Cycling Overseas: Decisions regarding helmet use

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Key Findings

- Majority of survey respondents (60.4%) indicated that they would not ride a bicycle whilst travelling overseas.
- Survey respondents who had ridden a bicycle in the last 12 months were more likely to indicate they would be likely to ride overseas.
- High helmet use amongst survey respondents, although required by law, is a predictor of high likelihood of intention to wear a helmet if cycling overseas.
- Survey respondents who regularly cycle and wear a helmet are more likely to think cycling injuries are preventable.

Abstract

Background: Cycling engagement in tourists is increasing; yet, bicycle helmet usage is not widely mandated internationally. Exploring hypothetical helmet use intentions when cycling in a foreign location for residents were the ability to decide in their home setting is removed presents a novel enquiry into the relationship between habit and tourist safety behaviour intentions. **Methods:** Queensland Social Survey (phone survey) of Queensland (Australia) residents (n=1,256) exploring current cycling participation, hypothetical cycling and helmet use whilst travelling overseas. Ethics approval was obtained. Backward logistic regression analyses were performed to identify the socio-economic and health characteristics that were significantly associated with hypothetical cycling and helmet use overseas. **Results:** One-third (39.6%) of respondents indicated they might cycle overseas and this was related to recent cycling engagement at home ($p < 0.01$). Helmet usage at home was related to hypothetical helmet use overseas ($p < 0.01$); with self-reported helmet use 'every time' cycle a positive predictor of hypothetical helmet use overseas (OR=10.78; 95%CI=2.04-47.67). **Conclusions:** Safety habits from a home setting, which likely exist due to legislation, might transfer to a foreign non-legislated settings. Promoting of safe cycling practices regardless of location has utility and warrants discussion within the disciplines of travel medicine and road safety. It is recommended before cycling overseas that individuals familiarise themselves with road rules, right of way, cycling infrastructure and the general conduct of other cyclists. Route planning will also likely be faciliated by this familiarisation and enable strategic sightseeing opportunities.

Keywords

Safety, bicycle, helmet, travel

Introduction

Individuals travel for a variety of reasons; however, a "desire for stimulation and excitement" is a key motivator (Leggat & Fischer, 2006; Schneider & Vogt, 2012). Riding a bicycle whilst on holiday, particularly in a foreign location, fulfils this desire and is becoming increasingly easy given the growth in cycling infrastructure, supportive policies and the availability of bicycles for hire due to bike-sharing programs (Kaplan, Manca, Nielsen, & Prato, 2015a, 2015b; Pucher, Dill, & Handy, 2010). Cycling while traveling is an activity undertaken for a wide range of reasons including leisure, transport or thrill-seeking. Cycling undertaken whilst travelling can be viewed on a continuum from opportunistic leisure engagement to pre-planned adventure-orientated mountain biking. While there is a continuum of engagement, the majority of cycle tourists are those who prior to traveling had intended to cycle during their travels and it was pre-planned as an activity and/or as a mode of transport (Faulks, Ritchie, & Fluker, 2007; Ritchie, 1998).

There are three categories of cycle tourists: 'incidental', 'premeditated' and 'pure cycle tourists'. Incidental cycle tourists are those individuals who do not intend to undertake cycling whilst overseas but who cycle at least once at the destination. Injuries often befall travellers who use modes of travel not normally used or activities in which they do not regularly participate and this might be the case for incidental cycle tourists (Leggat, 2006). Premeditated cycle tourists are those individuals who plan to engage in cycling whilst on holiday but as a once-off activity. Pure cycle tourists are those individuals for whom the majority of their holiday is

cycling focused. An example is a spectator of the Tour de France who also follows the tour around using a bicycle (Faulks et al., 2007). Note those who are cycling as part of sport, including racing events, whilst on holidays are classified as sport tourists (Simonsen, Jørgensen, & Robbins, 1998). Cycle tourists who sustain an injury whilst cycling are noted to have increased risk for infection as well as other health concerns (Gundacker, Rolfe, & Rodriguez, 2017).

