The University of NSW/Sax Institute study *The impact of compulsory cycle helmet legislation on cyclist head injuries in New South Wales, Australia* by Walter, Olivier, Churches and Grzebieta attempts to prove that the ratio of cyclist head vs limb injuries justifies retention of the law, but fails to recognise within its own methodology the increased risk of cyclist accidents/injuries that negates any possible benefit from the mandatory wearing of helmets.

This failure is highlighted by the observations of lead author Jake Olivier, senior lecturer at UNSW's Prince of Wales Clinical School, published by The Conversation website on June 23, 2011.

Olivier concedes that the number of child cyclists reduced by around one third following helmet law enforcement, although he cites one study commissioned by the Road Traffic Authority but ignores the detail. For example, a 1993 study conducted by Smith MC and Milthorpe MW (*An observational survey of law compliance and helmet wearing by cyclists in New South Wales*, RTA 1993 (ISBN0-7305-9110-7) found:

• school students riding to/from NSW schools: total counts 3107 in 1991 to 1648 in 1993, a drop of 47%
• for female students the figures were 654 in 1991 down to 222 in 1993, a drop of 64%
• for secondary female students the reduction in cycling was greater: 455 in 1991 to 106 in 1993, a drop of 77%
• for secondary children cycling to school in Sydney the reduction was from 904 to 294, a drop of 67%.
• the largest reduction in cycling was among secondary female students in Sydney: 214 in 1991 down to 20 in 1993, a drop of 90.6%

Between 1991 and 1993, the NSW Road Traffic Authority measured a decrease in <16 child cycling of 44% (Walker M. *Law compliance among cyclists in New South Wales*, April 1992. *A third survey.: Road and Traffic Authority Network Efficiency Strategy Branch*, July 1992 / Smith N, Milthorpe F. *An observational survey of law compliance and helmet wearing by bicyclists in New South Wales* - 1993.: Roads and Traffic Authority,1993.)

Whether it's a third, 44% or 90.6% reduction in child cycling, it could reasonably be expected that such declines would see a roughly commensurate reduction in accidents/injuries among children after helmet law introduction, regardless of whether or not they wore helmets.

Walter et al note there are data and timing flaws in the Voukelatos/Rissel study, *The effects of bicycle helmet legislation on cycling-related injury: The ratio of head to arm injuries over time* (p50) which prompted their analysis, but critics concede that its age-group-specific injury counts are fairly accurate.

As presented in the Voukelatos/Rissel study, those injury trends for children were:

Table 2. Cases of head and arm injuries for hospitalised cycling-related injuries by age group
Ages 0-14

Year	**Head**		**Arm**	
	ICD9	**ICD10**	**ICD9**	**ICD10**
1988-89	421		334	
1989-90	423		409	
1990-91	356		338	
1991-92	291		397	
1992-93	310		446	
1993-94	315		476	
1994-95	311		521	
1995-96	330		617	
1996-97	373		595	
1997-98	386		640	
1998-99	288	554	484	587
1999-2000	339	620	567	712
2000-01		574		612
2001-02		466		615
2002-03		544		675
2003-04		479		678
2004-05		480		753
2005-06		496		641
2006-07		445		657
2007-08		403		526

Head injuries came down: comparing the first three years of data (88-91 av 400) to the following three years (91-93 av 305), a reduction of 24%; or comparing the first four years of data (88-92 av 373) to the following four years (92-96 av 317), a reduction of 15%.

Arm injuries went up: comparing the first three years of data (88-91 av 360) to the following three years (91-93 av 440), an increase of 22%; or comparing the first four years of data (88-92 av 370) to the following four years (92-96 av 515), an increase of 39%.

So Olivier concedes that child cycling fell by about 33% when the helmet law was introduced (with children helmet wearing rates increasing from about 20% to more than 60% within two months of helmet law introduction), yet is satisfied that head injuries only declined by 24% on a three year comparison and just 15% on a four year comparison.

More disturbing is that even though child cycling fell by about 33%, according to Olivier, arm injuries increased by 22% on a three year comparison and by 39% on a four year comparison.

The NSW University/Sax Institute study asserts that 1988-89 should be discounted due to an absence of admission data.

Excluding 1988-89, **head** injuries came down: comparing the first two years of data (89-91 av 390) to the following two years (91-93 av 301), a reduction of 23%; or comparing the first three years of data (89-92 av 357) to the following three years (92-95 av 312), a reduction of 13%.

Arm injuries went up: comparing the first two years of data (89-91 av 374) to the following two years (91-93 av 422), an increase of 13%; or comparing the first three years of data (89-92 av 381) to the following three years (92-95 av 481), an increase of 26%.

Helmets do not prevent arm injury - indeed, they may increase arm injury - and being indicative of non-head injury the results suggest there was an increased number of accidents and thus injuries despite a smaller pool of child cyclists.

A further consequence of reduced cycling is a significant decrease in public health as people abandon regular recreational exercise during an era of high obesity. The ongoing discouragement of public cycling participation is apparent in the failure of Bike Share schemes in Melbourne and Brisbane, despite the success of such schemes in all other countries without mandatory all-age helmet legislation.

Olivier contends that "any major drop in cycling rates would have resulted in a drop in head and arm injury rates. So the comparisons we made were 'exposure free'". This implies that no decrease in arm (or leg) injuries would prove that cyclist numbers didn't fall, ignoring the possibility that the ratio of arm (or leg) injuries per cyclist might have increased.

