

Personal, social and environmental correlates of resilience to physical inactivity among women from socio-economically disadvantaged backgrounds

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Abstract

While sex and socio-economic disparities in physical activity have been well documented, not all disadvantaged women are inactive. This study aimed to examine correlates of achieving recommended levels of physical activity among women of low socio-economic position. In 2005, a population-based sample of 291 women with low educational attainment provided survey data on leisure time physical activity (LTPA). Participants reported potential personal (enjoyment and self-efficacy; barriers; intentions; guilt and priorities; routines and scheduling; occupational physical activity; television viewing), social (support from family/friends; social participation; sport/recreation club membership; dog ownership) and environmental (aesthetics; safety; local access; footpaths; interesting walks; busy roads to cross; heavy traffic) correlates of physical activity. Nearly 40% of participants achieved recommended LTPA (150 min week⁻¹). Multivariable analyses revealed that higher levels of self-efficacy for walking [prevalence ratio (PR) 2.05, 95% confidence interval (CI) 1.19–3.53], higher enjoyment of walking (PR 1.48, 95% CI 1.04–2.12), greater intentions to be active (PR 1.97, 95% CI 1.12–3.45) and having set routines for physical activity (PR 1.91, 95% CI 1.18–3.09) were sig-

nificantly associated with achieving recommended LTPA. Personal factors were the characteristics most strongly associated with achieving recommended levels of LTPA among women from socio-economically disadvantaged backgrounds.

Introduction

Although the benefits of physical activity are well documented, a considerable proportion of the population is inactive, failing to meet guidelines which recommend accumulating 30 min day⁻¹ of moderate-intensity physical activity on most days of the week [1–3]. Furthermore, there is an uneven distribution of physical activity participation across sex and socio-economic groups. Women are less active in leisure time than are men [4, 5], and those individuals from lower socio-economic groups consistently show lower levels of activity, irrespective of the measures of socio-economic position (SEP) or physical activity used [5–8]. These socio-economic discrepancies in physical activity behaviour are consistent with socio-economic gradients observed for a number of health outcomes and behaviours [9–11]. While differentials are well established, the underlying mechanisms through which SEP influences physical activity behaviour are not well-understood.

The concept of resilience has recently been proposed as a promising avenue for obesity prevention research among those of low SEP [12]. Resilience is a ‘dynamic process encompassing positive adaptation within the context of significant adversity’ [13]. Ball and Crawford highlighted the similarities

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between resilience theories and paradigms currently being used to study obesity risk behaviours. For instance, three factors important in the development of resilience—attributes of individuals, attributes of the family environment and attributes of the broader environment—show strong parallels to the personal, social and physical environmental constructs described in social–ecological models [14, 15]. While a number of studies have assessed the relationship between personal, social or physical environmental factors and physical activity, few have examined the combined influence of personal, social and environmental factors on physical activity [16, 17].

Personal factors positively associated with physical activity include enjoyment of activity, self-efficacy, behavioural intentions and low perceived barriers [5, 18]. Occupational physical activity is inversely associated with leisure time physical activity (LTPA) [19–21] and lower levels of television (TV) viewing may be associated with more LTPA [21, 22]. Social factors positively associated with physical activity include support from family and friends, membership of sporting or recreational clubs [5, 18] and dog ownership [23]. Environmental factors include neighbourhood safety, urban design features (such as street connectivity, sprawl and land use mix) and access to pleasant and convenient spaces for recreation [5, 24].

When framed as an individual-level attribute and operationalized in relation to physical activity, resilience may be used to describe those who achieve recommended levels of activity despite poorer socio-economic circumstances. While simply sharing similar attributes (personal, social and environmental) does not make the concepts of resilience and social–ecological theory interchangeable, adopting the approach of investigating characteristics of those who do manage to be active despite socio-economic adversity (i.e. a similar approach to that used in the resilience literature) may prove a helpful means of better understanding and ultimately promoting physical activity in this high-risk target group. Examining characteristics of women from disadvantaged backgrounds who demonstrate resilience to phys-

ical inactivity may provide useful insights to guide development of interventions aimed at promoting activity among women of low SEP. This exploratory study aimed to investigate the personal, social and physical environmental correlates of women of low SEP who are physically active despite their disadvantage.

