836 | 0.05 |
| Other, n.e.i. (incl. bitters) | .. | .. | .. | 336 | .. | .. | .. | .. | 1,596 | 0.57 |
| Total spirits | .. | .. | .. | 14,153 | .. | .. | .. | .. | 19,450 | 0.09 |
| | .. | .. | .. | .. | .. | .. | .. | .. | .. | 1.12 |

(a) Stocks supplied by the Australian Meat and Livestock Corporation. (b) Processed foods are not shown separately, but are included in production and apparent consumption. (c) Domestic sales supplied by the Australian Dairy Corporation. (d) Cold store stocks of apples and pears. (e) Comprises deliveries year ended 30 June as recorded by the Australian Dried Fruits Association, and imports. (f) Comprises deliveries and imports for consumption in Australia. (g) Data collected triennially and not available for 1991-92. (h) See paragraph 5, Section 1 of the Technical Notes. (i) Comprises quantities upon which excise duty was paid and imports cleared for consumption in Australia. (k) Comprises quantity of sales by winemakers and imports cleared for consumption in Australia.

APPARENT CONSUMPTION OF FOODSTUFFS

AUSTRALIA

EMBARGO: 11:30AM (CANBERRA TIME) WED 25 OCT 2000

C O N T E N T S

| | <i>page</i> |
|---------------------------|-------------|
| Notes | 2 |
| Summary of findings | 3 |

TABLES

| | |
|---|----|
| 1 Apparent per capita consumption—average 3 years ended 1938–39 to 1988–89, and 1998–99 | 10 |
| 2 Total apparent consumption—years ended 30 June 1994–1999 . | 12 |
| 3 Estimated supply and utilisation of foodstuffs— year ended 30 June 1998 | 16 |
| 4 Estimated supply and utilisation of foodstuffs— year ended 30 June 1999 | 24 |

ADDITIONAL INFORMATION

| | |
|--------------------------------------|----|
| Explanatory notes | 32 |
| Glossary | 35 |
| Appendix—per capita statistics | 38 |

GLOSSARY *continued*

- Non-food use, waste, etc.** Non-food use indicates food removed from the human food supply. Wastage does not take into account losses at the retail and household level. Data are given only for oranges, fresh vegetables, bread and peanuts.
- Nuts** Data are presented as total weight in shell. For tree nuts, data are directly comparable back to 1987–88 and include estimates for home production based on the 1992 Home Production Survey. Earlier data are for commercial production only.
- Oils and fats** Butter and margarine data are presented as product weight. The group total which is expressed as fat includes an annual per capita allowance of 10 kg to represent fats and oils consumed in processed and cooked foods. This allowance for edible oils was increased from 2 kg to 10 kg for 1980–81 data onwards. Data were recalculated back to 1975–76. Thus annual data from 1975–76 published in the 1980–81 and subsequent issues of the series are directly comparable. Data published before the 1980–81 issue include an annual per capita allowance of 2 kg. The figure of 10 kg per capita is currently considered conservative. Fat associated with carcass meat is included in the meat commodity group.
- Poultry** Poultry data are presented as dressed weight, i.e. as sold by retailers, as this is a standard practice.
- Sugar** Sugar cane products and honey are represented as product weight. Due to confidentiality restrictions cane sugar 'available for consumption' data is only available as a total figure for 1997–98 and onwards. This figure incorporates 'packed refined sugar' and 'sugar used in manufactured foods'. The group total includes the sugar content of syrups and glucose.
- Use for processed food** In tables 3 and 4 data relating to both fresh and processed product are shown for some foods. Please note that quantities relating to fresh product reflect the total supply and utilisation of that food, including processed food. Therefore processed production should not be added to fresh production as to do this would introduce double counting of the processed product.
- Vegetables** Data are presented as total fresh weight including the fresh equivalent weight of processed products.

Attachment 4

Submission to formal inquiry from the Complainant

RR's submission to the formal inquiry into the competence and integrity of the University of Sydney's *Australian Paradox* research

By Rory Robertson

March 2014

On 29 November 2013, I was advised by the head of the Charles Perkins Centre, Professor Stephen Simpson, that the University of Sydney had opened - after nearly two years of encouragement from me - a formal inquiry into the competence and integrity of the extraordinarily faulty *Australian Paradox* research:

<http://www.australianparadox.com/pdf/LettersCPCProfSimpson.pdf>

On 6 March, I was asked by the University of Sydney if I would like to provide any further information to the inquiry. This is my summary of the *Australian Paradox* scandal. After two years, various things have become crystal clear. I have four main concerns, as discussed in the following pages. Cutting to the chase, here's my **proposed Retraction Notice**:

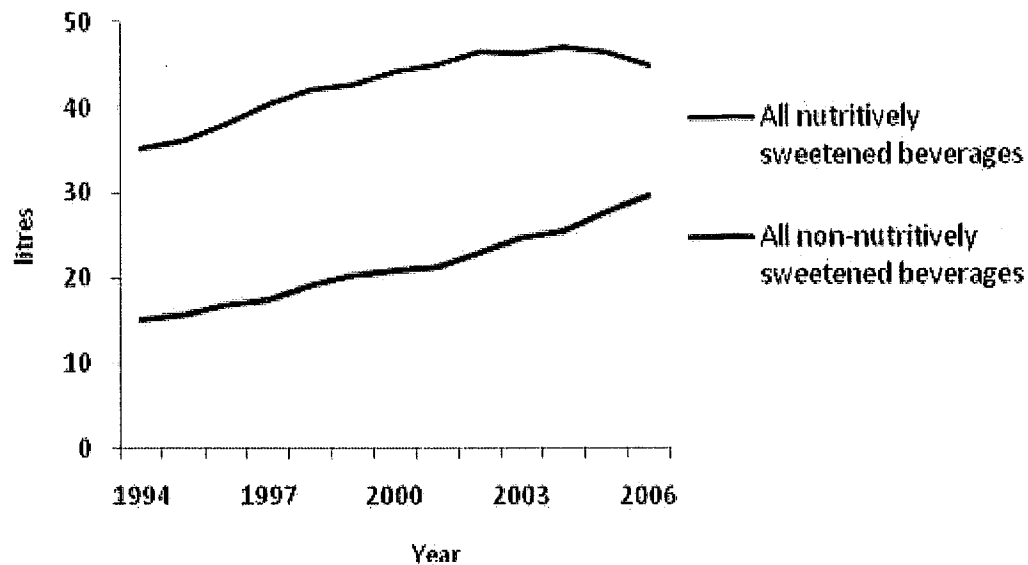
Abstract: *It has been brought to our attention by a reader of Nutrients that the conclusion of "a consistent and substantial decline" in per-capita sugar consumption between 1980 and 2010 in "The Australian Paradox: A Substantial Decline in Sugars Intake over the Same Timeframe that Overweight and Obesity Have Increased" is based on serious misinterpretations and errors that invalidate the finding of "an inverse relationship" between sugar intake and obesity. For example, the uptrend in the authors' own chart - Figure 5A [Figure 2 overleaf] - suggests strongly that sugar intake via softdrinks increased as obesity increased between 1980 and 2010. Indeed, the same is true of Figure 4 [Figure 4a overleaf] which shows four different indicators of sugar consumption by children all trending up not down over the relevant timeframe. Unfortunately, those observations eliminate two central "lines of evidence" for the authors' claimed "finding". What paradox? Moreover, the third and final claimed "line of evidence" is based on a data series that was discontinued as unreliable by the Australian Bureau of Statistics (ABS) after 1998-99 and then falsified for the 2000s by the Food and Agriculture Organization. MDPI has a strict "zero tolerance policy" towards the use of falsified data, whether the authors were aware of the invalidity of the data or not. Separately, the authors' business links to the sugar and sugary food/drink industries [<http://www.gisymbol.com/category/products/sweeteners/>] also are somewhat unsettling. Taking public-health considerations into account, particularly evidence that excessive sugar consumption is a major contributor to global obesity and type 2 diabetes - <http://care.diabetesjournals.org/content/33/11/2477.full.pdf>; <http://www.who.int/mediacentre/news/notes/2014/consultation-sugar-guideline/en/>; and <http://www.youtube.com/watch?v=xDaYa0AB8TQ&feature=youtu.be> - the Editorial Team and Publisher have determined that this manuscript should be retracted. Further, MDPI intends to conduct an investigation into how these problems successfully evaded all our normal quality-control processes. Twice. In the meantime, we also intend to retract Australian Paradox Revisited, a second faulty piece published in our journal by the same Charles Perkins Centre author and "Guest Editor"; and further, to seek the retraction of another sister piece published last year in BMC Public Health journal [<http://www.biomedcentral.com/1471-2458/13/898/prepub>]. We apologize for any inconvenience this may cause, but have chosen to take the only approach that gives proper priority to the integrity of the scientific record. [An earlier version of that proposed Retraction Notice is posted at <http://retractionwatch.com/2013/08/22/journal-to-feature-special-issue-on-scientific-misconduct-seeks-submissions/>]*

In terms of new information, my observation is that Professor Jennie Brand-Miller and Dr Alan Barclay's response to the **ABC's Background Briefing** program was outrageous. Investigator Wendy Carlisle documented profound flaws and highlighted why the Charles Perkins Centre's *Australian Paradox* paper is an academic disgrace and a menace to public health. Yet the overconfident authors responded with a statement pretending that nothing had just happened: "no material impact on the conclusions of our paper" <http://www.australianparadox.com/pdf/CPCscientistsresponse.pdf>

Accordingly, a key question for the inquiry includes: At what point does persistent negligence or recklessness in defending obviously flawed analysis as flawless - and claiming that utterly invalid "findings" on the scientific record are perfectly valid - morph into scientific fraud?