Smith-Milthorpe's 1993 study suggested a 67% drop in secondary student cycling, and the closest data range from the Voukelatos/Rissel study is the 15-24 age group:

Head injuries came down among 15-24yo: comparing the first three years of data (88-91 av 160) to the following three years (91-93 av 128), a reduction of 20%; or comparing the first four years of data (88-92 av 153) to the following four years (92-96 av 123), a reduction of 20%.

Arm injuries went up among 15-24yo: comparing the first three years of data (88-91 av 106) to the following three years (91-93 av 111), an increase of 5%; or comparing the first four years of data (88-92 av 103) to the following four years (92-96 av 130), an increase of 26%.

Walter et al speculate whether the downturn in child cycling was temporary or permanent. *Trends in Australian children traveling to school 1971-2003: burning petrol or carbohydrates?* (final page Appendix 4) shows the decline in walking and cycling to school by children across Australia aged 5-9 and 10-14 from 1971 to 2003 (other = cycling). This and other surveys suggest the downturn was permanent.

But what of adults? Olivier states that "there seemed to be an increase in adult riders" after the helmet law was introduced, and in his study cites Walker, Cameron, Smith and Milthorpe (see Appendix 2 and Appendix 3).

Report CR69, *Day-to-Day Travel in Australia 1985-86*, a statistical data analysis commissioned by the Department of Transport and Communication and the Federal Office of Road Safety, estimated **147,200** people above the age of nine used bicycles daily in Sydney (see Appendix 1), five years before helmet law enforcement.

Cycling in Sydney: Bicycle Ownership and Use suggests that in 2000, there were an average **94,571** bicycle trip per day in Sydney - down 35% on the 1985/86 numbers. On Census day 2006, an estimated **22,161** people used a bicycle for their journey to work in NSW (Appendix 6) and cycling as a proportion of work trips in Sydney was at the same level as it was in 1986 (Appendix 7).

The 2008/09 Sydney Household Travel Survey (p26) shows there were **106,000** bike trips on average weekdays in 2008/09, compared to **101,000** bike trips in 2001/02 (Appendix 8), and data from *Cycling in New South Wales: What the data tells us* shows Sydney had Australia's lowest proportion of bicycle use for journeys to work at 0.7% in 2006 (Appendix 5).

Age-group-specific and all-age data in the Voukelatos/Rissel study is not consistent and the all age totals in particular are considered unreliable. Nevertheless, the Rissel data shows:

Table 2. Cases of head and arm injuries for hospitalised cycling-related injuries by age group
All ages

Year	Head		Arm	
	ICD9	ICD10	ICD9	ICD10
1988-89	702		499	
1989-90	770		666	
1990-91	640		638	
1991-92	509		627	
1992-93	579		765	
1993-94	513		692	
1994-95	505		756	
1995-96	532		904	
1996-97	581		913	
1997-98	618		979	
1998-99	511	1170	812	1212
1999-20	581	1323	966	1421
2000-01		1293		1341
2001-02		1321		1462
2002-03		1355		1540
2003-04		1519		1731
2004-05		1514		1863
2005-06		1624		1956
2006-07		1619		1955
2007-08		1443		1754

Head injuries came down: comparing the first three years of data (88-91 av 704) to the following three years (91-93 av 534), a reduction of 24%; or comparing the first four years of data (88-92 av 655) to the following four years (92-96 av 532), a reduction of 19%.

Arm injuries went up: comparing the first three years of data (88-91 av 601) to the following three years (91-93 av 695), an increase of 16%; or comparing the first four years of data (88-92 av 608) to the following four years (92-96 av 779), an increase of 28%.

As critics believe the all-age data in the Voukelatos/Rissel study is most likely to be inaccurate, the all-age table can be recalculated based on the age-group-specific data:

Table 2. Cases of head and arm injuries for hospitalised cycling-related injuries by age group
All ages based on total of age-group-specific data

Year	Head		Arm	
	ICD9	ICD10	ICD9	ICD10
1988-89	662		499	
1989-90	747		632	
1990-91	629		541	
1991-92	527		609	
1992-93	548		735	
1993-94	551		731	
1994-95	537		804	
1995-96	562		955	
1996-97	615		959	
1997-98	652		1014	
1998-99	521	1158	815	1212
1999-20	591	1317	970	1418
2000-01		1262		1319
2001-02		1228		1389
2002-03		1265		1472
2003-04		1140		1479
2004-05		1202		1582
2005-06		1314		1638
2006-07		1294		1630
2007-08		1160		1399

Head injuries came down: comparing the first three years of data (88-91 av 679) to the following three years (91-93 av 542), a reduction of 20%; or comparing the first four years of data (88-92 av 641) to the following four years (92-96 av 550), a reduction of 14%.

Arm injuries went up: comparing the first three years of data (88-91 av 557) to the following three years (91-93 av 692), an increase of 24%; or comparing the first four years of data (88-92 av 570) to the following four years (92-96 av 806), an increase of 41%.

The NSW University/Sax Institute study asserts that 1988-89 should be discounted due to an absence of admission data.

Excluding 1988-89, **head** injuries came down: comparing the two pre-law years of data (89-91 av 688) to the following two years (91-93 av 538), a reduction of 22%; or comparing the first three years of data (89-92 av 634) to the following three years (92-95 av 545), a reduction of 14%.

Arm injuries went up: comparing the first two years of data (89-91 av 587) to the following two years (91-93 av 672), an increase of 14%; or comparing the first three years of data (89-92 av 594) to the following three years (92-95 av 757, an increase of 27%.

