



Original research

Socioecological factors potentially associated with participation in physical activity and sport: A longitudinal study of adolescent girls



Rochelle M. Eime^{a,b,*}, Meghan M. Casey^a, Jack T. Harvey^a, Neroli A. Sawyer^{a,b},
Caroline M. Symons^b, Warren R. Payne^b

^a Faculty of Health, Federation University, Ballarat, Australia

^b Institute of Sport, Exercise and Active Living, Victoria University, Melbourne, Australia

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ABSTRACT

Objectives: Many adolescents are not physically active enough to receive associated health benefits. Furthermore, participation in physical activity generally declines during adolescence, and to a greater degree for females. Longitudinal research is required to better understand the determinants of change in physical activity by adolescent females to inform physical activity-related policy and practice. This study explored patterns of change in socioecological factors hypothesised to be associated with physical activity and sport, across the adolescent period for females.

Methods: This longitudinal study employed three annual surveys of females from metropolitan and non-metropolitan areas recruited in Year 7 ($n=328$) and Year 11 ($n=112$). Self-report measures included questions regarding general barriers to participation, as well as factors relating to the socioecological domains.

Results: The barriers where significant changes within or differences between cohorts were observed were mostly intrapersonal (lack of energy, lack of time due to other leisure activities). Lack of time was more prevalent in the Year 11 cohort than in the Year 7 cohort. Perceived importance of life priorities mainly related to education and study and more so for the Year 11 cohort. Perceived competence declined for the Year 7 cohort. Support from family and peers trended downwards in both cohorts, whereas access to facilities increased both within and between cohorts.

Conclusions: Significant patterns of change in the determinants of physical activity participation were observed across the adolescent period. It is important to consider flexible structure and scheduling of physical activity and strategies to develop competency in childhood and early adolescence.

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1. Introduction

Females are commonly identified as being less active than males.¹ Furthermore, an Australian study reported that fewer than half of adolescent females are active enough to meet the physical activity (PA) guidelines.² The adolescent period is recognised as a difficult and stressful period of life transition. During this time life there are many biological, environmental, social and psychological transformations which influence changes in PA.^{3,4} As a result of the low levels of PA, particularly among adolescent girls, researchers have sought to understand determinants of participation in PA from both quantitative^{5,6} and qualitative^{4,7,8} perspectives.

A systematic review of prospective studies quantifying change in PA in children and adolescents found that the majority of quantitative studies have been conducted in North America among 10–13 year olds.⁵ For these children, PA tended to increase over time, and previous PA and self-efficacy were consistently positively associated with this change.⁵ For adolescents 14 years and older, smaller declines occurred in PA, with perceived behavioural control, social support and self-efficacy being negatively associated with declines in PA.⁵ However, the determinants examined were mostly limited to individual factors which were not investigated across the studies in a consistent manner and not all established correlates could be confirmed longitudinally.⁵ Historically, research has focused on individual-level factors and only recently have ecological models been adopted⁶ and evidence encompassing all domains of the ecological model identified in an holistic manner.⁵

The socioecological model was developed to demonstrate multiple levels of influences on health behaviours including

* Corresponding author.

E-mail address: r.eime@federation.edu.au (R.M. Eime).

intrapersonal, interpersonal, organisational, community and public policy levels.⁹ Socioecological models have been applied to qualitative studies to determine the multiple influences on participation in PA among adolescents.^{4,7,10} These studies found that environmental factors including proximity, cost, and access to facilities were important,^{4,7,10} especially for youth living in low-socioeconomic areas¹¹ or in regional communities.^{4,7} Further, intrapersonal factors (i.e. perceived skill and competence), interpersonal factors (i.e. support of friends and adults), and organisational factors (i.e. school and community sport club environment) were also considered important influences on PA participation.^{4,7,10}

There have been calls for longitudinal research into determinants of changes in PA in order to achieve a more definitive understanding of why people are active or inactive.⁶ Longitudinal studies that examine determinants of PA participation across the socioecological model are needed in order to better inform strategies to foster continued participation in PA throughout adolescence.⁴ Importantly, little is known about the changes in determinants of PA during adolescence despite adolescence being recognised as a difficult period of life transition.

This study explored patterns of change in socioecological factors hypothesised to be associated with physical activity and sport, across the adolescent period for females.

2. Methods

This study is part of a larger study for which the methodological procedure has been previously outlined.² Seventeen secondary schools in the metropolitan area of Melbourne, Victoria, Australia and 14 schools in surrounding rural and regional areas participated in the study. Ethical approval was gained from the University Human Research Ethics Committees, the Victorian Department of Education and the Victorian Catholic Education Office.