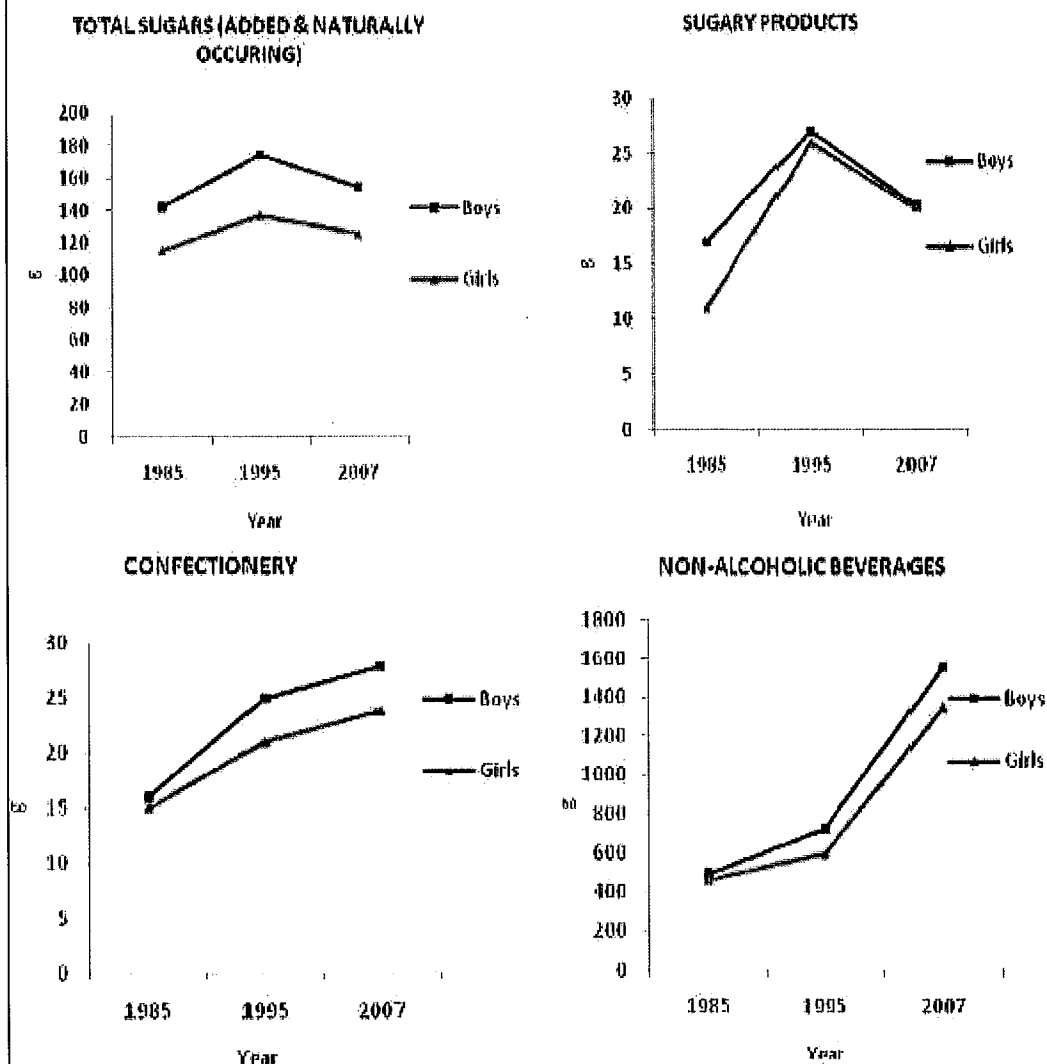
It is nothing short of outrageous, in my opinion, that the University of Sydney has been defending the indefensible for two years. Moreover, most reasonable people would agree that the **World Health Organization's** latest plan to fight global obesity - via its proposed 50%-plus reduction in global sugar consumption - has strengthened my case for the formal retraction of this profoundly faulty paper, a paper that was designed to exonerate sugar and particularly sugary softdrinks as a cause of obesity: <http://www.who.int/mediacentre/news/notes/2014/consultation-sugar-guideline/en/>

**Figure 2: Australian softdrink sales; Top (dark) line is sugary softdrinks
(Litres per person per year)**



Source: Australian Paradox

Figure 4a: National surveys - Children



* Including coffee, tea and low joule soft drinks.

Source: Australian Paradox

As noted above, after two years, I have four main concerns regarding the *Australian Paradox* scandal.

1. False information

Globally, it has been documented that the published "findings" of "peer reviewed" studies on the link between sugary softdrinks and obesity tend to be influenced by financial conflicts of interest:

<http://www.plosmedicine.org/article/info%3Adoi%2F10.1371%2Fjournal.pmed.1001578>

For two years, the University of Sydney has promoted false information in the critical public debate on the origins of obesity, which, together with type 2 diabetes and related maladies, is the greatest public-health challenge of our times. That is my complaint. That is why I am here.

We should be able to trust taxpayer-funded entities to correct blatantly false information in the critical area of public health. Yet for two years the University of Sydney has claimed unreasonably that the existence of "an inverse relationship" between sugar consumption and obesity is a reliable "peer reviewed" result.

Notably, the unreliable *Australian Paradox* "finding" is supportive of the University's Glycemic Index business that stamps particular brands of sugar and sugary products as Healthy:

<http://www.australianparadox.com/pdf/quickquizresearch.pdf> ;

<http://www.gisymbol.com/category/products/sweeteners/>

In my opinion, the *Australian Paradox* paper is profoundly faulty and would never have been published in a real journal with real quality control, where the influential lead author was not also the influential "Guest Editor":

http://www.mdpi.com/journal/nutrients/special_issues/carbohydrates

In short, there is no Australian Paradox. There is no valid evidence that Australians ate less added sugar (per person per year) as we got fatter between 1980 and 2010. Indeed, it seems likely that we ate more! Specifically, there was no "consistent and substantial decline" in sugar consumption between 1980 and 2010, and so no "inverse relationship" between (added) sugar consumption and obesity.

As highlighted in that Retraction Notice, the mistaken "finding" – less sugar, more obesity - simply is a function of the authors ignoring the range of indicators of sugar consumption that **trend up not down**, in their own published charts! What paradox? Figures 1, 2, 3, 4 and 4a in <http://www.australianparadox.com/pdf/GraphicEvidence.pdf>

In particular, it seems clear that **sugar consumption via sugary softdrinks** increased rather than declined substantially over the relevant 1980 to 2010 period. Most of us born before 1970 actually watched that happen, and some of us were part of the process. Similarly, the authors' evidence from national nutrition surveys - presented in Figure 4a - suggests that **Australian children** consumed more sugar as they got fatter over the relevant 1980 to 2010 timeframe (Sections 2 and 4 in *GraphicEvidence* link).

Notably, my analysis of this matter has been "peer reviewed" by hundreds, even thousands of scientists and others globally (I've had 30,000 unique visitors to my <http://www.australianparadox.com/> website over the past 15 months). Over the past two years, no-one has put a dent of my correct critique of the paper. The worst that has been said is that I'm unnecessarily long-winded. Fair enough. I'll cop that. Regardless, no-one has come within cooee of collecting the cash in my **\$40,000 Australian Paradox Challenge** to University of Sydney Vice-Chancellor Dr Michael Spence in June 2012: Chart 6 in <http://www.australianparadox.com/pdf/22Slideshowaustraliangoestoparadoxcanberrafinal.pdf>

With the valid data in their own published charts contradicting their conclusion of "a consistent and substantial decline", the *Australian Paradox* authors haplessly embraced a sugar series that was **discontinued as unreliable** by the Australian Bureau of Statistics (ABS) after 1998-99 (as confirmed by the ABC's Wendy Carlisle), and then **falsified** by the Food and Agriculture Organization (FAO) of the United Nations: Slides 21 and 22 in <http://www.australianparadox.com/pdf/22Slideshowaustraliangoestoparadoxcanberrafinal.pdf>

No-one competent will dispute the fact that the clear uptrends in the authors' own sugary softdrink and children's intake charts (p.2) completely contradict their mistaken "substantial decline" finding. Those defending the authors may, however, choose to argue against my use of the word "**falsified**" to describe the conspicuous flat line in the authors'

preferred sugar series (in previous link). Nothing much swings on the words used - choose whatever words you like: "falsified", "not based in reality", "made up on the basis of nothing", "completely unreliable" or simply "invalid".