Annual results in all ICD9 data suggest increasing head and particularly arm injuries beyond 1996 to 2000, a worsening trend maintained within the ICD10 data to 2008 as cyclist numbers gradually recovered from their 1991/92 slump.

Whichever way the head/arm injury data is diced from the Voukelatos/Rissel study, it indicates a lower proportion of head injuries but an overwhelming increase in total accidents/injuries per cyclist on the road.

Walter et al repeated the arm and leg analyses on pedestrians *"so if we found a big drop in pedestrians, that would be an indication of general road safety improvements. But we did not see a reduction in pedestrian head injury at all relative to limb injuries."*

NSW pedestrian fatalities and Injuries

Year	Killed	Injured
1960	367	4022
1970	291	4346
1980	252	4161
1990	177	3944
1997	114	2985
2000	110	2979
2001	88	2861
2002	94	2607
2003	94	2490
2004	85	2301
2005	96	2220
2006	72	2126
2007	68	2119

Source : RTA document Road Traffic Crashes in New South Wales 2007

Walter et al ignore the fact that since bicycle helmet laws were introduced, pedestrian injuries have almost halved, indicative of general road safety improvements - yet cyclist injuries have increased.

The 1991 introduction of speed cameras in NSW is likely to be a significant factor in the pedestrian death/injury rate after 1990, yet the Walter et al study contends that, for cyclists, "speed modifying interventions would not be expected to have a marked differential effect on head and arm injury rates". Why not?

Within the NSW University/Sax Institute study of June 2011, it is stated that "counts of road accidents for pedestrians, motorists and cyclists showed a marked decline approximately between 1989 and 1992 (Fig. 1)". Figure 1 shows that annual casualty rates for pedestrians, cyclists and motor vehicle occupants had all been falling from 1986/87 to 1991/92, after which they all plateaued.

This is not dissimilar to the finding by Voukelatos/Rissel, who calculated injuries among both on-road and off-road cyclists had been falling prior to helmet law enforcement. On and off road cyclist injuries actually increased after 1991/92.

In considering whether helmets are currently a barrier to cycling, Olivier writes:

Helmets aren't a major barrier. There's a widely cited survey by the Cycling Promotion Fund and the National Heart Foundation that suggests it is one of many coming in as the tenth most selected barrier. However, there were some problems with their methodology in terms of finding the primary barriers to cycling.

The researchers asked, "What do you find are the barriers to cycling?" and gave the respondents a list of choices, allowing them to tick as many as they wanted. The problem with that is you don't get an idea of what the main barrier of cycling is for these people.

The results showed around 16% said the helmet law was a barrier to cycling and it was ranked the tenth most common barrier. So when you consider that this might not be the main barrier, the actual figure is likely to be much lower than 16%.

No it's not. The CPF survey asked 1000 respondents if they own or have access to a bike and 596 said they do.

Among 158 who have ridden a bike for transport in the past month, 26 ticked that they don't ride more often for transport because they don't like wearing a helmet. What of the other 438 of the 596 who own or have access to a bike but *haven't* ridden for transport in the past month? Is their reason invalid because they rode two or 12 months ago?

Within reasons for not owning or having access to a bike, the 404 respondents were not given a multiple choice option referring to helmets, although 13.1% ticked "Other".

Among 515 of the 596 who don't ride a bike for transport, 81 said it was at least partly because they don't like wearing a helmet. Within reasons for not being interested in riding a bike for transport, 515 were not given a multiple choice option referring to helmets, although 11.9% ticked "Other".

All 1000 were asked which conditions would encourage them to ride a bike more often than they currently do (or at all) and among a multiple choice of nine answers, none of the choices offered by the CPF referred to helmets.

The 16.5% is perfectly valid, if not an underestimate, and that rounds to one in six people (who own a bike and have cycled in the past month) who cite helmets as a barrier to cycling. What might be the opinion of everybody else on the planet?

Conclusion

The data accepted as accurate by pro helmet law researchers shows that child cyclist road numbers fell by a greater percentage than the reduction in child head injuries, at the same time actually increasing the number of non-head injuries. All survey data within the public domain suggests a similar result for adult and all-age cyclists.

This is the same result recorded in other Australian state jurisdictions. In Western Australia, Main Roads WA surveys showed a reduction of at least 30% in cyclist numbers but no decrease in hospital admissions, with admissions increasing by about 30% once cyclist numbers had recovered to pre-law levels by 2000.

Cyclist road number/injury data since helmet law enforcement suggests an approximate 10% reduction in head injury risk but an approximate 30% increase in accident/injury risk due to factors such as risk compensation, safety in numbers, helmet size, rotational brain injury and increased car traffic density when discouraged cyclists drive instead.

Among all age groups, mandatory helmet wearing reduces the risk of head injury but increases the accident risk by a greater per cent, resulting in a larger number of head injuries and a substantially larger number of non-head injuries from the same size pool of cyclists on the road.