Safety of Cyclists

Cyclists generally represent a vulnerable road user group; however limited literature exists exploring the demographic and injury incidence specific to the cycle tourist (Kim, Park, Kang, Park, & Lee, 2011; Piyaphanee et al., 2014). Although injury incidence for adventure cyclists, those for whom cycling is adrenaline orientated, are documented particularly within New Zealand's adventure tourism sector (Bentley, Meyer, Page, & Chalmers, 2001; Bentley, Page, Meyer, Chalmers, & Laird, 2001; Bentley, Page, & Walker, 2004; Bentley & Page, 2008; Bentley, Page, & Laird, 2001; Bentley, Page, & Macky, 2007). It is recognised that assorted medical problems may arise when undertaking cycling in a foreign location and as such considering existing health conditions, fitness level, experience and seeking pre-travel advice in relation to these issues are important factors recommended for any cycle tourist, and tourists generally (Gundacker et al., 2017; Nikolic, Missoni, & Medved, 2005). A factor which may influence injury experiences of cycle tourist is the disparate risk environments relating to cycling infrastructure and the novelty present in these settings (Gushulak & MacPherson, 2004). Road surfaces and segregated bicycle facilities are factors important in determining perceived safety when cycling generally and increase attractiveness of bicycle tourism destinations (Deenihan & Caulfield, 2015; Haworth & Schramm, 2011; Lee & Huang, 2012; Pucher & Buehler, 2008).

Evidence demonstrates that bicycle helmet use can reduce head and brain injuries (Olivier & Creighton, 2016; Thompson, Rivara, & Thompson, 1999). Australia and New Zealand have mandatory helmets laws requiring helmets to be worn by all cyclists with the only exception for adult cyclists riding on separated bike paths in the Northern Territory (Haworth, Schramm, King, & Steinhardt, 2010). Queensland, a state in Australia, has had mandatory blanket helmet laws in effect since 1 July 1991 with enforcement by police commencing on 1 January 1993 (Haworth et al., 2010). A recent review highlights there are nine countries with blanket bicylce helmet legislation with a number of other countries having age specifications (Esmaeilikia, Grzebieta, & Olivier, 2018). For those tourists who might wish to wear a helmet whilst cycling overseas, there are issues when hiring a helmet around availability, hygiene, size, comfort, attractiveness, age and condition; or the challenge of packing a helmet (Fishman, Washington, & Haworth, 2012; Hargarten, 1994). However given modern bicycle helmets are becoming increasingly lightweight (typically 250-300grams), this will increase the potential for a helmet to be packed or form part of luggage carry-on (Lu & Yu, 2003).

Impromptu decisions to cycle are likely to be undertaken without a helmet if one is not easily accessible, which is likely if utilising bike-sharing programs outside Australia (Ma et al., 2016; Shaheen & Guzman, 2011). In the Netherlands those who are wearing a helmet are generally treated with caution by other motorists as they are presumed to be a foreigner and more likely to behave erratically (Aland, 2010) cited in (Haworth et al., 2010). As to whether the preponderance to 'gear-up' with safety equipment in locations where their use is voluntary is a result of the perceived value of helmets, habit or related to the perception that cycling is less safe (generally or specifically in foreign locations) is unknown (Kaplan et al., 2015b). Regardless, tourists should be encouraged to wear a helmet that is appropriately sized and fitted when cycling overseas. Helmet use is recommended for two reasons: firstly the protective effect of mitigating head injuries; and also for the potential to act as an indicator for others to proceed with caution (Olivier, Wang, Walter, & Grzebieta, 2014; Thai, McIntosh, & Pang, 2015).

While helmet use is recommended it is not known whether existing mandatory safety behaviours in the tourists' home environment impacts their subsequent behaviour intentions in a non-legislated setting. This paper aims to explore in a sample of Queensland resident's their hypothetical likelihood of cycling engagement when travelling overseas and, if an intention to cycle whilst overseas exists, their hypothetical likelihood of wearing a bicycle helmet, even if helmet use is not legally required.

Methods

Procedure and Participants

Data for this study was collected as part of the annual Queensland Social Survey (QSS) 2012. The QSS utilises computer-assisted telephone interviewing (CATI) system and trained interviewers to randomly interview individuals residing in the state. It is conducted by Central Queensland (CQ) University's Population Research Laboratory and allows, through cost-sharing arrangements, questions to be incorporated by researchers, government and community groups. It uses a two-stage sampling strategy whereby the state of Queensland is split into two regions with geographically proportionate number of respondents sampled for South-East Queensland (n=843) and the remainder of Queensland (n=413). Within each region random digit dialling of landlines was used with the required gender of the respondent being pre-determined prior to the household being called. Interviews were conducted across a four week period (22 October- 22 November 2012), at various times of days, including weekends, which enables a higher contact rate and the potential to reach a wider demographic (i.e. full time workers). A total of 3130 households were contacted or with whom contact was attempted, with an overall response rate of 40.27% (n=1256).