Amusingly, the authors have managed time and time again not to comment on the conspicuous dud flat line smack in the middle of their "paradox". To me, what is genuinely paradoxical is how the authors must have observed that dud flat line in their preferred chart yet didn't ask: Why? So much for indefatigable scientists searching night and day to uncover the "the truth" about their sugar and obesity "paradox": they simply downloaded the data, pasted in their charts, and rushed to do what they wanted to do in the first place - exonerate sugar!

In any case, the underlying facts are as follows. The ABS stopped even pretending to count apparent consumption of sugar after 1998-99. Then, extraordinarily, instead of writing "Not available" in its global spreadsheets, the FAO recklessly began pretending that the Australian sugar series for the 2000s is a flat line: the FAO series for the 2000s has no basis in reality. No-one is actually doing any real counting. There are no underlying data beyond 1998-99. The conspicuous flat line in the authors' preferred chart was a big **red flag** hinting strongly that their key series for the 2000s is invalid/falsified/made up (see pp. 12-13 in <http://www.australianparadox.com/pdf/GraphicEvidence.pdf>).

In neither scientific nor economic studies of human behaviour is it valid to assume a straight line and then pretend it represents genuine information. I have documented that the FAO is pretending to do something that, clearly, it is not: <http://www.australianparadox.com/pdf/FAOfalsifiedsugar.pdf>

So "falsified" - not "estimated", "extrapolated" or "interpolated" - is indeed the appropriate description. Such made-up data with no basis in reality are not supposed to trump signals from a range of valid indicators. Moreover, observers may be surprised to find that a paper supposedly investigating trends in sugar consumption made no mention of **the particular difficulties faced by statisticians measuring modern sugar consumption**. That is, the trend in society towards eating highly processed foods and drinks meant that statisticians' sugar-counting exercises morphed from counting bags of sugar to counting grains of added sugar in many thousands of kinds of processed foods/drinks: <http://www.australianparadox.com/pdf/New-nonsense-based-sugarreport.pdf>

In my opinion, this glaring omission tells us much about the authors' competence in this space. It is unreasonable for the authors to have steered well clear of this fundamental issue, in one, then two, and now three published papers.

My bottom line remains that in the absence of reliable sugar consumption data it is unreasonable to claim anything much. In particular, it is wrong to claim "a consistent and substantial decline" in per-capita consumption between 1980 and 2010, especially while operating a pro-sugar Glycemic Index business that has partnered with sugar producer CSR and that gets paid up to \$6,000 a pop to put Healthy stamps on various brands of sugar and sugary products: <http://www.gisymbol.com/category/products/sweeteners/> ; <http://www.gisymbol.com/pom-wonderful/>

Readers, what's quite amusing is that the sugar industry's also-shonky "Green Pool" sugar series – designed to rescue its underperforming business partners – also contradicts the University of Sydney's claim of a "consistent and substantial decline" between 1980 and 2010! <http://www.australianparadox.com/pdf/JBM-AWB-AustralianParadox.pdf>

Importantly, that there is no Australian Paradox – no "inverse relationship" between sugar consumption and obesity - was confirmed by unconflicted scientists way back in 2012, including the **widely respected Dr Rosemary Stanton**:

"And yes, I agree with you [Rory] that we have no evidence that sugar consumption in Australia has fallen. A walk around any supermarket shows that huge numbers of foods contain sugar. I argue this point frequently with colleagues"; "I have many objections to that particular paper and to the idea that sugar is not a problem"; and "I have expressed my opinion about the paper to the authors ... I will almost certainly cite it at some stage as an example of something I consider to be incorrect" (Slide 18 in Canberra link above).

So too, the complete absence of any genuine "paradox" – as opposed to the authors' profound confusion - was confirmed again by ABC investigator Wendy Carlisle in her recent *Background Briefing* report: <http://www.abc.net.au/radionational/programs/backgroundbriefing/2014-02-09/5239418>

Thus, the "peer reviewed" claim of "a consistent and substantial decline" in Australians' (added) sugar consumption between 1980 and 2010 is nonsense. The nonsense-based "finding" was published only because "peer review" in this case was non-existent, incompetent or ignored

Disturbingly, University of Sydney Vice-Chancellor, Dr Michael Spence, has claimed that the *Australian Paradox* paper was “**independently and objectively peer reviewed prior to its publication**”, while Deputy Vice-Chancellor (Research), Professor Jill Trehwella, berated me for making a fuss about the profoundly faulty paper being dominated by serious errors, in the process (falsely) insisting that it had been subject to quality control according to “**internationally accepted standard practice**”: <http://www.australianparadox.com/pdf/Sept2012-Conversations.pdf>

Again, the paper and the authors' two subsequent sister papers are full of obvious problems, small and large: for a laundry list, see pages 14-21 in <http://www.australianparadox.com/pdf/GraphicEvidence.pdf>

That **the authors formally corrected several obvious arithmetic errors in February** – in a disingenuous response to the ABC's *Background Briefing* investigation – some three years after their (self) publication merely draws attention to the conspicuous lack of competent “peer review” that I have correctly and repeatedly highlighted over the past two years: <http://www.australianparadox.com/pdf/CPCscientistsresponse.pdf>

All of the above remains a serious problem for the Charles Perkins Centre's influential Professor Jennie Brand-Miller, the lead author and “Guest Editor” of the publishing journal, for co-author and head of research at the Australian Diabetes Council, Dr Alan Barclay, for the University of Sydney and its fledgling Charles Perkins Centre, and for the dodgy pay-as-you-publish e-journal *Nutrients* and its Editor-in-Chief Professor Peter Howe: <http://www.mdpi.com/2072-6643/4/4/258>

2. Retraction required

In my opinion, the profoundly faulty *Australian Paradox* paper should be retracted: <http://retractionwatch.com/>

This should not be controversial. After all, retraction is the standard way that the scientific record is cleansed of false information and faulty scientific “findings”. Here is Retraction Watch's top-10 list from over 500 retractions globally in 2013: <http://www.the-scientist.com/?articles.view/articleNo/38743/title/Top-10-Retractions-of-2013/>

On the retraction of *Australian Paradox*, Mr Dietrich Rordorf - the CEO of the MDPI stable of journals that publishes *Nutrients* – has said that MDPI will retract the faulty paper as soon as he is instructed to do so by the University of Sydney: “If the Publisher receives an official note from either the university or the academic editor to retract the paper, the paper will be taken down” (see discussion in Responses) <http://retractionwatch.com/2013/08/22/journal-to-feature-special-issue-on-scientific-misconduct-seeks-submissions/>

Of course, if *Australian Paradox* were just another hopeless paper by incompetent Neville Nobodies in academia, no-one would waste their time seeking its retraction. But Professor Jennie Brand-Miller and Dr Alan Barclay both are highly influential in the Australian nutrition-research and nutrition-advice spaces:

<http://www.livepositively.com.au/Webinar?id=5> ; <http://daa.asn.au/for-the-media/daa-spokespeople/about-daa-spokespeople/> ; <http://sydney.edu.au/medicine/people/academics/publications/jennieb.php>

And *Australian Paradox* is an important paper: after its publication, the University of Sydney's mistaken “peer reviewed” finding of “an inverse relationship” between sugar consumption and obesity was promoted worldwide with enthusiasm by a range of sellers of sugar and sugary foods and drinks: <http://www.australianparadox.com/pdf/WHO'S%20CITING%20OZ%20PARADOX.pdf>

Disturbingly, the University of Sydney's (once) trusted stamp of competence and integrity in science has been used to try to (falsely) exonerate added sugar and sugary softdrinks in particular as key drivers of obesity and related maladies. That is the purpose of the *Australian Paradox* “finding”: “Conclusions” on page 2 of <http://www.australianparadox.com/pdf/GraphicEvidence.pdf>

Notably, the authors' attempt in a scientific journal to exonerate added sugar and sugary softdrinks as key drivers of obesity came after they already had falsely “exonerated” sugar as a key driver of type 2 diabetes, in their range of popsci diet books (3 million+ copies sold): “**There is absolute consensus that sugar in food does not cause [type 2] diabetes**”: <http://www.australianparadox.com/pdf/diabetes.pdf>

So, here's the problem: we have an influential Charles Perkins Centre scientist and global sugary food/drink industries marketing a scientific "finding" that is: (i) false; (ii) dangerous to public health; and (iii) carrying the University of Sydney's (once) trusted banner of credibility and integrity.