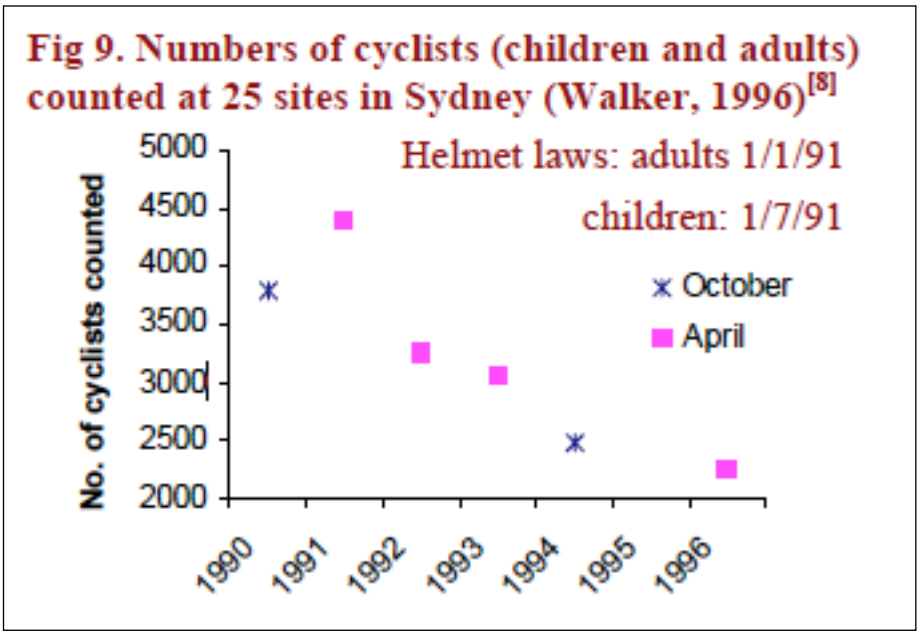
Based on the analysis by Walter et al, the question of whether mandatory helmet laws reduce head injury, increase accident risk or damage public health should be properly debated in NSW, and the law should be repealed.

Appendix 1

	Canberra	Sydney	Melbourne	Brisbane	Adelaide	Perth	Hobart	Darwin	Total
Males									
Walk	537	8966	6888	2098	2056	1694	423	111	22774
Bicycle	194	1117	2038	667	758	908	33	69	5784
Bus	213	3098	1227	619	567	481	201	22	6429
Train	1	2462	1260	537	129	99	0	0	4488
Tram	2	0	879	54	35	0	0	0	971
Taxi	19	346	128	165	58	32	27	3	777
Ferry	0	177	3	36	0	6	1	3	226
M/Bike	29	408	208	219	147	195	16	16	1238
C/driver	1987	25631	22558	8396	8602	8688	1388	657	77908
C/pass	593	5717	5270	2273	2868	1975	362	123	18182
Truck	37	701	299	241	63	192	25	8	1567
Semi-tr	1	18	26	3	4	12	0	0	65
Other	28	86	99	70	31	47	5	5	372
Total	3642	48727	40884	15381	14319	14329	2481	1018	140780
# males ('000)	91	1356	1154	431	394	378	71	26	3902
Females									
Walk	553	9205	7938	2443	2498	1982	463	112	25194
Bicycle	108	355	668	197	377	415	17	50	2187
Bus	195	3405	1525	806	1021	605	166	26	7748
Train	***0***	2161	1263	417	138	115	0	1	4094
Tram	***0***	13	1265	13	31	0	0	0	1321
Taxi	**10**	402	222	118	62	34	18	5	870
Ferry	***0***	101	3	19	0	15	3	4	144
M/Bike	***0***	32	15	16	8	18	6	1	95
C/driver	1541	16420	15056	5663	5541	6456	948	375	52000
C/pass	979	11660	10080	4202	3929	4048	671	221	35790
Truck	0	3	12	5	0	10	0	1	32
Semi-tr	0	0	0	0	0	0	0	0	0
Other	5	44	63	42	2	14	2	2	173
Total	3392	43800	38110	13939	13607	13711	2292	798	129648
# females ('000)	92	1412	1199	450	420	395	74	24	4067

Source: Survey of Day-to-Day Travel in Australia 1985-86

Appendix 2



Appendix 3

Table 1. Counts of child cyclists in NSW before and in the first two years of the helmet law (RTA surveys*)

Year	1991 (Pre-law)		1992 (1st law yr)		1993 (2nd law yr)	
Location	Total counted	No helmeted	Total counted	No helmeted	Total counted	No helmeted
Road Intersections	1741	440	1188	874	881	582
Change from 1991			*-553*	*434*	*-860*	*142*
Recreational areas	1742	709	1236	899	1184	872
Change from 1991			*-506*	*190*	*-558*	*163*
School gates	2589	761	1433	1156	1349	1025
Change from 1991			*-1156*	*395*	*-1240*	*264*
Total child cyclists	6072	1910	3857	2929	3414	2479
Change from 1991			*-2215*	*1019*	*-2658*	*569*