Measures

General questions

The interview contains a standardised introduction along with a brief overview of the question topics which are incorporated. All researchers have access to the responses to the health and demographic question along with the response to their research questions. The questions incorporated by the research team related to bicycle use (or non-use), motivations, ownership, bicycle safety questions and hypothetical cycling participation whilst overseas.

Cycling overseas

The focus of this article relates to the responses to the two questions related to bicycle use overseas. The first question asked was "If you were travelling overseas, how likely would you be to ride a bicycle as part of a tour or leisure activity?", with the response format of a four-point Likert scale ('not at all likely'; 'somewhat likely'; 'moderately likely'; and 'very likely'). Any participant who stated they were unsure or they were 'not at all likely' were not asked the second question. The second question asked if when cycling on that hypothetical tour or independently, "if legislation in that country did not require compulsory bicycle helmets, how often do you think you would wear a bicycle helmet when riding?" A five-point Likert scale was used ('never'; 'almost never/rarely'; 'sometimes'; 'almost every time'; and 'every time) (Table 1).

Coding and analysis

Responses to these two questions were than dichotomized into 'No' and 'Yes' (Table 1). An exploratory of basic demographic characteristics and current cycling behaviour (Table 1) were compared for hypothetical cycling and helmet use overseas by using chi-square tests and multivariate logistic regression analysis. Backward stepwise logistic regression analyses were performed to identify the socio-economic and health characteristics that were significantly associated with hypothetical cycling and helmet use overseas. Statistical analysis was undertaken using SPSS, with statistical significance set at $p<0.05$ and confidence intervals of 95% (IBM Corporation, 2013). The QSS 2012 had ethics approval provided by CQ University (H10/06-121).

Results

Of the 1,256 respondents half (50.3%) were male. Respondents ages ranged from 18 to 91 years (M=55.6, SD= 16.2) with over half the sample (n=661; 53.1%) being aged 55 and older which is an overrepresentation compared to the Queensland population. A third (39.5%) of respondents household income was over A$100,000 (n=313). Over half of the sample indicated they hadn't cycled in the previous 12 months (n= 831; 66.4%).

Majority of the sample indicated that if they were travelling overseas they wouldn't ride a bicycle (n=747; 60.4%) (Table 2). People who had ridden a bike in the previous 12 months were significantly more likely to indicate they would cycle when travelling overseas (55% vs. 19.5%; $\chi^2 = 166.67$, $p < 0.01$). One quarter (26.8%) of respondents who indicated, despite not having cycled at home in the previous year, they would be likely to cycle overseas and 35.2% of current cyclists would not cycle overseas (Table 3). Current cyclists who always wear their helmet when cycling in Australia indicated this behaviour would continue when cycling overseas even if helmet use was not compulsory (69.8%; $\chi^2 = 25.23$, $p < 0.01$).

Significant differences were found between the respondents likelihood of indicating they will cycle overseas and: perceptions of bicycle injury preventability, cycling engagement including frequency, duration and exposure of cycling in hours per annum ($p<0.01$). Individuals who responded that they were 'very likely' to cycle whilst overseas were more likely to indicate that they thought cycling injuries were preventable ($\chi^2 = 14.01$, $p < 0.01$), classified as moderate and frequent cyclists ($\chi^2 = 20.06$, $p < 0.01$), more likely to cycle for a duration longer than 31 minutes and engaged in high levels of cycling ($\chi^2 = 14.28$, $p < 0.01$) (Table 4).

Within the bivariate results significant associations were found for cycling overseas and bicycle helmet use overseas (Table 3). For cycling overseas the characteristics where it is more likely were for: males ($\chi^2 = 5.37$, $p < 0.05$), young adults (aged 18-34) ($\chi^2 = 127.69$, $p < 0.01$), people who cycle frequently at home ($\chi^2 = 173.34$, $p < 0.01$) and those who had a higher gross household income (A$100,000 or more per annum) ($\chi^2 = 53.24$, $p < 0.01$). For helmet use those who wear the helmet every time they cycle were more likely to wear it overseas ($\chi^2 = 25.23$, $p < 0.01$).