Outrageously, the University of Sydney's nutrition area and its associates in the food/drink industries campaigned against the Australia's National Health and Medical Research Council's plan to toughen dietary advice against sugar, using the University of Sydney's supposedly "peer reviewed" *Australian Paradox* "finding" as an intellectual spearhead to try to kill the move: <http://www.theaustralian.com.au/news/health-science/a-spoonful-of-sugar-is-not-so-bad/story-e6frg8y6-1226090126776> and <http://www.smh.com.au/national/health/research-causes-stir-over-sugars-role-in-obesity-20120330-1w3e5.html>

I use the words "dangerous" and "outrageous" because there is overwhelming evidence that sugar consumption and obesity are positively not inversely related. Indeed, the NHMRC and the WHO in 2013 and 2014 toughened their dietary advice against added sugar, highlighting it as a key driver of local and global obesity, not to mention tooth decay, type 2 diabetes, heart disease and various cancers:

<http://www.who.int/mediacentre/news/notes/2014/consultation-sugar-guideline/en/> ;

<http://care.diabetesjournals.org/content/33/11/2477.full> ;

<http://www.australianparadox.com/pdf/talktoyear3boys.pdf> ;

<http://www.youtube.com/watch?v=xDaYa0AB8TQ&feature=youtu.be>

In my opinion, it is a disgrace that the University of Sydney's senior management did nothing at the time to protect public health from the misinformation produced by one of its highest-profile scientists. It is not as if senior management was not advised repeatedly about exactly what was going on: LHS of <http://www.australianparadox.com/>

Separately, the slowly inflating *Australian Paradox* scandal was cited recently by Jeffrey Beall, as he added MDPI to his widely followed list of "predatory" publishers: <http://scholarlyoa.com/2014/02/18/chinese-publishner-mdpi-added-to-list-of-questionable-publishers/>

Ironically, Professor Jennie Brand-Miller now finds herself advised to resign from the Editorial Board of *Nutrients* along with everyone else involved with MDPI's 100-plus journals, in part because of her glaring lack of quality control as lead author and "Guest Editor" of *Nutrients*, while she oversaw the publication of her own hopelessly faulty paper: <http://www.mdpi.com/journal/nutrients/editors> ; http://www.mdpi.com/journal/nutrients/special_issues/carbohydrates

3. Deliberate exaggeration of strength of sugar-is-not-a-problem evidence base

Again, this all matters because obesity, type 2 diabetes and related maladies are the greatest public-health challenge of our times. Globally, vast sums of taxpayers' money are being devoted to researching causes and cures to limit the resulting human misery.

As noted above, the NHMRC and WHO recently toughened dietary advice against sugar, because there is clear evidence of a strong **positive** – not inverse - relationship between sugar consumption and obesity, clear evidence that modern rates of sugar consumption are a major driver of the growing obesity-related disaster in global public health.

Meanwhile, the University of Sydney and its highly conflicted researchers, despite being aware as early as March 2012 - <http://www.smh.com.au/business/economist-v-nutritionists-big-sugar-and-lowgi-brigade-lose-20120307-1uj6u.html> - that their pro-sugar analysis is dominated by serious errors and misinterpretations, have chosen time and time again to claim that their analysis is flawless "peer reviewed" science.

My observation is that Professor Jennie Brand-Miller and Dr Alan Barclay, by not correcting their misrepresentations of the underlying facts, for two years, have been exaggerating the strength of their evidence that sugar consumption has "an inverse relationship" with obesity, thus exaggerating the strength of their evidence that sugar consumption is not a problem for public health. For two years, they have claimed falsely that sugar is innocent – and that I am incompetent - in this straightforward matter.

In more detail, Professor Jennie Brand-Miller and Dr Alan Barclay have put quite a bit of energy into claiming falsely that my correct critique has no merit: **(a)** in the media; **(b)** via links to a University of Sydney website; and **(c)** outrageously, via two further papers published without peer review in two supposedly "peer reviewed" journals.

(a) "Professor Brand-Miller says Mr Robertson is not a nutritionist and does not understand nutrition": <http://www.smh.com.au/national/health/research-causes-stir-over-sugars-role-in-obesity-20120330-1w3e5.html#ixzz2w69nxD61>

(b) "Unfortunately, there are factual errors in the economist's arguments, and misinterpretation of the distinctions between total sugars vs. refined sugars, sugar availability vs. apparent consumption, sugar-sweetened and diet soft drinks, and other nutrition information": <http://www.theaustralianparadox.com.au/> via <http://www.glycemicindex.com/>

None of that is true. And, to be clear, please note that **my dispute with the University of Sydney at its core is not about science or nutrition**: it's about simple things like up versus down, valid versus invalid, the use of falsified data in "peer reviewed" science, and the need for publicly funded entities to correct serious errors and misrepresentations in the public debate, in this case on the origins of obesity and related maladies. This is much simpler – and much more important – than my earlier high-profile dispute with a university professor on the outlook for home prices: <http://www.bloomberg.com/apps/news?pid=newsarchive&sid=aBGpZWYKLiWE>

(c) Two more faulty defences of the *Australian Paradox* nonsense, in "peer reviewed" journals: (March 2012) <http://www.australianparadox.com/pdf/nutrients-03-00491-s003.pdf>; (September 2013): <http://www.biomedcentral.com/1471-2458/13/898/prepub>

Most recently, the credibility of the authors' research was comprehensively shedded, again, by that ABC Background Briefing investigation. And the authors responded by pretending, again, that the core of their analysis is flawless: "no material impact on the conclusions of our paper" <http://www.australianparadox.com/pdf/CPCscientistsresponse.pdf>

One simple definition of fraud is the misrepresentation of matters of fact for personal gain and/or to unfairly damage another individual. Importantly, the *Australian Paradox* fraud is not a fraud because the authors (self) published an incompetent pro-sugar assessment of the available information. The problem is their ongoing and determined refusal to acknowledge and correct the serious misrepresentations that I've documented, again and again, in great detail, including in Sections 2-5 in <http://www.australianparadox.com/pdf/GraphicEvidence.pdf>

Moreover, it's not just the University of Sydney researchers who have done the wrong thing, in my opinion. It matters a lot that **the University of Sydney's Glycemic Index business collects substantial revenues (up to \$6,000 a pop) from stamping particular brands of sugar and sugary products as Healthy**: p. 5 [http://www.foodhealthdialogue.gov.au/internet/foodandhealth/publishing.nsf/Content/D59B2C8391006638CA2578E600834BBD/\\$File/Resources%20and%20support%20for%20reformulation%20activities.pdf](http://www.foodhealthdialogue.gov.au/internet/foodandhealth/publishing.nsf/Content/D59B2C8391006638CA2578E600834BBD/$File/Resources%20and%20support%20for%20reformulation%20activities.pdf);

The University of Sydney itself, by failing for two years to correct false public-health information - false information marketed under its (once) trusted banner of competence and integrity - has been exaggerating its evidence that the consumption of sugar and sugary products has nothing to do with obesity, while its pro-sugar Glycemic Index business has collected revenues from promoting sugar and sugary products as Healthy. Whether or not you call that fraud, it's a serious problem: <http://www.gisymbol.com/category/products/sweeteners/>; <http://www.gisymbol.com/pom-wonderful/>; <http://www.australianparadox.com/pdf/Sydney-Uni-conflict-interest-030712.pdf>

If all of the above were not enough to alert the world to research misconduct, perhaps telling a spectacular untruth on ABC national radio might be sufficient? In particular, despite having herself published a formal response to a peer-reviewed paper critical of her paradox claim by five University of Western Australia scientists - they observed pointedly, "This finding calls into question the existence of an Australian paradox as reported by Barclay and Brand-Miller" (p. 9 of 11) <http://www.biomedcentral.com/content/pdf/1471-2458-13-668.pdf> - lead author Professor Jennie Brand-Miller insisted, falsely, on ABC radio: "Yes, I'll just correct you there. My paper has not been criticised by any scientist" <http://www.abc.net.au/radionational/programs/backgroundbriefing/2014-02-09/5239418#transcript>