Appendix 4

Table 1

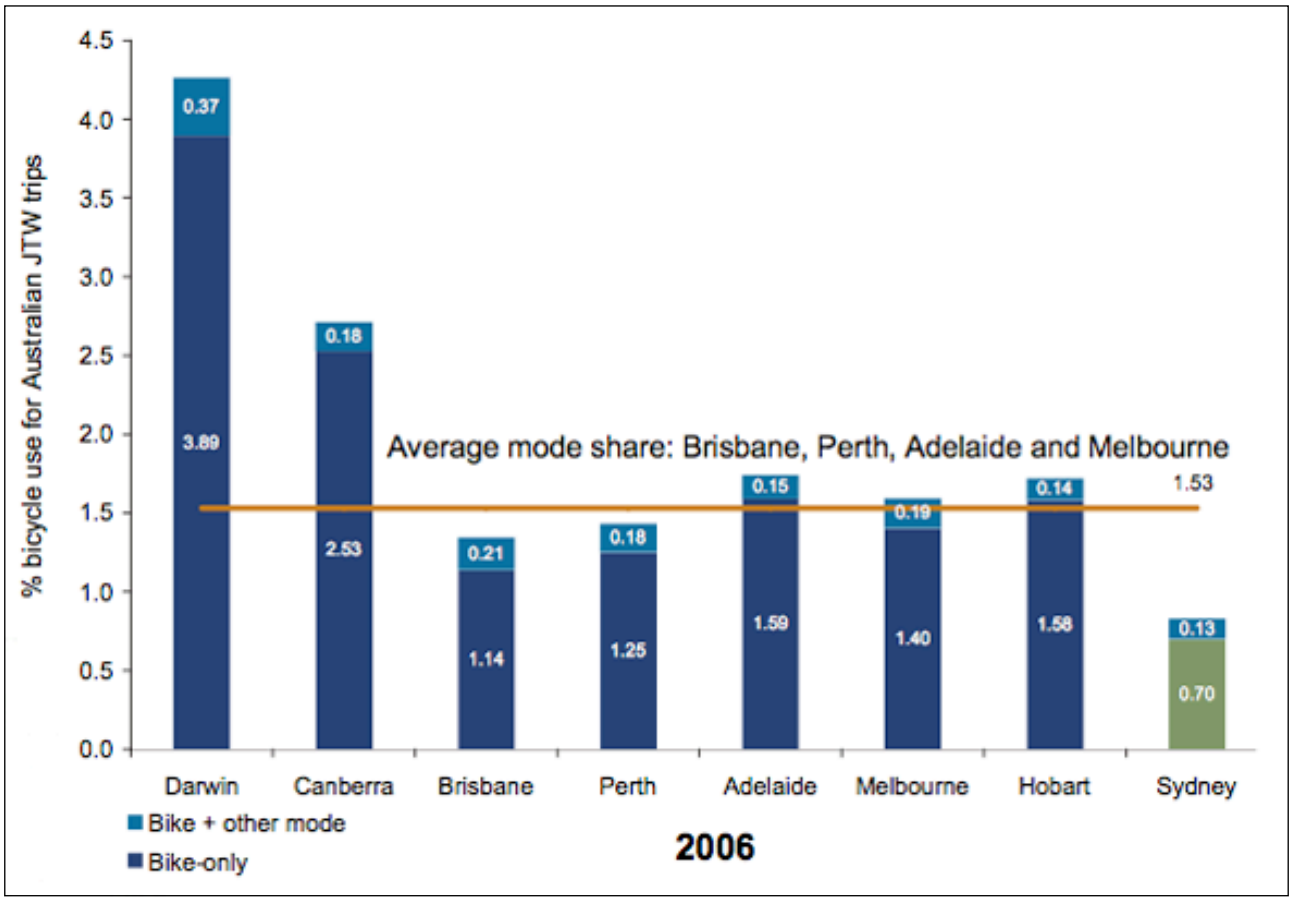
Prevalence of walking and being driven to and from school in Australian children age 5-9 and 10-14 between 1971 and 2003.

	1971[a] (N=4284)			1981 (N=4936)			1991 (N=662)			1999-2003 (N=816)		
	n	%	Odds ratio	n	%	Odds ratio (95% confidence interval)	n	%	Odds ratio (95% confidence interval)	n	%	Odds ratio (95% confidence interval)
Age 5-9												
Walk to school	1217	57.7	1.00	1047	44.5	0.59 (0.51, 0.68)*	119	35.3	0.40 (0.30, 0.54)*	107	25.6	0.25 (0.18, 0.34)*
Walk from school	1317	62.6	1.00	1133	48.2	0.56 (0.48, 0.65)*	134	39.8	0.39 (0.29, 0.53)*	123	29.4	0.25 (0.19, 0.33)*
Car to school	481	22.8	1.00	878	37.3	2.01 (1.71, 2.37)*	183	53.9	3.96 (2.94, 5.33)*	279	66.6	6.76 (5.05, 9.05)*
Car from school	403	19.1	1.00	748	31.8	1.97 (1.66, 2.34)*	157	46.5	3.67 (2.72, 4.97)*	265	63.4	7.32 (5.49, 9.77)*
Bus to school	388	18.4	1.00	392	16.6	0.89 (0.73, 1.08)	31	9.1	0.44 (0.29, 0.69)*	26	6.2	0.29 (0.17, 0.50)*
Bus from school	360	17.1	1.00	428	18.2	1.08 (0.89, 1.32)	41	12.2	0.67 (0.45, 1.02)	23	5.6	0.29 (0.17, 0.48)*
Train to school	9	0.4		11	0.5		0	0		2	0.5	
Train from school	11	0.5		13	0.5		0	0		2	0.5	
Other to school	14	0.7		27	1.1		6	1.7		5	1.1	
Other from school	14	0.7		30	1.3		5	1.5		5	1.1	
Age 10-14												
Walk to school	961	44.2	1.00	1018	39.4	0.82 (0.72, 0.94)*	107	33.1	0.63 (0.47, 0.84)*	84	21.1	0.34 (0.24, 0.48)*
Walk from school	1074	49.5	1.00	1136	44.1	0.81 (0.71, 0.92)*	120	37.9	0.62 (0.47, 0.82)*	130	32.7	0.50 (0.37, 0.66)*
Car to school	266	12.2	1.00	479	18.6	1.64 (1.36, 1.97)*	106	32.7	3.50 (2.56, 4.78)*	190	47.8	6.59 (4.98, 8.72)*
Car from school	146	6.7	1.00	288	11.1	1.75 (1.39, 2.22)*	77	24.3	4.46 (3.15, 6.30)*	126	31.8	6.48 (4.72, 8.89)*
Bus to school	690	31.7	1.00	808	31.3	0.98 (0.85, 1.13)	73	22.6	0.63 (0.47, 0.85)*	78	19.8	0.53 (0.39, 0.73)*
Bus from school	687	31.7	1.00	855	33.3	1.07 (0.93, 1.23)	87	27.3	0.81 (0.61, 1.08)	99	25.0	0.72 (0.54, 0.95)*
Train to school	179	8.3		173	6.7		29	8.9		34	8.6	
Train from school	188	8.6		196	7.6		28	8.9		33	8.4	
Other to school	79	3.6		103	4.0		9	2.7		11	2.7	
Other from school	76	3.5		100	3.9		5	1.6		9	2.1	

