Research Article

iMedPub Journals
http://www.imedpub.com/

Dual Diagnosis: Open Access
ISSN 2472-5048

2018
Vol.3 No.3:09

DOI: 10.21767/2472-5048.100043

The Effect of Age on Perceived Benefits and Constraints to Participation in Masters Cycling

Campbell Macgregor*

Sport and Exercise Sciences, School of Health, Medical and Applied Sciences, Central Queensland University, Australia

***Corresponding author:** Campbell Macgregor, Sport and Exercise Sciences, School of Health, Medical and Applied Sciences, Central Queensland University, Australia, Tel: Sport and Exercise Sciences, School of Health, Medical and Applied Sciences, Central Queensland University, Australia; E-mail: c.macgregor@cqu.edu.au

Received Date: 13, November 2018; **Accepted Date:** 19, December 2018; **Published Date:** 27, December 2018

Citation: Campbell M (2018) The Effect of Age on Perceived Benefits and Constraints to Participation in Masters Cycling. Dual Diagn Open Acc Vol.3 No.3: 9.

Copyright: ©2018 Macgregor C. This is an open-access article distributed under the terms of the Creative Commons Attribution License, which permits unrestricted use, distribution, and reproduction in any medium, provided the original author and source are credited.

Abstract

This project examined the effects of age on the benefits and constraints to participation in male masters cyclists. Male participants (n=288) aged 35 y and older were divided into three age groups-masters (35-44 y; n=102), middle-aged masters (45-54 y; n=91) and seniors masters (55+ y; n=95). An online self-report survey presented 13 benefit items and 12 constraint items previously used by Cardenas, Henderson and Wilson (2009). ANOVA was used to identify between-group differences on perceived benefits, total perceived constraints, and subscale constraints. No effect of age was observed for perceived benefits or subscale constraints. However, those in 55+ y age group reported significantly lower total perceived constraints ($F(2,285)=10.70$, $p<0.01$). Furthermore, those in 55+ y group reported significantly lower constraint subscales compared to other age groups. These subscales were reported as: community constraints ($F(2,285)$ 4.68, $p=0.01$), social constraints ($F(2,285)$ 16.35, $p<0.01$), intrapersonal constraints, ($F(2,285)$ 3.80, $p=0.02$). The results suggest that senior masters male cyclists perceived less total and subscale constraints than younger masters and middle-aged masters male cyclists. This finding suggests that lifespan development is evident even in seniors and that unique life events may allow older adults to enjoy greater participation in cycling.

Keywords: Australian male masters cyclists; Perceived benefits and constraints

Introduction

Participation in cycling has long been associated with physiological benefits including reductions in BMI and in cardiovascular risk [1-3]. Masters' cyclists systematically train to compete in organised sports for individuals over the age of 35 to 44 y, with 'middle aged masters' 45-54 y of age and 'seniors' falling into the over 55 y of age category [4]. Recently, there has been an emergence of older athletes engaging or re-engaging with sports [5]. Moreover, participation in masters cycling has systematically increased in the last 20 years [5] While this increase in participation has led to increased interest in masters athlete research [6,7], no study to date has examined the effect of age on social and psychological influences on participation in masters cyclists.

One way researchers have identified studying these social and psychological influences on participation in older adults has been through the use of a social ecology framework [8]. A social ecology framework is the notion that nature and nurture are not independent and a dynamic and ever changing relationship occurs on several levels of theoretical conceptualisation in lifespan development [9-11]. Historically, the labels of certain interactions have been altered in a progressive development of a social ecology framework for use in health promotion and public policy interventions. A reliable and tested method to research participation in older adults is to measure perceived constraints and benefits of sports participation [12].