There may be a pattern here. In 2012, when the authors were briefly subject to serious media scrutiny, they falsely - clownishly - claimed that cars not humans had been consuming a big chunk of the available sugar via sugar's (non-

existent) use as a foodstock in Australian ethanol production: <http://www.smh.com.au/business/pesky-economist-wont-let-big-sugar-lie-20120725-22pru.html>

In summary, the authors for the past two years have recklessly claimed that their profoundly flawed pro-sugar analysis is flawless. The authors continue to claim that I am incompetent on this matter, despite my two-year-old critique having been vindicated at every turn, including in the ABC's *Background Briefing* investigation. And with my **\$40,000 Australian Paradox Challenge** cash still uncollected (as it would be). Even the University of Sydney's student newspaper makes it clear that I am absolutely in the right on this matter: <http://honisoit.com/2014/03/sweet-research-goes-sour/>

The University of Sydney's failure to properly correct or retract its "shonky sugar study" - instead pretending that dominating misrepresentations of fact do not exist, and too bad that key data are falsified - has transformed this episode into a scandal featuring "research misconduct" as defined by the National Health and Medical Research Council (NHMRC), including, amongst other things: (i) "recklessness or gross and persistent negligence"; (ii) "serious consequences, such as false information on the public record"; and (iii) "failure to declare and manage serious conflicts of interest": Sections 1-10 of <http://www.australianparadox.com/>

In my opinion, and as I wrote 18 months ago, the authors and their University of Sydney's senior management now are involved in either inadvertent or deliberate scientific fraud, along the lines of the fictional Dr Sydney Nutrition's **"Australian Blue Kangaroo" fiasco**: Slide 44 in <http://www.australianparadox.com/pdf/AUSTRALIAN-PARADOX-101-SLIDESHOW.pdf>

Since the University of Sydney did nothing to remedy these problems for almost two years – it simply pretended that there was no problem, as its Glycemic Index business accumulated revenue at up to \$6,000 a pop from stamping particular brands of sugar and sugary products as Healthy - I feel strongly that the person in charge of overseeing competence and integrity in research at the University of Sydney – Deputy Vice-Chancellor (Research), Professor Jill Trehwella - should be removed from her post: <http://www.australianparadox.com/pdf/LettersProfTrehwella.pdf>

4. Charles Perkins Centre off to a bad start as shopfront for unhealthy high-carb, pro-sugar diets

In my opinion, the slowly inflating *Australian Paradox* scandal has put a dark cloud over competence and integrity in "science" at the University of Sydney's fledgling \$500 million Charles Perkins Centre:

<http://www.smh.com.au/national/university-sets-up-500m-centre-for-obesity-research-20130724-2qig8.html>

It's been a bad start. For two years, the Centre's highest-profile obesity and diabetes expert has failed to correct her sugar-is-not-a-problem misinformation from the critical public debate on the origins of obesity, no matter that Australia's chief health advisor (NHMRC) toughened dietary advice against added sugar in 2013, nor that the World Health Organization earlier this month suggested at least halving global sugar consumption to combat global obesity.

Compounding that problem, we now have a high-profile Charles Perkins Centre **mouse longevity study** that has been used to tell the world that protein is "nearly as bad" as tobacco: <http://www.theaustralian.com.au/news/latest-news/protein-diets-nearly-as-bad-as-smoking/story-fn3dxiwe-1226845436762>

On the mouse study, it is unsettling that what began as an analysis of 30 diets quietly became a published analysis of 25 diets. Notably, the published results exclude five diets - all low-protein diets - and 100+ sick/dying mice - all on low-protein diets – before concluding that low-protein diets boost longevity! I have published a comment in the journal asking why we should take such a finding seriously: [http://www.cell.com/cell-metabolism/abstract/S1550-4131\(14\)00065-5#Comments](http://www.cell.com/cell-metabolism/abstract/S1550-4131(14)00065-5#Comments)

Another issue here – beyond the veracity of the published results – is the Charles Perkins Centre's cavalier – indeed, seemingly reckless - **extrapolation of its mouse "findings" to humans**: "A good balance for a mouse is about 20 per cent protein, about 60 per cent carbohydrates and about 20 per cent fat. 'And mice are not that different from humans,' he [the academic head of the Charles Perkins Centre] said": <http://www.heraldsun.com.au/news/breaking-news/prof-uses-1000-mice-to-expose-food-folly/story-fni0xqi4-1226764591760>

Thus, almost before it has opened its doors, the fledgling Charles Perkins Centre seems to have established itself as a shopfront for promoting unhealthy high-carb, pro-sugar diets and human nutrition advice we cannot trust

It is ironic – or worse - that the Charles Perkins Centre is promoting processed carbohydrates as healthy - the mice diets deemed most healthy were dominated by sugar (sucrose) and processed grains - and downplaying the importance of protein, when back in the real world **the people Charlie Perkins cared most about are dying prematurely on diets that are dominated by unhealthy sugar and processed grains, and are dangerously low in protein:** Box 2

<https://www.mja.com.au/journal/2013/198/7/characteristics-community-level-diet-aboriginal-people-remote-northern-australia>

We can take a wild guess about what a young Charlie Perkins would have said about the high-profile research – the clownish pro-sugar *Australian Paradox* paper and now the pro-carb, pro-sugar, low-protein mouse paper – that is being promoted under his name. In a world where reversing obesity and type 2 diabetes is the main game in public health, shouldn't the Charles Perkins Centre be telling people to eat fewer processed carbohydrates and especially less sugar? After all, as noted above, sugar is perhaps the single-biggest driver of obesity, type 2 diabetes, heart disease and related maladies. Those are the chronic disabilities that the Charles Perkins Centre is supposed to be curing, not spreading: <http://sydney.edu.au/perkins/>

Beyond the idiosyncratic “science” I have documented above, I am concerned about the University of Sydney’s links to the sugary food/drink industries via the pro-sugar Glycemic Index business operated by the Charles Perkins Centre’s influential Professor Jennie Brand-Miller and her sidekick Dr Alan Barclay: Charts 11, 12 and 37 at <http://www.australianparadox.com/pdf/22Slideshowaustraliangoestoparadoxcanberrafinal.pdf>

For the sugary food/drink industry, sugar is a miracle-like additive. When added to processed products, sugar’s preservative nature boosts shelf-life. Being so sweet and somewhat addictive, it makes processed food/drinks more-ish and promotes over-consumption. And at around 50 cents per kilogram wholesale, the extraordinary cheapness of added sugar massively boosts profit margins. With those three profoundly helpful features found in sugar alone, it is no exaggeration to say that added sugar is responsible for a large chunk of global food and beverage industry profits.

Given that importance of added sugar to global food/drink industry profits, it is perfectly understandable that industry for more than half a century has sought universities’ assistance to “prove” that sugar does not cause of obesity, type 2 diabetes or related maladies. Along the way, **Harvard University in the 1960s and 1970s became America’s “most public defender” of “modern sugar consumption” as harmless, its “science” reportedly corrupted by heavy funding from the sugar and sugary food/drink industries:** <http://www.motherjones.com/environment/2012/10/sugar-industry-lies-campaign>

Is the University of Sydney in general and the Charles Perkins Centre in particular alert to these issues? To what extent was the *Australian Paradox* paper inspired by such considerations? I do not know.

<http://www.smh.com.au/national/health/research-causes-stir-over-sugars-role-in-obesity-20120330-1w3e5.html> ;
<http://www.theaustralian.com.au/news/health-science/a-spoonful-of-sugar-is-not-so-bad/story-e6frg8y6-1226090126776>

Regardless, the “peer reviewed” *Australian Paradox* claim that sugar has nothing to do with obesity is both an academic disgrace and a menace to public health. Again, the WHO recently toughened its stance against added sugar, calling for a halving - from 10% to 5% of our total energy intake - of sugar consumption to combat global obesity and related maladies. Disturbingly, the people Charlie Perkins cared most about look to have average intakes that are multiples of WHO’s suggested target. In my opinion, the Charles Perkins Centre should devote a chunk of its considerable resources to educating everyday people – especially the information poor – about the problem of excessive sugar consumption.

In conclusion, I want to be clear that I am not much interested in whether or not the University of Sydney declares “research misconduct” or “scientific fraud” in the matter of the clownish *Australian Paradox* research. I have been arguing near and far for the formal retraction of its profoundly false claim of “an inverse relationship” between (added) sugar consumption and obesity. That’s my main interest in pursuing this matter. I’ve been amazed at the University of Sydney’s and its Charles Perkins Centre’s propensity to keep defending the indefensible.

Obviously I am aware that the University of Sydney has little or no appetite for retraction. After all, Vice-Chancellor Michael Spence reportedly told the Academic Board late in 2013 that the university will never “denounce” an academic’s (mistaken) findings if those findings are “lawful”. Huh?