Methods

Sample

Using a stratified sampling procedure, participants were recruited from 45 neighbourhoods of different socio-economic strata (low, mid and high) in Melbourne, Australia in 2005 [16, 25]. Melbourne is a large capital city and has a population of >3.6 million. Like other cities of its size in Australia, Melbourne includes areas of substantial socio-economic diversity, and the present study includes neighbourhoods of considerable heterogeneity in the environment, for instance, in terms of walkability and access to public transport. All neighbourhoods within 30 kilometres of the Melbourne central business district were ranked using the Socio-economic Index for Areas (SEIFA), an Australian Bureau of Statistics-constructed score derived from population census data based on a suburb's relative disadvantage [26]. Fifteen neighbourhoods were selected from each of the lowest, middle and highest SEIFA septiles. A random sample of women aged 18–65 years was selected from the Australian electoral roll (of which compulsory registration is required at age 18 years) within each neighbourhood to complete a physical activity survey. There was oversampling from the low- and mid-SEIFA neighbourhoods relative to the high SEIFA neighbourhood (using a ratio of 1.5: 1.2: 1) to counter differential response rates typically observed in health surveys [27, 28]. A total of 2400 women were selected, with 975 from low, 780 from mid and 645 from high SEP neighbourhoods. A second independent sample of 2400 women from the same neighbourhoods was drawn in the same manner to complete a separate nutrition survey, with respondents to

that survey being asked to complete the physical activity survey.

Measures

Outcome measure

LTPA was assessed using the International Physical Activity Questionnaire (long version) (IPAQ-L) [29]. These questions asked about the number of days and the duration of walking for leisure, moderate LTPA and vigorous LTPA of at least 10 min duration in the past week. LTPA was categorized as insufficient (<150 min week⁻¹) or meeting recommended levels [1, 3] of physical activity (≥ 150 min week⁻¹).

Exposure measures

Twenty-six personal, social and environmental factors were assessed (Table I). Of these, 13 were personal factors. Self-efficacy for walking and self-efficacy for vigorous physical activity were assessed using a modified measure [30] with good internal consistency (Cronbach's $\alpha = 0.86$). Enjoyment of walking and enjoyment of vigorous physical activity were assessed using a modified scale [31] with very high internal consistency (Cronbach's $\alpha = 0.96$). Barriers to physical activity were assessed using a scale [32] with additional questions, such as barriers related to lack of time and motivation, developed in response to a qualitative study on physical activity barriers among women [33], with good internal consistency (Cronbach's $\alpha = 0.87$). Intentions were assessed by asking about the likelihood of trying to engage in a regular exercise routine in the next 2 weeks [34]. For each of these scales, responses were summed and then categorized based on tertile splits into three groups: low, mid and high.

A small number of questions regarding physical activity behavioural skills and motivation were developed based on findings from qualitative pilot work and findings from another Australian study [33, 34]. Participants responded to five statements about guilt, work and family priorities, physical activity routines and scheduling for physical activity. Response categories were collapsed into three

groups: low (strongly disagree or disagree), mid (neither disagree nor agree) and high (agree or strongly agree). Occupational physical activity was derived from the IPAQ-L [29], and participants reported time during the last 7 days they spent watching TV on weekdays and weekends [8]. Responses to each of these questions were summed and categorized into three groups based on tertile splits.

Five social factors were measured. Support for physical activity from family and from friends/colleagues was assessed using a well-validated measure [35] (Cronbach's $\alpha = 0.75$ for family and 0.83 for friends/colleagues). Responses were summed separately for family and friends/colleagues and three categories created based on tertile splits. 'Social participation' was assessed using 13 questions that asked about the frequency of informal social participation, social participation in public spaces and social participation in group activities in the past 12 months [36]. Responses were summed and three categories created using tertile splits. Dog ownership and sports/exercise group or club membership were also assessed.