Perceived constraints are the limiting factors which prevent an individual from participating in physical activity [13]. Those individuals who perceive constraints may still participate in physical activity but would have to find ways to overcome them [14,15]. Constraints may be intrapersonal (time, self-consciousness, physical abilities or disabilities), social (companionship and exercise partners) or community (facilities, lack of information) [12]. When examining older adults participating in Senior Games, Cardenas et al. [12] found that constraints yielded a three-factor solution with each constraint moderately correlated with one another. Firstly, community-linked and social influences were significantly correlated ($r=0.61$); secondly, community-linked were significantly correlated with intrapersonal ($r=0.56$); and thirdly, social influences were significantly correlated with intrapersonal constraints ($r=0.69$).

Benefits are the perceived rewards or gains made from participation in physical activity [8]. Perceived benefits may seem like a straightforward construct in terms of physical activity. And, a simple view may consider that when the reward of perceived benefits outweighs the negotiation of perceived constraints physical activity can commence. Many researchers have produced a benefits scale instrument to describe perceived

[16-18]. Cardenas et al. [12] used a self-made tool, senior-games benefit scale (SGBS). The SGBS invited Likert responses on perceived benefits ranging from physical appearance, physical functioning to friendship. Factor analysis techniques were applied which resulted in a one-factor solution that explained 59% of the variance in perceived benefits to participation. Cardenas et al. [12] provide a solid theoretical foundation for which social ecology research can be conducted.

Studying cycling participation from a social ecology model is currently the preferred method of research as shown by Australian policy writers [19] and cycling researchers [20]. The National Cycling Strategy (NCS) [19] released by Bicycling Australia aims to double the number of people cycling in Australia by 2016. The NCS [19] also proposes six key priorities and objectives: cycling promotion, infrastructure and facilities, integrated planning, safety, monitoring and evaluation, and guidance with best practice. In summary, the current trend in cycling and masters sport research is to use a social ecology framework.

However, the effect of age on perceived benefits and constraints in Australian masters cyclists have yet to be examined. Thus, the purpose of the present study is to examine the effect of age on the perceived benefits and constraints to participation in masters cycling.

It is hypothesised that an effect of age exists in the total constraints of cycling to participation perceived by male Australian masters, middle aged masters and senior cyclists. It is also hypothesised that an effect of age exists in the benefits of cycling perceived to participation by male Australian masters, middle aged masters and senior cyclists. A final hypothesis is that an effect of age exists within perceived intrapersonal, social and community constraints to participation by male Australian masters, middle aged masters and senior cyclists.

Methods

Participants

Current cycling Australia members were invited through the organisation's e-mail list to opt-in to an online survey to be completed *via* Survey Monkey. Four hundred and fourteen respondents completed the four-item questionnaire which included informed consent declaration at the commencement of the survey. Respondents were between the ages of 10 and 78 y. 73 respondents were female and to eliminate gender effects were excluded from the analysis. A further 53 participants were excluded as they did not meet the age criteria of 35 y or older. 288 male cyclists aged between 35 and 78 were included for this study. 102 (35.4%) were aged 35-44 y, 91 (31.6%) were aged 45-54 y, and 95 (33%) were aged 55 y of age or older. The study was approved *via* simulated ethics application and the CQ University Human Research Ethics Committee and was conducted within APS ethical guidelines. The confidentiality of participants was ensured through the omission of personally identifiable information that held no relevance to this study, such as names of the individual and location of cycling participation.

Materials

Respondents were emailed *via* the cycling Australia membership database and invited to participate in the online survey. The survey consisted of 4 items; age, gender, a benefits scale, and a constraints scale.

Perceived benefits scale: The benefits scale developed by Cardenas et al. [12] was included as question 18 and had 13 items on a 5-point Likert scale ranging from 1 "strongly agree" to 5 "strongly disagree". No items are negatively coded. The benefits scale adapted from Cardenas et al. [12] reported Cronbach's Alpha α=0.94 and within this study α=0.84. Cardenas et al. [12] reported a one-factor solution for perceived benefits. The one-factor solution was confirmed by factor analysis conducted in this study. 12 items ranged from factor loadings of 0.43 to 0.72 and the first item had a factor loading of 0.23. The benefit items were summed with lower total score indicating more perceived benefits.