Multivariate analysis was also conducted with the outcome variables of hypothetical cycling engagement and helmet use when cycling overseas. All independent variables entered into the model are outlined (Table 5). Controlling for confounding, individuals who were aged 55 years and older (*OR*=0.363; 95%*CI*: 0.170-0.777) and those who have 11-12 years of education are less likely to cycle overseas (*OR*=0.315; 95%*CI*: 0.140-0.709). Whereas predictors of cycling overseas were engaging in sufficient physical activity of 30 minutes or more on five or more days/sessions a week (*OR*=1.986; 95%*CI*: 1.194-3.303), cycled for a usual duration of more than 30 minutes (*OR* =1.721; 95%*CI*: 1.066-2.777), perceive cycling as neither unsafe or safe (*OR*=2.153; 95%*CI*: 1.084-4.276) and perceive cycling as safe (*OR*=2.689; 95%*CI*: 1.335-5.416) (Table 5). Individuals who wear a helmet every time they cycle in Queensland are more likely to continue this behaviour even if not required when cycling overseas (*OR*= 9.870; 95%*CI*: 2.044-47.665) (Table 5).

Table 1. Cycling Questions and Coding: Behaviour and Safety in Queensland and Hypothetically Overseas

Topic	Question	Respondents	Original Coding	Recoded
Cycling Overseas	"If you were travelling overseas, how likely would you be to ride a bicycle as part of a tour or leisure activity?"	All Sample	1. 'Not at all likely' 2. 'Somewhat likely' 3. 'Moderately likely' 4. 'Very likely'	1 = 'No' 2-4 = 'Yes'
Helmet Use if Cycling Overseas	"If legislation in that country DID NOT require compulsory bicycle helmets, how often do you think would you wear a bicycle helmet when riding?"	All except those who responded 'Not at all' or 'Unsure' to the question above.	1. 'Never' 2. 'Almost never/rarely' 3. 'Sometimes' 4. 'Almost every time' 5. 'Every time'	1-3 = 'No' 4-5 = 'Yes'
Cycling Injuries Preventable	"To what extent do you think it is possible to prevent people from being injured while riding a bicycle?"	Whole Sample	1. 'Impossible' 2. 'Some could be prevented' 3. 'About half could be prevented' 4. 'Most could be prevented' 5. 'All could be prevented'	**Possible to prevent All bicycle injuries:** 1-4 = 'No' 5= 'Yes'
Queensland Cycling Frequency	"Over the past 12 months, how often have you ridden a bicycle?"	Whole Sample	1. Note: These responses are already recoded 2. 'Frequent' (min. once in last week) 3. 'Moderate' (min. once in last month) 4. 'Infrequent' (min. once in last year) 5. 'Non-Cyclist' (no cycling in last year)	**Cycled in last 12 months:** 1-3 = 'Yes' 4 = 'No'
Queensland Cyclists Reasons for Cycling	"What is the main reason that you ride your bicycle?"	Cyclists	1. 'Transport' 2. 'Leisure' 3. 'Fitness' 4. 'Sport' 5. 'Other'	'Other' Recoded: New categories ='Family Activity' & 'Mixed motive'
Helmet Use when Compulsory (Qld)	"How often do you wear a helmet when riding your bike?"	Cyclists	1. 'Never' 2. 'Almost never/rarely' 3. 'Sometimes' 4. 'Almost every time' 5. 'Every time'	1= 'Never' 2-4 = 'Sometimes 5 = 'Every time'

Note: Unsure and no response were always classed as missing.

Table 2. Responses to likelihood of riding a bicycle whilst travelling overseas and helmet usage whilst riding overseas if not compulsory

Response	N (%)	Recoded Response	Sub-Total N (%)
"If you were travelling overseas, how likely would you be to ride a bicycle as part of a tour or leisure activity?"			
Not at all likely	747 (60.4)	No	747 (60.4)
Somewhat likely	182 (14.7)	Yes	489 (39.6)
Moderately likely	132 (10.7)		
Very likely	175 (14.2)		
"If legislation in that country DID NOT require compulsory bicycle helmets, how often do you think would you wear a bicycle helmet when riding?"			
Never	89 (18.3)	No	167 (34.3)
Almost never/rarely	23 (4.7)		
Sometimes	55 (11.3)		
Almost every time	47 (9.7)	Yes	319 (65.6)
Every time	272 (56)		