Eight perceived environmental factors were examined. Aesthetics were assessed by examining agreement with three statements [37] about the neighbourhood (Cronbach's $\alpha = 0.89$). Perceived safety was assessed by examining agreement with three statements (Cronbach's $\alpha = 0.73$). Responses were summed and categorized using tertile splits into three groups: low, mid and high aesthetics and safety. Participants were asked about access to places to walk or be vigorously active in their neighbourhood, the condition of footpaths, availability of interesting local walks, presence of busy roads to cross when out on walks and traffic in the neighbourhood. Responses were collapsed into two categories: yes (strongly agree or agree) and no (strongly disagree, disagree or neither agree nor disagree).

SEP

There is considerable contention in the literature about the most appropriate indicator of SEP, particularly among women [38]. Consistent with many

Table 1. *Description of exposure measures*

Exposure Measures	Mode of measurement	No. of items	Scale
Personal factors			
Self-efficacy [30]	Confidence in walking	5	5 point: 1, not at all confident;
	Confidence in doing vigorous physical activity	5	5, extremely confident
Enjoyment [31]	Feelings about walking	8	7 point: for example—1, I hate it;
	Feelings about vigorous physical activity	8	7, I love it; 1, It's a lot of fun; 7, It's no fun at all; 1, I find it tiring; 7, I find it energising
Barriers [32, 33]	Frequency barriers prevented being active	19	5 point: 1, never; 5, very often
Intentions [34]	Likelihood of trying to engage in a regular exercise routine in the next 2 weeks	1	7 point: 1, very unlikely; 7, very likely
Skills/motivation [33, 34]	Guilt about physical activity	1	5 point: 1, strongly disagree; 5, strongly agree
	Set, regular routines for physical activity	1	5 point: 1, strongly disagree; 5, strongly agree
	Fit in physical activity around schedule	1	5 point: 1, strongly disagree; 5, strongly agree
	Family commitments take priority over physical activity	1	5 point: 1, strongly disagree; 5, strongly agree
	Work/study commitments take priority over physical activity	1	5 point: 1, strongly disagree; 5, strongly agree
Occupational physical activity [29]	Frequency, duration and intensity of work-related physical activity	6	Continuous variable
Television viewing [8]	Time spent sitting watching television on weekdays and weekends	2	Continuous variable
Social factors			
Social support [35]	Support for physical activity from family	5	5 point: 1, never; 5, very often
	Support for physical activity from friends/colleagues	5	5 point: 1, never; 5, very often
Social participation [36]	Frequency of informal social participation (visiting family, friends or neighbours), social participation in public spaces (cafe/restaurant, social club, theatre or cinema, party or dance) and social participation in group activities (played sport, attended a gym, exercise or other class, involvement in a hobby, singing, acting, musical or self-help group)	13	4 point: 1, not at all; 4, more than twice per month
Dog ownership	Do you own a dog that you walk regularly?	1	2 point: 0, no; 1, yes
Sports club membership	Are you a member of a sporting, exercise or outdoor recreational group or club?	1	2 point: 0, no; 1, yes
Environmental factors			
Aesthetics	Attractiveness, pleasant walks, neighbourhood well-maintained	3	5 point: 1, strongly disagree; 5, strongly agree
Safety	Neighbourhood safe for walking, neighbourhood safe for walking day or night, streets well lit at night	3	5 point: 1, strongly disagree; 5, strongly agree

Table 1. *Continued*

Exposure Measures	Mode of measurement	No. of items	Scale
Access	Access to places to walk or be vigorously active	2	5 point: 1, strongly disagree; 5, strongly agree
Infrastructure	Footpaths in good condition, busy roads to cross, heavy local traffic	3	5 point: 1, strongly disagree; 5, strongly agree
Interesting walks	There are interesting local walks available	1	5 point: 1, strongly disagree; 5, strongly agree

previous studies [39–41] and because women's occupation, income and employment status often change as they move in and out of the workforce during the childbearing years, while educational attainment remains relatively stable, educational attainment was used as the indicator of SEP. Women self-reported their highest level of education, with three categories created: no formal qualification/up to year 10 (low SEP); year 12/trade/apprenticeship/certificate/diploma (mid SEP) or university degree/higher degree (high SEP).

Covariates

Potential covariates were determined a priori and included: children under 18 living at home (yes or no), marital status (married/living as married; separated/widowed/divorced; never married), smoking status (current smoker; current non-smoker) and age.