Perceived constraints scale. The 12-item constraints scale (α=0.86) used in Cardenas et al.'s [12] study was comparable with the results of the present study (α=0.84). Cardenas et al. [12] reported three subscales within the 12 items. These were community constraints (CC), social constraint (SC) and intrapersonal constraints (IC). The CC subscale deals with community-linked constraints including lack of equipment, lack of places to ride, lack of knowledge and lack of skill. The SC subscale conceptualises the perceived social-influence constraints including discouragement from friends, lack of interest, lack of time and lack of company. The IC subscale attempts to tap into the construct of perceived constraints from within, such as lack of good health, fear of injury, self-consciousness and lack of self-discipline. All items in the constraints subscale were summed and then analysed. Lower total scores represented fewer perceived constraints.

Design and Procedure

The design for the study was a between-subjects ANOVA design in which perceived benefits and constraints scores were contrasted between three age groups (35-44, 45-54 and 55+ y). The first dependant variable was the total sum of benefits as scored in the 13-item benefits scale. The second, third and fourth dependant variables were the three subscales; community constraints, social constraints and intrapersonal constraints. The final dependant variable was the total sum of constraints as scored on all three subscales.

Participants were invited to complete the online survey at their convenience which maintained anonymity. The title page of the online survey outlined that the results of this survey would not affect academic standing or employment prospects and that participants have the right to withdraw at any stage of the survey. Data was collected off the website and interpreted by the researcher to begin the process of data analysis.

Results

Data were entered into SPSS v22.0 for initial data screening and accuracy checks. Data was recoded into three age groups as

per the hypothesis (35-44, 45-54 and 55+ y). Preliminary analyses were conducted on the data to both explore the data and test assumptions. Assumptions of normal distribution and equal variances were met. However, 52 cases had missing data. This non-response in the questionnaire was dealt with by the expectation maximisation (EM) method. To ensure that the questionnaire did not suffer from systematic non-response bias, an assumption test of Little's MCAR test was conducted. Each subscale and total scale was tested for 'Missing Completely at Random' and revealed non-significant results. Therefore, EM method was executed and justified to replace missing data. No outliers were identified.

Item Responses

Item response scores are recorded in Tables 1 and 2 below. The lowest score for combined ages (n=288) representing the strongest agreement of benefit on the benefits scale was item three "improves my health" (M=1.18, SD=0.40). The highest score for combined ages (n=288) on the benefits scale representing the least agreement of benefit on the benefits scale was item 13 "helps me cope with pain" (M=2.43, SD=0.84) (Table 1).

Table 1: Perceived benefits to participation of male masters cyclists grouped by age.

	35-44 y	45-54 y	55 + y	Total
	n=102	n=91	n=95	n=288
Item	M (SD)	M (SD)	M (SD)	M (SD)
Meet more people	2.10 (0.72)	2.16 (0.78)	2.21 (0.84)	2.16 (0.78)
Makes me feel good about life	1.54 (0.54)	1.50 (0.55)	1.54 (0.56)	1.53 (0.55)
Improves my health	1.17 (0.37)	1.22 (0.47)	1.56 (0.37)	1.18 (0.40)
Increases my self esteem	1.79 (0.67)	1.81 (0.68)	1.83 (0.65)	1.81 (0.66)
Motivates me to get out more	1.60 (0.58)	1.76 (0.72)	1.82 (0.65)	1.72 (0.66)
Helps me to be more energetic	1.65 (0.61)	1.65 (0.64)	1.63 (0.62)	1.64 (0.62)
Helps my heart and lungs function better	1.38 (0.55)	1.32 (0.55)	1.22 (0.42)	1.31 (0.51)
Decreases my tension and/or stress	1.40 (0.55)	1.54 (0.72)	1.71 (0.74)	1.55 (0.68)
Increases my physical strength	1.63 (0.67)	1.70 (0.69)	1.77 (0.79)	1.70 (0.72)
Improves my shape/physique	1.79 (0.69)	1.75 (0.72)	1.78 (0.75)	1.77 (0.72)
Makes me feel more attractive	2.30 (0.77)	2.38 (0.87)	2.47 (0.88)	2.38 (0.84)
Keeps me from getting sick	2.25 (0.84)	2.15 (0.82)	2.10 (0.73)	2.16 (0.80)
Helps me cope with pain	2.45 (0.83)	2.51 (0.92)	2.32 (0.76)	2.43 (0.84)
total benefits	24.43 (5.20)	24.75 (6.17)	24.78 (5.20)	24.65 (6.20)
Note. Results are based on a 5-point Likert scale from 1=strongly agree to 5=strongly agree.				