*$p<0.05$

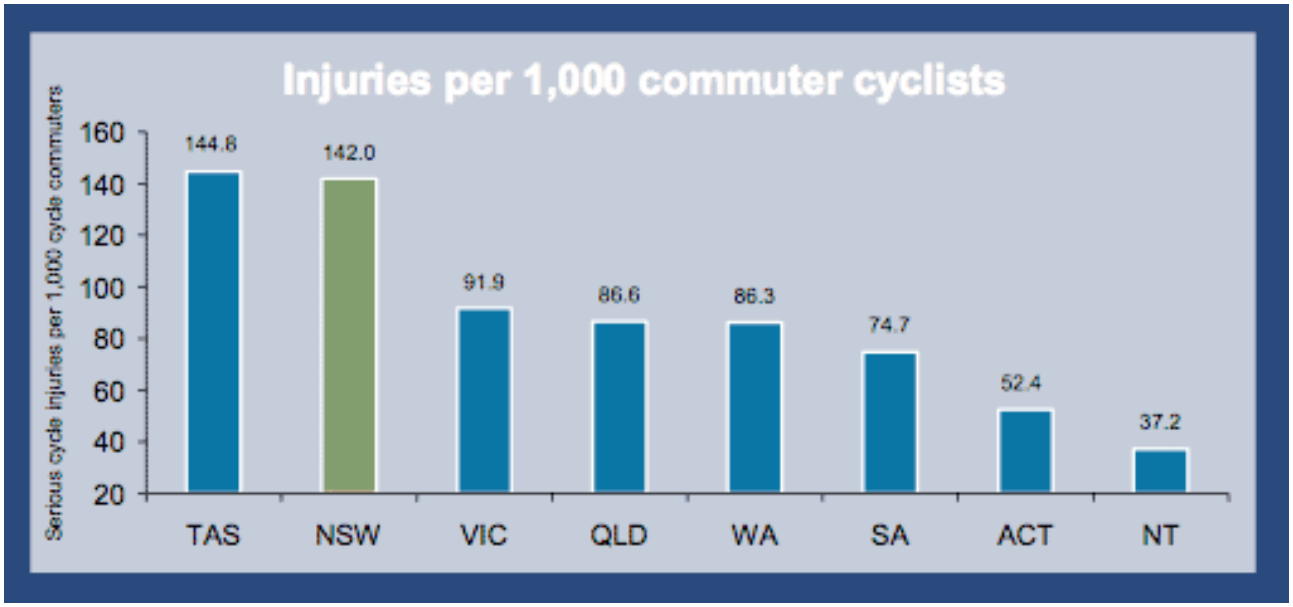
[a]reference year for regression analyses

Appendix 5



Extract from *Cycling in New South Wales: What the data tells us* prepared for the Premier's Council for Active Living, December 2008

Note: Bicycle helmets are not mandatory in Darwin for cycling on public paths. Extracted from the same report, the Northern Territory cyclist injury rate based on 2006 Census data is displayed below:



Appendix 6

Cycling accounts for a small proportion of commuter trips in NSW

Bicycle-only trips accounted for less than 0.8% of NSW Journey to Work trips on Census day in August 2006. This meant 19,274 trips out of more than 2.4 million people who reported travelling to work.

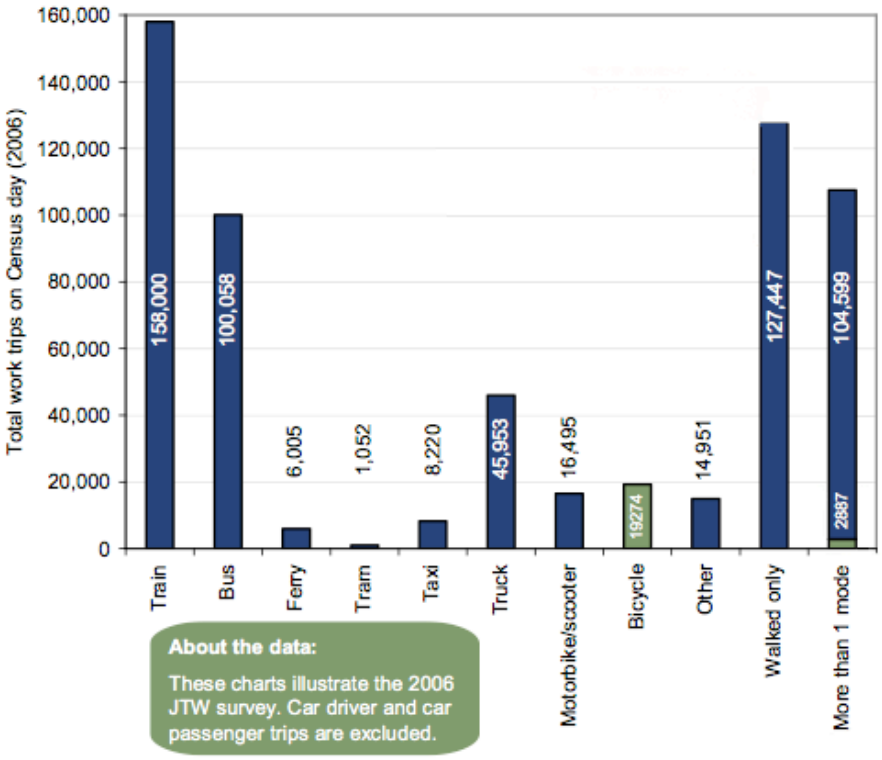
Where bicycle-only *and* bicycle-plus-another mode trips were reported (22,161 trips):