(p.9) http://sydney.edu.au/ab/about/old/2013/draft_AB_Dec13_minutes.pdf

That's fine. The University of Sydney will have to choose between: (i) pretending that its profoundly faulty *Australian Paradox* paper is flawless; and (ii) arguing with a straight face that it is devoted to competence, integrity and "excellence" in research. If it chooses the former, it will provide ammunition for those who think that the Group of Eight's claimed devotion to "excellence" in research is a hoax, and that Canberra could cut university research funding in half and not lose much in the way of useful research output. That is, if we cannot trust the research output from our most prestigious (pretentious?) universities - because the Group of Eight has no research quality control when it matters - then taxpayers obviously should be allowed to find better things to do with their money: <http://www.go8.edu.au/documents/go8-policy-analysis/2013/role-importanceofresearchunis.pdf>

Please, University of Sydney, please correct the scientific record by retracting your mistaken *Australian Paradox* "finding" of "an inverse relationship" between sugar consumption and obesity. I'm hoping that you and your food-industry "partners" will do the right thing and stop misleading the critical debate on the origins of obesity, type 2 diabetes and related maladies. Then we can all get on with improving the health of the people Charlie Perkins cared most about, as well as that of the millions of other information-poor families across our society.

Apologies, readers, if you think this whole piece strikes the wrong "tone" and comes across as a bit of a rant. Perhaps I may be granted that indulgence since it well illustrates my frustration after two years of determined effort to get something done that should have been done without any input at all from me.

Finally, if you think you found errors of fact in my analysis above, please get in touch immediately and I will correct the online version as soon as possible. More generally, comments, criticisms, questions, compliments, whatever are welcome at strathburnstation@gmail.com

rory robertson
economist and former-fattie
<https://twitter.com/OzParadoxdotcom>

Want to stop trends in your family and friends towards obesity, type 2 diabetes, heart disease and cancer? Well, it's time to stop eating and drinking sugar: <http://www.youtube.com/watch?v=xDaYa0AB8TQ&feature=youtu.be>

Here's a time-tested diet to reverse obesity and type 2 diabetes: <http://www.australianparadox.com/pdf/why-we-get-fat.pdf> And here's why it works: <http://garytaubes.com/wp-content/uploads/2012/02/WWGF-Readers-Digest-feature-Feb-2011.pdf> ; <https://www.youtube.com/watch?v=D0GSSSE4l8U> ; <http://www.youtube.com/watch?v=bTUspjZG-wc>

Join the push to give all kids a fairer start in life: <http://www.australianparadox.com/pdf/Sugary-Drinks-Ban.pdf>

Quick Quiz: Q1 - What if the University of Sydney spent \$500m on Charles Perkins Centre but not five minutes on research integrity? <http://www.australianparadox.com/pdf/quickquizresearch.pdf>

Outsized rates of sugar consumption – alongside alcohol and tobacco – are a major driver of the unacceptable "gap" in life expectancy between Indigenous and non-Indigenous Australians: see the bottom row of Box/Table 2 in <https://www.mja.com.au/journal/2013/198/7/characteristics-community-level-diet-aboriginal-people-remote-northern-australia>

Isn't it ironic (or worse)? The Charles Perkins Centre's highest-profile obesity and diabetes experts have falsely exonerated as harmless the sugar that's devastating the health of those Australians who Charles Perkins cared most about: <http://www.australianparadox.com/pdf/diabetes.pdf> ; <http://www.rethinksugarydrink.org.au/facts> ; <http://www.smh.com.au/national/university-sets-up-500m-centre-for-obesity-research-20130724-2jqj8.html>

Globally, bogus scientific results are common when university-based researchers have close links to sugary food/drink industries: <http://www.plosmedicine.org/article/info%3Adoi%2F10.1371%2Fjournal.pmed.1001578> ; (scroll down) <http://www.australianparadox.com/pdf/Howdevious.pdf>

Strathburn Cattle Station is a proud partner of YALARI,
Australia's leading provider of quality boarding-school educations for Aboriginal and Torres Strait Islander teenagers. Check it out at www.yalari.com.au

Attachment 5

Data provided by the Australian Bureau of Statistics via email

[REDACTED]

From: Robert Clark [REDACTED]
Sent: Thursday, March 06, 2014 2:20 PM
[REDACTED]
Subject: RE: Apparent Consumption of Foodstuffs: Historical Statistical Data for Sugar [SEC=UNCLASSIFIED]

Dear [REDACTED]

Thank you indeed for this most helpful additional ABS information. I greatly appreciate the time and care that you have provided in assisting me.

Among other things [REDACTED] it is a reminder to me of the core values of the Australian Public Service, and the good people who serve within it.

My sincere thanks,

Bob

Professor Robert Clark, AO FAA FRSN
Chair of Energy Strategy and Policy
The University of New South Wales

[REDACTED]

[REDACTED]

Sent: Thursday, 6 March 2014 9:59 AM

To: Robert Clark
[REDACTED]

Subject: Fw: Apparent Consumption of Foodstuffs: Historical Statistical Data for Sugar [SEC=UNCLASSIFIED]

Dear Robert,

Please find answers to your further questions in blue below.

Please don't hesitate to contact me if you need anything further. Also please accept my apologies for the delay - I do not work Wednesdays.

Kind Regards

[REDACTED]
[REDACTED]
[REDACTED]
[REDACTED] Australian Bureau of Statistics
[REDACTED]
[REDACTED] (W) www.abs.gov.au
[REDACTED]
[REDACTED]

To: Robert Clark [REDACTED]
[REDACTED]

Date: 04/03/2014 10:27 AM

Subject: Re: Apparent Consumption of Foodstuffs: Historical Statistical Data for Sugar

Dear Robert,

Thank you for your query about the Apparent Consumption of Foodstuffs collection. Answers to questions from your original email appear in blue below.

After our conversation yesterday I have two things to investigate. Namely:

- providing more context about the note on the website about domestic deliveries (if you wouldn't mind sending a link to the page on the ABS website that would make it quicker)

Thank you for sending the link - I am now clear we were referencing the same material.

The reference to domestic deliveries indicates that the ABS data for these items includes the manufactured product not the raw product (eg sugar cane). Some of the other foodstuffs in the collection (eg vegetables) include the raw produce.

I have found some further information about the calculations. The available for consumption figure was calculated in two parts;

a) refined sugar available for domestic consumption

1 the quantity of domestic sugar deliveries to retailers and repackers

plus,

2 the quantity of refined sugar imported

b) Manufactured sugar available for consumption

1 the quantity of domestic sugar deliveries to manufacturers (excluding for nonhuman consumption) plus,

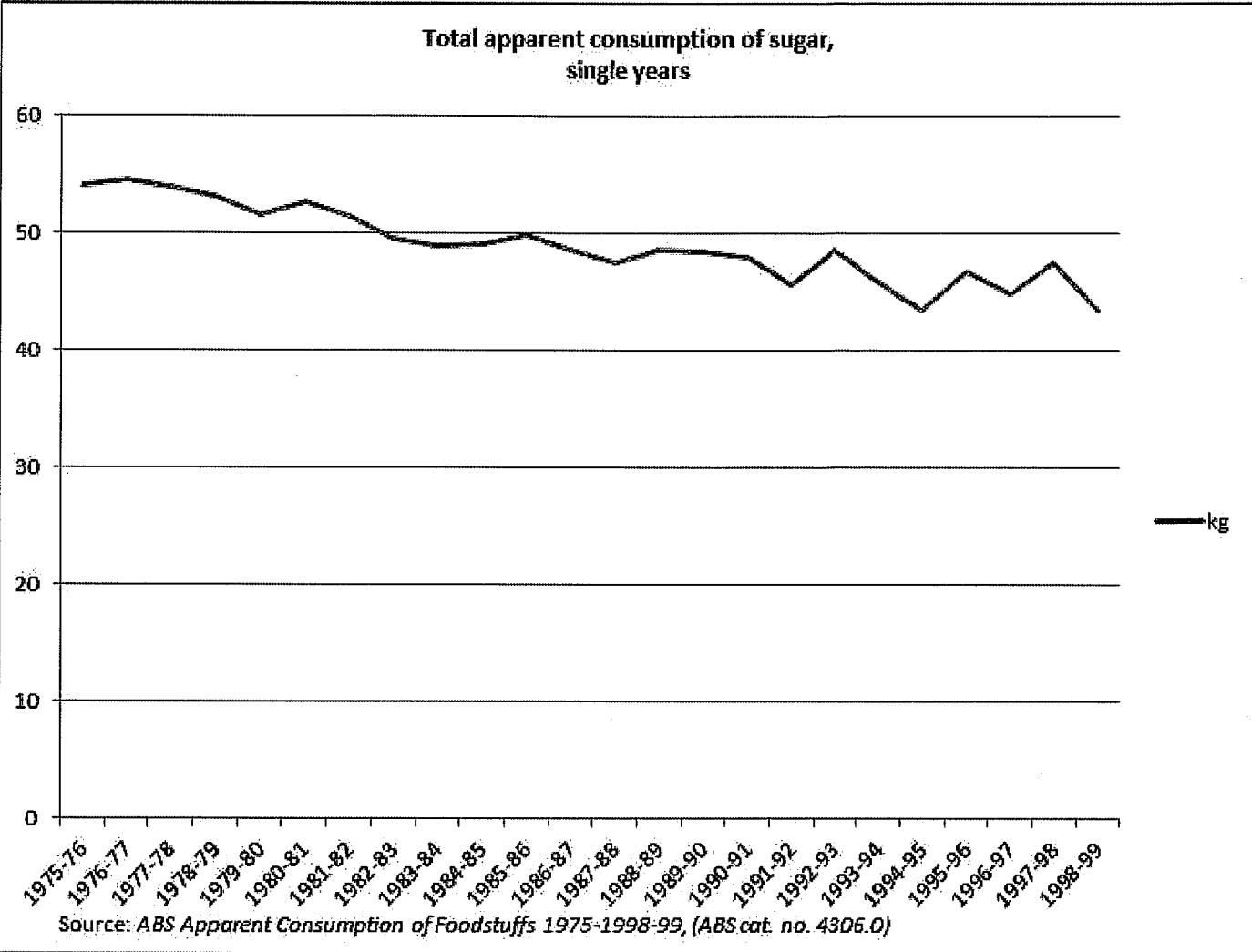
2 the quantity of sugar contained in imports minus,