The lowest item score for combined ages (n=288) representing least agreement of constraint is the social constraint "discouragement from friends" (M=1.49, SD=0.80). The highest item score for combined ages (n=288) representing most agreement of constraint is social constraint "lack of time" (M=3.14, SD=1.17) (Table 2).

Table 2: Perceived constraints to participation of male masters cyclists grouped by age.

	35-44 y	45-54 y	55+ y	Total
	n=102	n=91	n=95	n=288
Subscale and item	M (SD)	M (SD)	M (SD)	M (SD)
Community constraints	7.29 (2.81)	7.26 (3.22)	6.14 (2.56)*	6.91 (5.62)
Lack of equipment	1.86 (0.87)	1.76 (0.89)	1.42 (0.72)	1.68 (0.85)
Lack of places to ride	1.96 (1.05)	1.88 (1.06)	1.61 (0.92)	1.82 (1.02)
Lack of knowledge	1.79 (0.85)	1.81 (1.02)	1.53 (0.80)	1.71 (0.89)

© Under License of Creative Commons Attribution 3.0 License

Lack of skills	1.67 (0.82)	1.80 (1.01)	1.61 (0.81)	1.69 (0.88)
Social constraints	9.47 (2.35)	9.16 (2.64)	7.59 (2.34)**	8.75 (7.20)
Discouragement from friends	1.61 (0.88)	1.54 (0.81)	1.33 (0.67)	1.49 (0.80)
Lack of interest	1.93 (0.71)	1.90 (0.92)	1.66 (0.71)	1.83 (0.79)
Lack of time	3.41 (1.04)	3.48 (1.14)	2.53 (1.11)	3.14 (1.17)
Lack of company	2.51 (0.99)	2.25 (1.08)	2.08 (.88)	2.29 (1.00)
Intrapersonal constraints	7.55 (1.94)	7.64 (2.65)	6.82 (2.10)*	7.34 (5.81)
Lack of good health	2.00 (0.72)	2.05 (0.85)	1.86 (0.68)	1.97 (0.75)
Fear of injury	1.86 (0.77)	1.86 (0.88)	1.60 (0.69)	1.77 (0.79)
Self-consciousness	1.48 (0.61)	1.50 (0.79)	1.36 (0.58)	1.45 (0.66)
Lack of self-discipline	2.21 (0.82)	2.23 (1.03)	2.00 (1.00)	2.15 (0.95)
Total constraints	24.30 (5.62)	24.07 (7.20)	20.59 (5.81)**	23.00 (8.40)

Note. Results are based on a 5 point scale from 1=strongly disagree to 5=strongly agree. *p<0.05; **p<0.01

Main Analysis

Homogeneity of variance was tested for benefits scale with a Levene's statistic (2,285) 0.426, p=0.65, ns. No age effect was present in perceived benefits F (2,285) 0.122, p=0.89, ns between masters (M=24.43, SD=5.20), middle-aged masters (M=24.75, SD=6.17) and seniors masters cyclists (M=24.78, SD=5.20).