Table 3. Bivariate Associations between demographic, health and cycling characteristics by hypothetical cycling engagement and bicycle helmet use when travelling overseas

Parameter	*N*	Would Cycle Overseas?			*N*	Helmet Use Overseas*		
		Yes	No	*p* value		Yes	No	*p* value
		n (%)	*n* (%)			*n* (%)	*n* (%)	
Gender								
Male	632	266 (54.4)	356 (47.7)	<0.05[a]	265	161 (50.5)	104 (62.3)	<0.05[a]
Female	624	223 (45.6)	391 (52.3)		221	158 (49.5)	63 (37.7)	
Age								
18-34	128	77 (15.8)	51 (6.9)	<0.01[b]	77	47 (14.8)	30 (18.1)	0.821
35-44	188	104 (21.4)	82 (11.1)		103	68 (21.4)	35 (21.1)	
45-54	267	144 (29.6)	117 (15.9)		143	95 (29.9)	48 (28.9)	
55+	661	162 (33.3)	487 (66.1)		161	108 (34.0)	53 (32.9)	
Years of Education								
1-10 years	314	81 (16.7)	226 (30.8)	<0.01[b]	81	50 (15.8)	31 (18.7)	0.860
11-12 years	259	77 (15.8)	180 (24.6)		77	51 (16.1)	26 (15.7)	
13-14 years	157	69 (14.2)	86 (11.7)		68	44 (13.9)	24 (14.5)	
15+ years	507	259 (53.3)	241 (32.9)		257	172 (54.3)	85 (51.2)	
Income Category								
A $0-26K	144	39 (8.0)	103 (13.8)	<0.01[b]	39	27 (8.5)	12 (7.2)	0.894
A $26,001 -52 K	158	42 (8.6)	112 (15)		41	27 (8.5)	14 (8.4)	
A $52,001 -100K	177	83 (17.0)	92 (12.3)		83	52 (16.3)	31 (18.6)	
A $100K	313	167 (34.2)	144 (19.3)		165	112 (35.1)	53 (31.7)	
Did not Report income	464	158 (32.3)	296 (39.6)		158	101 (31.7)	57 (34.1)	

Parameter	*N*	Would Cycle Overseas?			*N*	Helmet Use Overseas*		
		Yes	No			Yes	No	
		n (%)	*n* (%)	*p* value		*n* (%)	*n* (%)	*p* value
Cycling Injuries Preventable								
Unpreventable	159	50 (10.4)	107 (15.1)	<0.05[a]	50	28 (8.9)	22 (13.5)	0.275
Neutral	676	266 (55.4)	404 (56.9)		266	176 (56.1)	90 (55.2)	
Preventable	368	164 (34.2)	199 (28)		161	110 (35.0)	51 (31.3)	
Cycling Frequency								
Non Cyclist	831	220 (45.0)	601 (80.5)	<0.01[b]	218	147 (46.1)	71 (42.5)	0.115
Infrequent	169	97 (19.8)	70 (9.4)		97	55 (17.2)	42 (25.1)	
Moderate	105	67 (13.7)	36 (4.8)		67	42 (13.2)	25 (15)	
Frequent	147	105 (21.5)	40 (5.4)		104	75 (23.5)	29 (17.4)	
Reasons for Cycling								
Transport	63	46 (17.2)	16 (11.2)	0.183	46	29 (17.0)	17 (17.9)	0.454
Leisure	212	137 (51.3)	72 (50.3)		137	83 (48.5)	54 (56.8)	
Fitness	116	66 (24.7)	48 (33.6)		65	45 (26.3)	20 (21.1)	
Sport	13	11 (4.1)	2 (1.4)		11	8 (4.7)	3 (3.2)	
Family Activity	4	2 (0.7)	2 (1.4)		2	1 (0.6)	1 (1.1)	
Mixed Motive	8	5 (1.9)	3 (2.1)		5	5 (2.9)	0 (0)	
Usual Duration when Cycle								
< 30 minutes	196	109 (40.8)	84 (57.5)	<0.01[b]	108	66 (38.4)	42 (44.7)	0.361
> 31 minutes	223	158 (59.2)	62 (42.5)		158	106 (61.6)	52 (55.3)	
Perceived Safety when Cycling across all Infrastructure Types								
Unsafe	58	23 (8.6)	35 (24.3)	<0.01[b]	23	15 (8.8)	8 (8.4)	0.657
Neither Unsafe or Safe	177	117 (43.8)	60 (41.7)		116	71 (41.5)	45 (47.4)	
Safe	176	127 (47.6)	49 (34)		127	85 (49.7)	42 (44.2)	
Helmet Use								
Never	23	12 (4.5)	10 (6.8)	0.166	12	2 (1.2)	10 (10.5)	<0.01[b]
Sometimes	25	20 (7.5)	5 (3.4)		20	6 (3.5)	14 (14.7)	
Every time	371	236 (88.1)	131 (89.7)		235	164 (95.3)	71 (47.7)	
Chronic Health Problems								
No	690	325 (66.5)	358 (48)	<0.01[b]	324	212 (66.5)	112 (67.1)	0.920
Yes	565	164 (33.5)	388 (52)		162	107 (33.5)	55 (32.9)	
Presently a smoker								
No	1110	432 (88.3)	660 (88.5)	1.000	430	289 (90.6)	141 (84.4)	0.052
Yes	145	57 (11.7)	86 (11.5)		56	30 (9.4)	26 (15.6)	
Physical Activity (PA) Classification (Sufficient is 30 minutes on five or more days per week)								
No Reported PA	191	43 (8.8)	140 (18.7)	<0.01[b]	42	23 (7.2)	19 (11.4)	0.300
Insufficient PA	466	157 (32.1)	303 (40.6)		157	105 (32.9)	96 (57.5)	
Sufficient PA	599	289 (59.1)	304 (40.7)		287	191 (59.9)	52 (31.1)	