Procedures

The study was approved by the Deakin University Human Research Ethics Committee. In 2003, a physical activity survey was posted by mail to 2400 women and nutrition surveys to a separate sample of 2400 women. In all, 1045 women responded to the initial physical activity survey (44% response rate), and of the women completing the nutrition survey ($n = 1136$; 47% response rate), 509 (45% of nutrition survey respondents; 21% of those initially approached to complete the nutrition survey) also completed the physical activity survey. These response rates are similar to those found in other population-based mail surveys [42, 43]. Of 1554 respondents, 14 had moved before completing the survey and were excluded from this analysis.

Analyses

For the purposes of these analyses (conducted in 2007), the sample was restricted to women of low individual-level SEP; that is, those who had no formal qualifications or who had completed up to year 10 high school ($n = 334$). Two pregnant women and 21 participants who did not provide complete information on LTPA were excluded from analyses.

Chi-squared tests (categorical data) and one-way analysis of variance (continuous data) were used to determine whether covariates differed significantly across LTPA categories. Smoking status and age were associated with the outcome and were therefore included as covariates in further analyses. Descriptive statistics were used to characterize the sample. Chi-squared tests were used to determine whether bivariable associations existed for each of the personal, social and environmental variables across LTPA categories. Log binomial regression was used to determine the prevalence of achieving recommend LTPA versus insufficient LTPA across exposure variable categories, adjusting for smoking status, age and clustering by suburb of residence. Prevalence ratios (PRs) and 95% confidence intervals (CIs) are presented. In this bivariable model, data from 20 women who had missing values for >3 of the 26 exposure variables were excluded, leaving 291 participants for analysis.

In the final model, personal, social and physical environmental factors that were significantly associated with LTPA ($P < 0.05$) were selected for entry into a multivariable model. Log multinomial regression was used to estimate PR and 95% CI of

achieving recommended versus insufficient LTPA across exposure variables categories, adjusting for all other exposure variables, smoking status, age and clustering within suburbs. Forty-seven participants with any missing exposure variables were excluded from these analyses, resulting in data for a total of 244 participants in the final multivariable analysis. All analyses were conducted using Stata Version 9.2 (Statacorp, College Station, TX, USA).

Results

Overall ($n = 291$), mean age was 48.4 (± 11.7) years, 69% of participants were born in Australia, 65% were married or living as married, 24% were current smokers and 39% had a child under the age of 18 years living in the household. Forty per cent ($n = 116$) of participants achieved recommended LTPA, a proportion not dissimilar to that observed in a recent Australian study of physical activity (45.5%) [4]. There were no significant differences in the demographic characteristics (age, country of birth, marital status, smoking or number of children) or the proportion of participants achieving recommended LTPA between the overall sample used in bivariable analyses and the restricted sample used in multivariable analyses ($n = 244$).

The proportion of women who achieved recommended physical activity levels was highest in those who reported higher levels of self-efficacy for walking and vigorous physical activity, higher enjoyment of walking, fewer barriers, higher intentions, having a set physical activity routine and fitting physical activity around schedules (Table II). Achieving recommended LTPA was also highest in those with high levels of friend/colleague social support, high levels of social participation, sport/recreation club membership, interesting local walks and many busy roads to cross when walking.

Medium and high levels of self-efficacy for walking (85 and 213% greater prevalence, respectively), high self-efficacy for vigorous physical activity (59% greater prevalence) and medium and

high enjoyment of walking (68 and 139% greater prevalence, respectively) were associated with achieving recommended LTPA (Table III). High barriers (59% lower prevalence), medium and high intentions (94 and 282% greater prevalence, respectively), having a set physical activity routine (158% greater prevalence) and fitting physical activity around schedules (57% greater prevalence) were also associated with achieving recommended LTPA. For social factors, high friend/colleague social support (44% greater prevalence), with medium and high levels of social participation (44 and 67% greater prevalence, respectively) and with sport/recreation club membership (50% greater prevalence), was associated with recommended LTPA. Having busy roads to cross when walking was the only environmental factor associated with achieving recommended LTPA (36% greater prevalence).

In multivariable analyses, the prevalence of achieving LTPA was approximately twice that in those with high self-efficacy for walking, high intentions to be active and a set routine for physical activity compared with those with low self-efficacy for walking, low intentions to be active and no set routine for physical activity, respectively (Table IV). Recommended LTPA was ~50% more prevalent in those participants with a high enjoyment of walking, compared with those with a low enjoyment of walking.