Homogeneity of variance was tested for total constraints scale with a Levene's statistic (2,285) 0.66, p=0.518, ns. Significantly less total perceived constraints were found for the senior masters cyclists (M=20.60, SD=5.81, F (2,285) 10.70, p<0.01) compared with masters (M=24.30, SD=5.62) and middle-aged masters (M=24.07, SD=7.20).

Homogeneity of variance was tested for the community constraints sub-scale with a Levene's statistic (2,285) 1.35, p=0.26, ns. Significantly less perceived community constraints were found for the senior masters cyclists (M=6.17, SD=2.90, F (2,285) 4.68, p=0.01) compared with masters (M=7.29, SD=2.80) and middle aged masters (M=7.26, SD=3.22).

Homogeneity of variance was tested for social constraints subscale with a Levene's statistic (2,285) 1.14, p=0.32, ns. Significantly less perceived social constraints were observed for the senior masters cyclists (M=7.59, SD=2.37, F (2,285) 16.35, p < 0.01) compared with masters (M=9.47, SD=2.35) and middle-aged masters (M=9.16, SD=2.64).

Homogeneity of variance was tested for intrapersonal constraints subscale with a Levene's statistic (2,285) 1.44, p=0.24, ns. Significantly less perceived intrapersonal constraints were observed for the senior masters cyclists (M=6.82, SD=2.1, F (2,285) 3.80, p=0.02) compared with masters (M=7.55, SD=1.94) and middle-aged masters (M=7.64, SD=2.65).

Inter-correlations: The three constraint subscales, (CC, SC and IC) were moderately correlated with one another: CC were correlated with SC with r=0.43, CC were linked with IC with r=0.52 and SC were correlated with IC with r=0.64.

Discussion

The purpose of the present study is to examine the effect of age on the perceived benefits and constraints to participation in masters cycling. The present results do not support an effect of age in perceived benefits of cycling in masters cyclists. However, the current data do support an age effect in total perceived constraints with the sum of intrapersonal, social and community constraints differing significantly as less perceived constraints in senior masters cyclists and both the masters and middle-aged masters cyclists.

It was also hypothesised there would be an effect of age within each of the constraint subscales of perceived intrapersonal, social and community constraints. The present results support an age effect for each of the three perceived constraints with individual constraint score of intrapersonal, social and community constraints differing significantly as less perceived respective constraints in senior masters cyclists and both the masters and middle-aged masters cyclists.

Results indicate senior Australian cyclists (55+ y) perceive fewer constraints than other age categories of masters cyclists (34-45 y and 45-54 y). However, no difference is present in terms of the perceived benefits.

Cardenas et al.'s [12] research with masters athletes at North Carolina Senior Games (NCSG) in 2006 and the present study are similar in scores of perceived benefits in masters cyclists. However, the present research presents more moderate findings of 3.1 (after converting to comparable direction) on the 5-point Likert scale as compared with 3.9 reported by Cardenas et al. [12]. Cardenas et al. [12] did not report on perceived benefit differences between age categories. Current research found no significant differences in benefits between age categories of masters cyclists. This provides important information to researchers that the perception of benefits maintains a constant level even though potential gains from cycling may plateau or decline [21]. This may indicate a psychological difference between age categories as intuitively one would suspect a

decrease in perceived benefit. This may also point to the relative subjectivity of perception and the expected benefit from participation in cycling at each life stage.

In terms of constraints, a similar constraint measure was used in this present study as was in Cardenas et al. [12]. The present study supports the findings of Cardenas et al. [12] total constraint means. Cardenas et al. [12] reported that those aged 55-64 y perceived more community and social constraints to participation than those aged 65 y and over. This present study confirms the findings presented by Cardenas and colleagues represented fewer perceived constraints (social and community) by older athletes (65 y and over) than younger athletes (55-64 y). However, Cardenas et al. [12] did not examine the effect of age on constraints in master cyclists but rather focused on masters athletes across a number of sports. The differences in the present research continue with age categories not in alignment with Cardenas et al. [12]. Seniors Games participation begins at 55 y and older. This current research has used comparisons of a younger cycling population. Thus, this study provides concurrent evidence for the effect of age on perceived constraints to affecting new populations and sporting specific communities. This may help to increase the generalizability of the effect of age to participation in other fields of research.