[a] Significant chi square for trend at p<0.05; [b] Significant chi square for trend at p<0.01; [c] Not able to run a chi square test as this category only relates to cyclists * This represents people who said they would ride a bicycle overseas. Missing values are not included in the table.

Table 4. Exploring the Likelihood of Cycling Overseas by Cycling Behaviours and Perceptions on the Preventability of Cycling Injuries

Cycling Behaviour in Queensland	Likelihood of Cycling Overseas			
	Somewhat Likely	Moderately Likely	Very Likely	p value
	n = 177 (%)	n = 130 (%)	n = 173 (%)	
Bicycle Injuries Preventable [a]				
Unpreventable	20 (40.0)	21 (42.0)	9 (18.0)	<0.01[c]
Neutral	100 (37.6)	74 (27.8)	92 (34.6)	
Preventable	57 (34.8)	35 (21.3)	72 (43.9)	
Cycling Frequency [a]				
Non Cyclist	98 (44.5)	57 (25.9)	65 (29.5)	<0.01[c]
Infrequent Cyclist	36 (37.1)	33 (34.0)	28 (28.9)	
Moderate Cyclist	19 (28.4)	17 (25.4)	31 (46.3)	
Frequent Cyclist	29 (27.6)	25 (23.8)	51 (48.6)	
Duration Spent Cycling				
<30 minutes	43 (39.4)	36 (33.0)	30 (27.5)	<0.01[c]
>31 minutes	41 (25.9)	37 (23.4)	80 (50.6)	
Helmet Use in Queensland when Cycle				
Never	3 (25.0)	5 (41.7)	4 (33.3)	0.813
Sometimes	7 (35.0)	6 (30.0)	7 (35.0)	
Every time	74 (31.4)	63 (26.7)	99 (41.9)	
Middle Exposure Estimate Categorised into Hours Cycling Per Annum [b]				
Infrequent Cycling	32 (43.8)	23 (31.5)	18 (24.7)	<0.01[c]
Moderate Cycling	28 (31.1)	26 (28.9)	36 (40.0)	
High Cycling	24 (23.1)	24 (23.1)	56 (53.8)	
Perceived Safety When Cycling Across All Infrastructure Types				
Perceive Cycling as Unsafe	10 (43.5)	7 (30.4)	6 (26.1)	0.555
Perceive Cycling as Being Neither Unsafe or Safe	35 (29.9)	34 (29.1)	48 (41.0)	
Perceive Cycling as Safe	38 (29.9)	33 (26.0)	56 (44.1)	

[a] These two questions were asked to the whole sample whereas the rest were only asked or calculated for those individuals who had indicated they had cycled at least once in the previous 12 months.

[b] Infrequent Cycling is cycling between 0 and 3 hours per annum; Moderate Cycling is cycling between 4 and 27 hours per annum and High Cycling is cycling more than 30 hours per annum.