3 the quantity of sugar contained in exports.

The ABS obtained detailed information from sugar manufacturers (via a survey form) about refined sugar and the amount they sent to other manufacturers (among other things). The ABS also used data from other ABS collections to estimate the amount of refined sugar which was imported and exported. The quantities for refined products imported and exported were used in conjunction with the factors included in my previous email for use in the calculations for sugar.

- providing an ABS view about what the data are telling us about the trend in per capita consumption of sugar in the period 1980 to 1998-99.

The ABS Apparent Consumption of Foodstuffs data for the period 1980 to 1998-99 show an overall slight decline in the per capita consumption of sugar. I have included the following spread sheet with the data behind this statement.



(See attached file: Apparent consumption of sugar.xlsx)

I am in the process of following these issues up and will get back to you as soon as possible.

Please don't hesitate to contact me in the mean time if you have any further questions.

[Redacted]

[Redacted]

[Redacted]

[Redacted] | Australian Bureau of Statistics

[Redacted]

[Redacted] (W) www.abs.gov.au

[Redacted]

Robert Clark ---25/02/2014 02:53:38 PM---Dear [REDACTED] Thank you so much for taking my phone call yesterday, and for the conversation relating

From: Robert Clark [REDACTED]
[REDACTED]

Date: 25/02/2014 02:53 PM

Subject: Apparent Consumption of Foodstuffs: Historical Statistical Data for Sugar

Dear [REDACTED],

Thank you so much for taking my phone call yesterday, and for the conversation relating to Australian government data for the apparent consumption of sugar in Australia, from 1980 onwards, and the context (in confidence) in which I am seeking this data.

As discussed, below I have set out the key information I am seeking, and I would be most grateful if you and ABS colleagues were able to provide this information by email.

Advice sought from ABS:

Background: The Food and Agriculture Organisation (FAO) of the United Nations provides data on the annual apparent consumption of sugar for Australia and other countries (kg/capita/year) – also referred to as FAO Food Balance Sheets. In publications that refer to this data, intake of total nutritive sweeteners (refined and added sugars) and separately refined sucrose alone are graphed from 1980 to 2003. Apparent consumption of other sweeteners (glucose, dextrose, fructose, lactose, isoglucose, maltose and maple sugar) is also graphed for this time period. It is discussed that the FAO data for Australia were derived from Australian Bureau of Statistics (ABS) data published by the then Australian Bureau of Agricultural and Resource Economics (ABARE) until 1998/9 and that beyond this date ABS no longer collected this information.

From ABS website information on apparent consumption of foodstuffs it is cited that *generally* the kg/capita/year data are calculated from commercial production minus exports divided by the mean resident population for the period. Here commercial production includes estimated home production, imports and opening stocks – and exports includes use for processed food, non-food use, wastage and closing stocks. However it is noted that this general equation is not used in instances where components of this equation are not available – and that this is the case for sugar, which is estimated on the basis of domestic deliveries.

Questions:

1. Is the FAO data on apparent consumption of sugars for Australia from 1980 to 1998/9 derived from ABS data?
Historically it was common practice for ABS and ABARES to provide data to the FAO however in relation to this data you would need to contact the FAO.
2. Does the ABS/FAO data on apparent consumption of sugar for this period capture the full range of sugar intake by Australians? It has for example been discussed in a publication that the data are constructed for primary crops up to their first stage of processing, and therefore do not take account of sugars contained in highly processed, imported food products (manufactured sweetened food imports). Is this the case?
The ABS can only comment on ABS data. The ABS data did include sugars contained in highly processed foods. Factors were applied to detailed breakdowns of highly processed commodities, (for example confectionary, sweet biscuits etc) for both imports and exports. While these highly processed foods were included in the calculations, it must be noted that the factors had not been updated to account for changing consumption patterns or changes in production. As discussed yesterday, a copy of the factors is included below along with some caveats.
3. What is the 'error bar' of the ABS/FAO data on annual apparent per-capita consumption of sugar?
There is no sampling error associated with the ABS calculations, however there may be other sources of error which have not been quantified.
4. Why did ABS stop collecting this data in 1998/9? In particular was this due to an increased complexity of sources of sugar in food consumed in Australia and availability of reliable data?
The decision to discontinue the publication, Apparent Consumption of Foodstuffs was taken in 2000 by the ABS after an internal

methodological review. The unpublished review concluded that the methodology for estimating virtually all foodstuffs in the collection needed updating. Improvements to the methodology for sugar, like most other foodstuffs, were recommended. At the time, the ABS was unable to secure public funding to update the methodology for the entire collection and continue to publish data about apparent foodstuffs. The decision was therefore taken to discontinue the publication.

5. How did the FAO manage to continue to document this data for Australia from 1998/9 to 2003 – by extrapolation or from non-ABS or other data sources?

The ABS can't comment on the sources and methods underlying the data the FAO publish. The ABS published data on apparent consumption of sugar up until the reference period 1998-9. After this time the ABS discontinued the estimation and publication of the data. Since then, the ABS have not been involved in the estimation or publication of data on apparent consumption of sugar.

In 2005, and then again in 2012, the ABS did respond to two separate requests and supplied a copy of the factors ABS used in the calculation of apparent consumption of sugar. These factors were supplied along with appropriate caveats including that the ABS no longer believed them to be appropriate. The ABS had no involvement with either recipient's use of these factors. Because the ABS have not reviewed the methodologies used by other organisations, the ABS can not comment on the methodologies used to estimate apparent consumption of sugar for non-ABS data or for time points after 1998-9.

In terms of reproducing the data using a similar methodology to the ABS, it would be necessary to obtain specific, detailed breakdowns from the sugar refining companies along with the factors which ABS used.

6. Are there any other limitations of the apparent consumption of sugar data for Australia?

Please refer to 2 above.

I would be most appreciative of any assistance you can provide in helping me answer these questions. If there is related information not covered by these questions that you also feel I should be aware of, I would be most grateful to receive this.

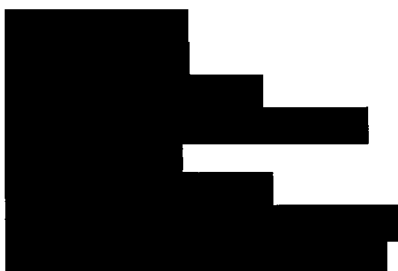
Thanking you and ABS in advance.

I have copied this message to Sarah Heesom, who is assisting me with regard to procedural matters of the inquiry.

Kind regards,

Robert Clark

Professor Robert Clark, AO FAA FRSN
Chair of Energy Strategy and Policy
The University of New South Wales
(Former Chief Defence Scientist of Australia)



Factors

Attached below are the factors used to estimate the quantity of sugar in imported and exported goods (when preparing the Apparent Consumption of Foodstuffs publication) for the years 1990-1999. Please be aware that the ABS no longer believes these to be appropriate.