In terms of factor analysis and factor correlation Cardenas et al. [12] was unable to substantiate earlier factor analysis conducted by Dergance et al. [8]. Similarly, the factor analysis conducted in this present study was inconclusive. According to Eigenvalues, three constraint factors were evident. However, the scree plot indicated that two constraint factors were likely to explain variance within the subscales. As each factor moderately correlates it is not surprising that three factors are not clear.

The current results are in agreement with recent research on masters cyclists reported by Titze et al. [20]. Titze et al. [20] reported an increase in cycling participation from 2001 to 2009. They also observed that cyclists who were 35+ y of age accounted for these increases in participation whereas younger populations decreased in participation. Both Titze et al. [20] and the recent NCS [19] results suggest the prevalence of older people cycling has increased between 2001 and 2009. This may be explained by the present finding of older cyclists perceiving fewer constraints, or an increase in the popularity of cycling, or perceiving a benefit from cycling therefore increasing their willingness to participate in cycling. Specifically, the present study reports that item scores for participants across age categories strongly disagree with the perceived constraint to participation as "discouragement from friends" (M=1.49, SD=0.80) and "self-consciousness" (M=1.45, SD=0.66). In summary, low levels of these particular perceived constraints reveal a willingness to participate in cycling as a sport.

Booth et al. [13] also examined the effects of age on perceived barriers to physical activity among older Australians. They identified lack of time as the major perceived constraint and that this lack of time constraint decreased with age. This finding is in agreement with their findings in a population of masters cyclists. However, Booth et al.'s [13] research differed in three ways. First, they used a different social ecology scale for examining barriers. Second, they focused on different age groups than the current research. Finally, they compared active and inactive respondents. Although significant population and methodological differences were used by Booth et al. [13], the current research supports the hypothesis that there is an age effect in perceived constraints in master's cyclists.

A number of limitations are associated with the current research. Firstly, the cross-sectional design of the survey takes a "snapshot" in time. Limited resources and time both call for such a design. Ideally a longitudinal study that accounted for differences over time would give a more valid measure of the effect of age on perceived benefits and constraints to cycling participation. Secondly, the present study's survey was undertaken in September 2013 which may produce systematic bias. For a cyclist, September represents the commencement of pre-season training and therefore a cyclist may have an overly optimistic view of the coming season or conversely an overly pessimistic view. Thirdly, the number of respondents was quite small. An increased number of respondents would have increased the statistical power of the current research. Finally, due to the small number of female respondents, this research did not examine the effect of gender.

Future research may focus on increasing the generalizability of this present research by addressing each of the aforementioned limitations individually. Specifically, a follow-up longitudinal study of the current respondents to see if 35-44 y and 45-54 y categories decrease perceived constraints when they enter the 55+ y category. In addition, an examination of the effects of gender on participation is warranted, particularly given that cycling Australia [22] have identified women as a key target demographic for both research and increased participation.

In conclusion, Australian male masters cyclists perceive benefits similarly with increasing age. However, Australian male cyclists over the age of 55 y perceive fewer constraints to participation in cycling. Moreover, the older age group perceived less intrapersonal constraints, less social constraints, and less community constraints to participation. With senior male cyclists (55+ y) reporting less interpersonal, social, and community constraints, this would be a key age for people to be introduced into masters cycling.