[c] Significant chi square for trend at $p<0.01$.

Missing values are not included in the table.

Table 5. Independent Predictors of Hypothetical Cycling Engagement Overseas and Helmet Use

Dependent Variable **Independent Variables**	**Sig.**	**AOR**	**95% CI**
Cycling Overseas			
Aged 18-34 years (REF)	0.001		
Aged 35-44 years	0.799	1.111	0.493-2.503
Aged 45-54 yeasrs	0.771	0.891	0.411-1.933
Aged 55 and older	**0.009**	**0.363**	**0.170-0.777**
Self Reported Health Status - Poor	0.022		
Self Reported Health Status - Fair	0.249	0.393	0.08-1.922
Self Reported Health Status - Good	0.545	1.55	0.375-6.413
Self Reported Health Status – Very Good	0.722	1.29	0.318-5.228
Self Reported Health Status - Excellent	0.324	2.103	0.48-9.22
Engage in Insufficient Physical Activity (REF)	0.001		
Engage in Sufficient Physical Activity	**0.008**	**1.986**	**1.194-3.303**
No reported Physical Activty	0.119	0.463	0.176-1.22
Duration Average Cycle >30 minutes	**0.026**	**1.721**	**1.066-2.777**
Perceive Cycling as Unsafe (REF)	0.021		
Perceive Cycling as Neither Unsafe or Safe	**0.028**	**2.153**	**1.084-4.276**
Perceive Cycling as Safe	**0.006**	**2.689**	**1.335-5.416**
Years of Education – 1 -10 years (REF)			
Years of Education – 11-12 years	**0.005**	**0.315**	**0.140-0.709**
Years of Education – 13-14 years(2)	0.065	0.436	0.181-1.051
Years of Education – 15 years and over (3)	0.844	0.931	0.457-1.896
Helmet Use When Cycling Overseas			
'Never' Wear Helmet when Cycle (REF)	0.000		
Wear Helmet 'sometimes' when Cycle	0.505	1.862	0.299-11.583
Wear Helmet 'Every time' Cycle	**0.004**	**9.870**	**2.044-47.665**

Sig. = significance; AOR = adjusted odds ratio; 95%CI = 95% confidence interval. Bold independent variables are significant positive or negative predictors of dependent variable.

Note: Odds ratios are adjusted for all relevant confounders.

Discussion

Promoting the health and safety of Australian tourists whilst overseas is a challenge given the variety of destinations, activities and potential hazards to which they may be exposed (Wadhwaniya & Hyder, 2013). However gaps currently exist in our knowledge about Australian tourists including their cycling participation rates, types of cycling engagement and epidemiology of cycling injuries sustained (Faulks et al., 2007). This paper has sought to examine hypothetical cycling engagement and helmet use whilst travelling overseas amongst a sample of Queensland residents. This analysis is a first step in addressing some of the current knowledge gaps regarding potential Australian cycle tourist numbers and to begin to disentangle the relationship between safety enhancing habits, generated by legislation, and behaviour intentions in a non-legislated setting. This study acts as a initial proxy measure of attitudes towards cycling overseas and helmet wearing in a non-legislated setting.

Cycling Overseas

Most of the Queenslanders who participated in this study expressed that it was unlikely that they would engage in cycling whilst travelling overseas. Considering the current levels of cycling participation within Australia (36.3% have cycled in last year), and Queensland specifically are low (33.2% have cycled in the last year), it is understandable that

if they do not currently engage in cycling the propensity to do so overseas is likewise going to be limited (Austroads, Australian Bicycle Council, & Munro, 2013; Austroads, Australian Bicycle Council, & Munro, 2015). The high proportion of respondents who indicated they would not cycle overseas is suggestive that bicycle helmet laws may not be restricting cycling participation in Australia.

Behaviour intentions for holiday cycling are influenced by perceived cycling ease related to concerns about weather, distance, traffic and crowding (Kaplan et al., 2015a). Furthermore it has been noted that older adults may have lower levels of trust in their own cycling abilities and as such it is unlikely they would cycle in foreign locations (Bernhoft & Carstensen, 2008). Cycle tourists are exposed to a novel cycling and road environment, unfamiliar bicycle and may underestimate the importance of confidence in cycling ability (Bentley, Meyer, et al., 2001). Furthermore, they may not expect the confidence of cyclists with whom they will engage in established cycling cities (Chataway, Kaplan, Nielsen, & Prato, 2014).