(See attached file: SUGARFCT.XLS)

(See attached file: sugar codes.xls)

Attachment 6

Response to the Draft Initial Inquiry Report from Jennie Brand-Miller and
Alan W. Barclay

Response to Draft Initial Inquiry Report

Jennie Brand-Miller and Alan Barclay

We thank Professor Clark for the rigour with which he has investigated Rory Robertson's complaint against the authors of *The Australian Paradox*, the Journal *Nutrients*, the University of Sydney, and FAO. We are gratified that he recommends, on balance, that the University dismiss the allegations.

We hope that Professor Clark might consider the following points in his final report.

1. In Point 4a, the statement *The prevalence of obesity has increased 3-fold in Australians since 1980* is actually correct. Obesity has increased from 8.7% to 24.8% of the population as shown in Figure 1 of the paper. This is close to a 3-fold or 200% increase. Mr Robertson's objection is that the final paragraph of our paper specified 300%. To be consistent with the rest of the text, we changed 300% to 3-fold in our 12th February 2014 correction.
2. Throughout the report, there are 16 instances where the term 'total sugar' is mentioned in the text. This has the potential to be confusing because in the field of nutrition, total sugar(s) is the sum of the naturally-occurring sugars in foods + added/refined sugar(s). In point 6.1.1, for example, *total sugar intake* is actually referring to the sum of all *refined sugars*. For this reason, we recommend that the report avoids the use of *total sugar* and instead uses *refined sugars* or *added sugars*.
3. Professor Clarke consulted [REDACTED] as a subject expert. Her advice needs to be considered in the context of her academic and publicly expressed bias against sugar.

[REDACTED] points out that some sectors of the population may have increased their intake of refined sugars. It should be appreciated that the national dietary data that were presented in the paper use representative sampling techniques that include disadvantaged groups. Furthermore, the implicit assumption that lower socioeconomic groups ingest more soft drink is not supported by new grocery sales data 2007-2011¹. In fact, low income households purchased *less* soft drink than middle- and high-income households.

In particular, we object to the inclusion of the following statement (Page 11, last para) because it is speculative and not directly relevant to the inquiry.

Put in straightforward terms, the decline in nationally-averaged (total) sugar consumption data over the same timeframe that obesity is increasing in Australia would indicate that Australians have adopted bad habits in relation

to other foods, but does not exonerate sugar as a contributor to obesity per se.

The causes of obesity are complex and unclear. Food, whether healthy or not, when eaten in amounts excess to requirements results in a positive energy balance. Sedentariness, sleep deprivation and stress increase appetite and/or reduce energy expenditure, and encourage weight gain. All calories are incriminated in our obesity epidemic but the debate in the scientific literature centres on whether added sugar is *uniquely* obesogenic, over and above its energy content. Our contribution to this debate is to point out that at least in one country with a very steep increase in obesity, refined sugar intake has actually declined over the same timeframe.

5. In the correspondence with ABS, it is stated that, *Apparent Consumption of Foodstuffs data for the period 1980 to 1998-99 show an overall slight decline in the per capita consumption of sugar.* In fact, Attachment 5 of the report demonstrates a 10 kg/capita/year decrease over this time frame, equivalent to 18%, and consistent with the findings of *The Australian Paradox*. It is a moot point whether a decline equivalent to 7 teaspoons/person/day is slight.
6. The draft report stated that we appeared to be unsure about the detailed methodology underpinning the FAO data. However, as nutrition scientists familiar with apparent consumption data, particularly on refined sugars, we were certain that ABS data included processed foods containing sugar, both exported and imported in their balance sheets, and we were absolutely certain that FAO data were almost identical to the ABS data. We stated this clearly in our response to Rikkers et al.
7. Professor Clarke is sympathetic to the frustration evident in Mr Robertson's complaints. He believes this resulted from our failure to directly answer his questions and clearly state the facts.

In our view, this is not a fair comment. Mr Robertson never chose to send his criticisms of our paper directly to the journal as *Correspondence*, preferring a manifesto-styled approach which lacked civility and clarity.

Despite the offensive nature in which Mr Robertson couched his complaints, we responded in a straight-forward scientific paper, *The Australian Paradox Revisited*. The Editor of *Nutrients* also wrote an Editorial to refute Mr Robertson's criticisms of the journal.

We chose not to correspond directly with Mr Robertson on the advice of the University.

Professor Clarke may not be aware that the nature of Mr Robertson's complaints has shifted over the past two years. The first 16-page document sent to JBM in early 2012 painted fructose as a dietary toxin. The word *fructose* is mentioned over 130 times, *Sweet Poison* 57 times, and the author, *David Gillespie*, 26 times. Yet, fructose does not appear in Robertson's March 2014 document. Similarly, 'arithmetic errors' were not mentioned in the

2012 document.

8. Professor Clarke criticises us for debating the detail of the methodology in our response to Rikkers et al., *rather than simply bringing certainty to the key point of whether their own Figure 2 in the Australian Paradox paper includes this (imported food) or not.*

We strongly disagree with this appraisal. The Journal used the first 3 lines of our response to Rikkers et al. as our abstract. It states (bolding ours):

*Rikkers et al. claim that the Australian Paradox is based on incomplete data because the sources utilised did not incorporate estimates for imported processed foods. **This assertion is incorrect.** Indeed, national nutrition surveys, sugar consumption data from the United Nations Food and Agricultural Organisation, the Australian Bureau of Statistics and Australian beverage industry data **all incorporated data on imported products.***

We believed it was also critical to emphasise that *even if* imported food had been excluded from FAOStat data (as they claimed), Rikkers used an intrinsically flawed methodological approach to assess the amount.

9. Professor Clarke is critical of our choice of journal to publish a 'big public policy conclusion'. The Australian Paradox was never intended as a policy paper, but rather a thought-provoking observation that challenged public and professional perception, academic dogma and proposed initiatives to combat obesity. *It is exactly what good scientists should do.*

In relation to the choice of journal, *Nutrients* is a new open access, peer-review journal that was appropriate for an observational analysis. The Editor-in-Chief, Professor Peter Howe, is widely respected and its impact factor is rising (currently 2.072). We have continued to submit articles for publication in *Nutrients*.

10. We believe that it is gratuitous to suggest that Mr Robertson's work with the indigenous community, *is a factor in his response to the paper and his genuine interest in this subject.* His motivation is probably better illustrated by the fact that he breached confidentiality of the inquiry, and misrepresented the inquiry to suggest in a public, international forum, that the University of Sydney also questioned the scientific integrity of the authors and the paper. His persona is also evident in his lack of civility, bullying, and keenness to expose his viewpoint to the press.

Indeed, there is nothing to suggest that Mr Robertson is a fair-minded person. His website (australianparadox.com) describes the *The Australian Paradox* and its authors as *shonky, hopeless, negligent, sloppy, a disgrace, incompetent, reckless, factually incorrect, idiosyncratic, a major embarrassment, hopelessly wrong, spectacularly false, and a threat to Australian public health.* And the journal that published our paper is hopeless too, its editors *incompetent,*

underperforming and asleep at the wheel, and its peer-review process hopelessly broken.

We note that Mr Robertson has clashed with other academics, such as Dr Steve Keen at the University of Western Sydney, making a widely publicised bet in November 2008:

<http://www.smh.com.au/business/property/macquaries-robertson-sees-easing-in-house-price-gains-20100420-squt.html>.

11. Professor Clarke raises concerns about how research data are documented and stored at the University of Sydney. It should be noted that all files concerning this research project are stored electronically, including all material collected by [REDACTED]. The data, data analysis, graphics, drafts, reading materials and correspondence are available on request.
12. Several times, Professor Clarke states that *The Australian Paradox* is not tightly written. In fairness, it should say that *some* parts are not clear to every reader. Our target audience was qualified dietitians and nutritionists with assumed knowledge of the national dietary data. Many of the figures were included in the interests of honesty and transparency, showing how the data could be easily misconstrued. Unfortunately, in hindsight we did not address this issue sufficiently in the discussion. However, we note that three reviewers recommended the manuscript for publication, [REDACTED] [REDACTED] Nobody, including Robertson or Rikkers et al., wrote correspondence to the Journal to complain.

Once again, we are grateful that Professor Clarke has recommended dismissal of the allegations against us. We are hopeful that this inquiry will bring the issue to closure. No scientist deserves the bullying and trial-by-media that a character such as Rory Robertson can incite.

As suggested, we will prepare a paper for publication that specifically addresses and clarifies the factual issues examined in the inquiry. We agree that there are a number of 'lessons learnt'.

Jennie Brand-Miller and Alan Barclay

2 June 2014

References

- 1 Levy, G. S. & Shrapnel, W. S. Quenching Australia's thirst: A trend analysis of water-based beverage sales from 1997 to 2011. *Nutrition & Dietetics*, n/a-n/a, doi:10.1111/1747-0080.12108 (2014).