References

1. Oja P, Titze S, Bauman A, de Geus B, Krenn P, et al. (2011). Health benefits of cycling: a systematic review. Scand J Med Sci Sports 21: 496-509.
2. Macgregor C (2014) The effects gender and age have on the training practices (distance and frequency) and body mass index (BMI) of masters cyclists (Unpublished master's thesis). CQ University Rockhampton.
3. Shephard RJ, Kavanagh T, Mertens DJ, Qureshi S, Clark M (1995) Personal health benefits of Masters athletics competition. Br J Sports Med 29: 35-40.
4. Reaburn P, Dascombe B (2008) Endurance performance in masters athletes. Eur Rev Aging Phys Activ 5: 31-42.

© Under License of Creative Commons Attribution 3.0 License

5. Stiefel MM, Knechtle BB, Lepers RR (2014) Master triathletes have not reached limits in their ironman triathlon performance. Scand J Med Sci Sports 24: 89-97.

6. Dionigi RA, Horton S, Baker J (2013) Negotiations of the ageing process: older adults stories of participation. Sport Educ Soc 18: 370-387.

7. Young BW, Medic N (2012) Expert masters sport performance: perspectives on age- related processes, skill retention, mechanisms and motives. The Oxford handbook of Sport and Performance Psychology. New York, NY: Oxford University Press pp. 493-512.

8. Dergance J, Calmbach W, Dhanda R, Miles T, Hazuda H, Mouton C (2003) Barriers to and benefits of leisure time physical activity in the elderly: differences across cultures. J Am Geriatr Soc 51: 863-868.

9. Bronfenbrenner U (1977) Toward an experimental ecology of human development. Am Psychol 32: 513.

10. McLeroy KR, Bibeau DD, Steckler AA, Glanz KK (1988) An ecological perspective on health promotion programs. Health Educ Q 15: 351-377.

11. Sallis J, Bauman A, Pratt M (1998) Environmental and policy interventions to promote physical activity. Am J Prev Med 15: 379-397.

12. Cardenas D, Henderson KA, Wilson BE (2009) Physical activity and senior games participation: benefits, constraints, and behaviors. J Aging Phys Activ 17: 135-153.

13. Booth M, Bauman A, Owen N (2002) Perceived barriers to physical activity among older Australians. J Aging Phys Activ 10: 271-280.

14. Booth M, Bauman A, Owen N, Gore C (1997) Physical activity preferences, preferred sources of assistance, and perceived barriers to increased activity among physically inactive Australians. Prev Med 26: 131-137.

15. Stokols D (1992) Establishing and maintaining healthy environments: Toward a social ecology of health promotion. Am Psychol 47: 6-22.

16. Booth M, Owen N, Bauman A, Clavisi O, Leslie E (2000) Social-cognitive and perceived environment influences associated with physical activity in older Australians. Prev Med 31: 15-22.

17. Brown TD, OConnor JP, Barkatsas AN (2009) Instrumentation and motivations for organised cycling: the development of the cyclist motivation instrument (CMI). J Sports Sci Med 8: 211-218.

18. Patel A, Schofield GM, Kolt GS, Keogh JL (2013) Perceived barriers, benefits, and motives for physical activity: two primary-care physical activity prescription programs. J Aging Phys Activ 21: 85-99.

19. Australian Bicycle Council (ABC) (2014) National Cycling Strategy 2011-2016. Implementation Report. Retrieved from Australian Bicycle Council website: http: //www.bicyclecouncil.com.au/publication/national-cycling-strategy-implementation-report-2013

20. Titze S, Merom D, Rissel C, Bauman A (2014) Epidemiology of cycling for exercise, recreation or sport in Australia and its contribution to health-enhancing physical activity. J Sci Med Sport 17: 485-490.

21. Reaburn P (2009) The masters athlete: Improve your performance, improve your fitness, improve your life. Mackay Qld Info Publishing.

22. Cycling Australia (2014) Cycling Australia>Recreation>She Rides. Retrieved from http: //www.cycling.org.au/Recreation/She-Rides