There is a current dearth of information about the experience, motivations and fitness level of Australian cycling tourists. The inclusion of cycling specific questions in the International and National Visitor Survey could further help establish some baseline information and identify profiles of cycle tourism engagement (Faulks et al., 2007). Cycling engagement generally and cycle tourism have economic, social and environmental benefits where undertaken (Faulks et al., 2007). Therefore knowing about Australians who engage in cycling tourism experiences domestically and overseas will provide insights into an emerging area of tourism but one which has the potential implications for road safety.

Bicycle Helmet Use Overseas and Safe Cycling

One issue which might have influenced the respondent's hypothetical use of a helmet is the perceived or real logistic difficulties of locating a bicycle helmet when helmets are not routinely worn within the country (Hargarten, 1994). It is antedotally suggested however that this logistic difficulty may be decreased given the boom in cycling tourism and the need to ensure the safety of participants (Shaheen & Guzman, 2011). Using the behaviour of change model to understand how to increase helmet usage for those cycling overseas where legislation requiring helmet use is non-existent, is needed. For example, the group of hypothetical travelers who are not considering wearing a helmet overseas are in the pre-contemplation phase, this group would require different strategies compared to the group who would like to wear a helmet overseas (action/maintenance stage) but may not do so due to other factors. Such a factor could be concerns regarding helmet hygiene (Grenier et al., 2013).

Advocating for safe cycling practices amongst all cyclists offers benefits regardless of helmet availability and use. For cycle tourists it is suggested that they familiarise themselves with the cycling infrastructure (if present), general conduct of other cyclists and pedestrians (including their interactions), road rules and general road environment prior to jumping on a bicycle. Relatedly selection of cycling routes where there is separation from other road traffic represents an optimal safe cycling practice.

Regardless of the type of cycle tourism, it is important that all cycle tourists, and all tourists, generally have appropriate travel insurance, which includes coverage for medical care and hospitalisation, and that their travel plans are registered (Leggat & Fischer, 2006). It is recommended in particular that the traveller checks that their insurance will cover bicycle riding as this may be classified as a hazardous recreational activity (Leggat, Carne, & Kedjarune, 1999; Leggat & Fischer, 2006).

Limitations

There are a few limitations to the current study, which should be noted. This study used a cross-sectional survey methodology, using a landline based telephone number with a response rate 40.3%. Although the response rate is low this was found to be on par with other CATI research (Steeh, Kirgis, Cannon, & DeWitt, 2001). Further, the respondents may not be representative with an overrepresentation of older adults in the sample relative to the Queensland population. Despite these limitations, other various tests of integrity are performed to assess the potential for sampling error, sample representativeness and data consistency checks.

Another limitation is respondents were asked about hypothetical behaviour whilst overseas. The use of such hypothetical questions without the use of a scenario enables respondents to answer based on their own preferences and not linked to actuality. However using such a methodology without obtaining information on their previous experiences or what influences their hypothetical tourist behaviour significantly limits interpretation, albeit we do know about their current levels of cycling engagement. There is also the potential that respondents were answering based on what they thought would be the most socially desirable response.

Future research which explores actual behaviour and/or behaviour intentions will be undertaken. This research will help to address the current dearth of information regarding the number of Australians who engage in cycling tourism overseas, types of cycling participation, epidemiology of cycling injuries, barriers to helmet use in practice and locations of cycling with respect to the road environment. Obtaining a sufficient sample to enable adequate power will be an important consideration. Exploring actual behaviour, factors that influence cycling particpation and safety decision making will promote further insights into safety legislation as an influencer on safety perceptions and habit formation.

Conclusions

Cycle tourism is an expanding travel niche with a third of all respondents saying they would undertake cycling when traveling. It is important, like any emerging tourism niche, that the specific safety concerns be addressed. People who wear helmets on a regular basis in a home setting are more likely to say they will wear a helmet when travelling. While wearing a helmet should ideally be promoted were possible this might not always be readily available overseas. Promoting other mechanisms to promote safe cycling participation of residents overseas regardless of helmet use and availability will offer benefits. Such approaches include familiarisation with road rules, right of way, general conduct of fellow cyclists including interactions with other pedestrians and reviewing the road and cycling infrastucture. This familiarisation process will also likely foster route planning and enable strategic sightseeing opportunities.

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