All female students in Years 7 and 11 from participating schools were invited to participate. There were three longitudinal waves of data collection at 12-month intervals during Autumn of 2008–2010.² Details of the content of the following questions are shown in [Tables 1 and 2](#), and in Supplementary table.

In this study, the Australian Sports Commission definition of sport was adopted: “a human activity involving physical exertion and skill as the primary focus of the activity, with elements of competition where rules and patterns of behaviour governing the activity exist formally through organisations, and is generally recognised as a sport”.¹² More broadly, the contexts of leisure-time physical activity (LTPA) have been classified in terms of modes, settings and types.² The four modes of LTPA are: team sport, individual sport, organised but non-competitive PA; and non-organised PA.

Regarding barriers, a list of potential intrapersonal, interpersonal and environmental/organisational barriers to PA participation was derived^{13,14} and participants were asked how likely these issues would arise over the next three months on a 5-point scale. For analysis, the responses were dichotomised to ‘yes’ (at least moderately likely) or ‘no’ (no more than slightly likely).

Regarding intrapersonal factors, perceived physical/sports competence was assessed using items from three scales/inventories.^{15–17} A 5-point scale was used to maintain consistency with other aspects of the questionnaire, and the terms ‘sport’ and ‘PA’ were used to align with the focus of this research. Self-efficacy was assessed in the second and third waves of questionnaires using items on a 5-point scale regarding confidence about participating in PA or sport when conditions were not ideal, adapted from Marcus and Forsyth.¹⁸

Priority of PA was examined through questions on leisure preference.¹⁹ Life priorities were measured using a scale that was

developed for this study which examined the importance of eight types of activity, including PA.

Interpersonal factors such as support from family and friends were measured using items which have demonstrated good reliability.²⁰ All family and friend items were scored on a 5-point scale. The support score for each domain – family and friends – was the mean score of the set of items, with high scores representing a high level of support from family or friends.

Environmental factors were examined with questions related to an adolescent’s ability to access each of 14 types of PA and sport facilities and were based on those used by Sallis et al.¹⁴ The 14 items were scored on a 4-point ordered scale indicating ease of access to the facility. The access score was the mean score of the 14 items, with high scores representing greater independent access/mobility. Neighbourhood socio-economic status (SES) was represented by the Socio-economic Indexes for Areas (SEIFA) Index of Relative Socio-economic Advantage and Disadvantage (IRSAD)²¹ score for the residential postcode of each participant.

Preliminary data screening (Eime et al.²) included ensuring that numerically coded responses to categorical items were within the specified range, and that dates of birth and self-reported heights and weights were within feasible limits. In a preliminary analysis, baseline characteristics of participants who returned survey forms in all three years of the study (‘completers’) and those who did not (‘non-completers’) were compared using *t*-tests and chi-square tests. Longitudinal analysis was based on the completers. All variables analysed were either quantitative (means of coded responses to a set of Likert scale items) or Yes/No dichotomies (see [Tables 1 and 2](#)). Linear mixed models and longitudinal logistic regression fitted by the method of generalised estimating equations were used to identify statistically significant differences between the two cohorts and statistically significant longitudinal trends – linear and non-linear – within each cohort. Differences between cohorts were assessed in 2-factor models incorporating cohort effects, time trends and cohort–time interactions. Time trends were assessed in simple effects analyses, i.e. separate analyses of trend for each cohort. All analyses were conducted using SPSS Version 19, with statistical significance set at $p < .05$.

3. Results

The 2008 recruitment/response rate (the proportion of invited students who provided consent returned the first survey form) was 19.6% with retention rates in 2009 and 2010 of 82.7% and 74.0%, respectively. Respondents who returned survey forms in all three waves of the study comprised: Year 7 ($n = 328$, 74.5%; aged 11–13, $M \pm SD = 12.2 \pm 0.5$ years at baseline) and Year 11 ($n = 112$, 25.5%; aged 16–18, 16.2 ± 0.6 years at baseline). Details of sampling design, recruitment and retention rates can be found in supplementary material.

For the Year 7 cohort those who completed all three surveys (‘completers’) had a lower mean self-reported weight at baseline ($M \pm SD = 46.6 \pm 9.3$ kg; $p = .009$) than those who did not (‘non-completers’: $M \pm SD = 49.4 \pm 10.9$ kg). There were no significant differences at baseline in mean age, SES (SEIFA IRSAD score of residential postcode), self-reported height or BMI. There were no significant differences at baseline between Year 11 completers and non-completers.

Across both cohorts, at baseline completers were significantly more likely than non-completers to report participating in PE classes at school (63.9% vs 45.8%, $p < .001$), competitive team sports outside school (64.5% vs 53.7%, $p = .003$), or competitive individual sports at school (68.6% vs 55.1%, $p < .001$). There were no significant differences with regard to participation in competitive team sports

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