- bicycle-only: 87% of bicycle trips
- bicycle plus one other mode: 11% of bicycle trips
- bicycle plus two other modes: 2% of bicycle trips

Multi-modal journeys

Of 107,486 trips where more than one mode was reported, cycling accounted for 2,887 trips. Cycling accounted for 2.7% of trips where more than one mode was reported.

Journey to work (private car trips excluded)



Appendix 7

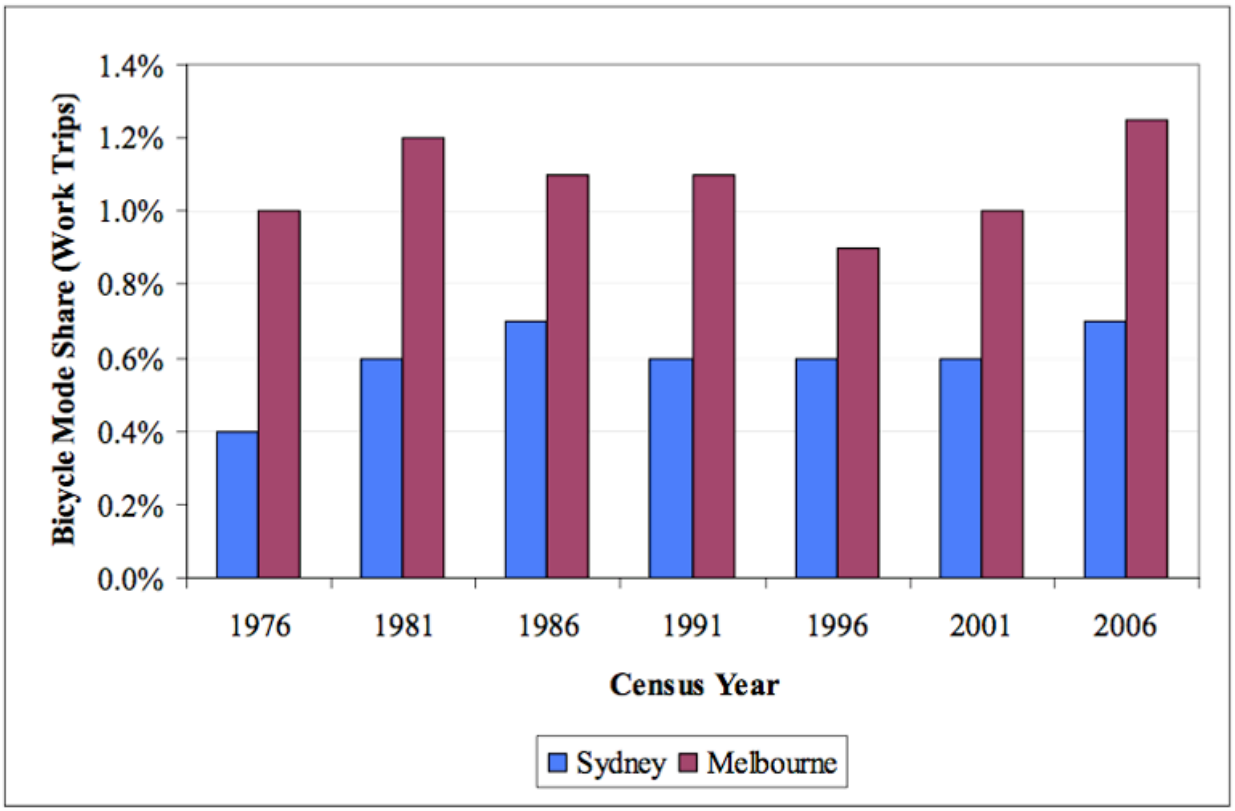


Figure 1: Bicycle mode share for work trips in Sydney and Melbourne metropolitan areas, 1976-2006
Source: Adapted from Mees et al. (2007)

Extract from *Cycling Down Under: A Comparative Analysis of Bicycling Trends and Policies in Sydney and Melbourne* by John Pucher, Jan Garrard and Stephen Greaves (Journal of Transport Geography, Vol. 18, 2010). Based on population (1986 - 0.7% x 3,472,000 population = 24,304 / 2006 - 0.7% x 4,282,000 population = 29,974) this suggests about 5,670 more Sydney cyclists riding to work in 2006 compared to 1986.

SYDNEY

	1976	%	1981	%	1986	%	1991	%	1996	%	2001	%	2006	%
Total Workforce	**1,425,324**		**1,553,110**		**1,555,226**		**1,621,868**		**1,675,461**		**1,816,225**		**1,903,527**	
Travelled to Work	**1,284,581**		**1,338,142**		**1,339,533**		**1,374,511**		**1,415,512**		**1,533,253**		**1,608,683**	
Public Transport	**385,289**	**30.0%**	**383,023**	**28.6%**	**350,738**	**26.2%**	**341,460**	**24.8%**	**305,363**	**21.6%**	**343,692**	**22.4%**	**341,076**	**21.2%**
Train	192,595	15.0%	214,245	16.0%	203,111	15.2%	202,574	14.7%	213,070	15.1%	241,792	15.8%	232,525	14.5%
Ferry/Tram	11,313	0.9%	10,482	0.8%	9,933	0.7%	7,591	0.6%	4,825	0.3%	6,211	0.4%	6,709	0.4%
Bus	181,381	14.1%	158,296	11.8%	137,694	10.3%	131,295	9.6%	87,468	6.2%	95,689	6.2%	101,842	6.3%
Car Total	**794,386**	**61.8%**	**854,453**	**63.9%**	**895,176**	**66.8%**	**922,461**	**67.1%**	**996,182**	**70.4%**	**1,047,230**	**68.3%**	**1,119,307**	**69.6%**
Car driver	662,405	51.6%	725,094	54.2%	774,178	57.8%	797,878	58.0%	890,138	62.9%	945,671	61.7%	1,019,117	63.4%
Car passenger	131,981	10.3%	129,359	9.7%	120,998	9.0%	124,583	9.1%	106,044	7.5%	101,559	6.6%	100,190	6.2%
Bicycle	**4,646**	**0.4%**	**8,008**	**0.6%**	**9,262**	**0.7%**	**8,934**	**0.6%**	**8,193**	**0.6%**	**9,223**	**0.6%**	**10,886**	**0.7%**
Walked Only	**75,257**	**5.9%**	**64,701**	**4.8%**	**59,503**	**4.4%**	**65,702**	**4.8%**	**62,815**	**4.4%**	**69,098**	**4.5%**	**79,570**	**4.9%**
Total of Other Modes:	***25,003***	***1.9%***	***27,957***	***2.1%***	***24,854***	***1.9%***	***35,954***	***2.6%***	***42,959***	***3.0%***	***64,010***	***4.2%***	***57,844***	***3.6%***
Motorbike/scooter	12,996	1.0%	16,117	1.2%	12,990	1.0%	8,029	0.6%	7,590	0.5%	7,129	0.5%	9,062	0.6%
Taxi	12,007	0.9%	11,840	0.9%	11,864	0.9%	10,269	0.7%	7,548	0.5%	6,638	0.4%	6,525	0.4%
Other	---		---		---		17,656	1.3%	18,620	1.3%	6,826	0.4%	8,573	0.5%
Other Two Methods	---		---		---		---		8,829	0.6%	12,817	0.8%	7,525	0.5%
Other Three Methods	---		---		---		---		372	0.0%	690	0.0%	516	0.0%
Truck	---		---		---		---		---		29,910	2.0%	25,643	1.6%
Transport Mode to Work TOTALS	**1,284,581**	**100%**	**1,338,142**	**100%**	**1,339,533**	**100%**	**1,338,557**	**100%**	**1,415,512**	**100%**	**1,533,253**	**100%**	**1,608,683**	**100%**

***Table 1.1*: ABS Census – method of travel to work, 1976-2006, Sydney**

Extract from Travel to work in Australian capital cities, 1976-2006: an analysis of census data by Mees, Sorupia and Stone (GAMUT and University of Melbourne, December 2007) showing Sydney adult cycling to work fell from 9,262 in 1986 to 8,934 in 1991 to 8,193 in 1996 to 9,223 in 2001.

Appendix 8

Table 4.3.1: Number of trips by mode[1] (average weekday)

Mode	2001/02	2002/03	2003/04	2004/05	2005/06	2006/07	2007/08	2008/09	AAGR % 01/02-08/09
	'000								
Average weekday									
Vehicle driver	7,686	7,939	8,106	8,114	7,952	7,992	8,080	8,015	0.6%
Vehicle passenger	3,462	3,465	3,483	3,559	3,470	3,550	3,642	3,635	0.7%
Total vehicle	**11,148**	**11,405**	**11,589**	**11,674**	**11,422**	**11,542**	**11,722**	**11,650**	**0.6%**
Train	775	775	779	768	794	815	863	890	2.0%
Public Bus	558	561	555	562	582	579	592	598	1.0%
Private Bus	335	330	331	320	342	344	370	387	2.1%
Ferry	37	43	47	47	38	37	38	39	0.7%
Total public transport	**1,706**	**1,710**	**1,712**	**1,696**	**1,756**	**1,775**	**1,863**	**1,915**	**1.7%**
Walk only	2,741	2,825	2,905	2,870	2,973	2,964	3,035	3,118	1.9%
Bicycle	101	115	124	113	115	114	119	106	0.6%
Taxi	115	118	119	124	117	121	113	127	1.4%
Other	83	97	112	98	110	112	135	134	7.0%
Total	**15,895**	**16,270**	**16,561**	**16,574**	**16,493**	**16,628**	**16,987**	**17,051**	**1.0%**

4.3
Mode of Travel

1. Mode figures are based on unlinked trip legs. Ferry, bicycle, taxi and other mode estimates are subject to high standard errors due to the small sample sizes for these modes.

The 2008/09 Sydney Household Travel Survey (p26)
shows there were 106,000 bike trips on average weekdays in 2008/09