Discussion

This paper aimed to examine the personal, social and physical environmental characteristics of women from socio-economically disadvantaged backgrounds who demonstrated 'resilience' to physical inactivity. The findings suggest that personal factors, in particular high self-efficacy for and high enjoyment of walking, high intentions to be active and having a set routine for physical activity, were associated with achieving 150 min or more of weekly LTPA. These associations were independent of other perceived personal, social and physical environmental factors that demonstrated

Table II. Distribution and bivariable associations of LTPA and personal, social and environmental factors

Personal, social and environmental factors	<i>n</i> (%)	LTPA (%)		<i>P</i>
		<150 min week ⁻¹	≥150 min week ⁻¹	
Personal factors				
Self-efficacy for walking (<i>n</i> = 289)				
Low	100 (34.6)	46.6	16.5	<0.01
Mid	94 (32.5)	33.9	30.4	
High	95 (32.9)	19.5	53.0	
Self-efficacy for vigorous PA (<i>n</i> = 289)				
Low	122 (42.2)	46.3	36.0	<0.01
Mid	72 (24.9)	29.1	18.4	
High	95 (32.9)	24.6	45.6	
Enjoyment of walking (<i>n</i> = 264)				
Low	89 (33.7)	42.8	20.0	<0.01
Mid	85 (32.2)	33.3	30.5	
High	90 (34.1)	23.9	49.5	
Enjoyment of vigorous PA (<i>n</i> = 240)				
Low	80 (33.3)	28.8	40.4	0.17
Mid	80 (33.3)	36.3	28.7	
High	80 (33.3)	34.9	30.9	
Barriers to PA (<i>n</i> = 290)				
Low	141 (48.6)	38.3	64.4	<0.01
Mid	67 (23.1)	24.0	21.7	
High	82 (28.3)	37.7	13.9	
Intentions to be active (<i>n</i> = 304)				
Low	110 (38.1)	52.3	16.5	<0.01
Mid	96 (33.2)	35.6	29.6	
High	83 (28.7)	12.1	53.9	
Guilt about PA (<i>n</i> = 290)				
Low	146 (50.3)	47.7	54.3	0.19
Mid	74 (25.5)	29.3	19.8	
High	70 (24.1)	23.0	25.9	
Priority for PA—family (<i>n</i> = 290)				
PA low priority	148 (51.0)	52.6	48.7	0.27
PA medium priority	73 (25.2)	46.9	22.6	
PA high priority	69 (23.8)	20.6	28.7	
Priority for PA—work (<i>n</i> = 283)				
PA low priority	92 (32.5)	32.4	32.7	0.05
PA medium priority	75 (26.5)	31.2	19.1	
PA high priority	116 (41.0)	36.4	48.2	
Set routine for PA (<i>n</i> = 287)				
No routine	136 (47.4)	60.1	28.1	<0.01
Neither	58 (20.2)	23.1	15.8	
Set routine	93 (32.4)	16.8	56.1	
Fit in PA around schedule (<i>n</i> = 287)				
Disagree	76 (26.5)	31.4	19.1	<0.01
Neutral	64 (22.3)	26.7	15.7	
Agree	147 (51.2)	41.9	65.2	
Occupational PA (<i>n</i> = 147)				
Lowest third	51 (34.7)	28.2	43.6	0.15
Middle third	50 (34.0)	36.5	30.7	

Table II. Continued

Personal, social and environmental factors	<i>n</i> (%)	LTPA (%) <150 min week ⁻¹	≥150 min week ⁻¹	<i>P</i>
Highest third	46 (31.3)	35.3	25.8	0.57
Television viewing (<i>n</i> = 284)				
Lowest third	93 (32.8)	32.8	32.7	
Middle third	99 (34.9)	32.8	38.1	
Highest third	92 (32.4)	34.5	29.2	0.08
Social factors				
Family social support (<i>n</i> = 285)				
Low	107 (37.5)	40.7	32.7	
Mid	107 (37.5)	39.0	35.4	<0.01
High	71 (24.9)	20.4	31.9	
Friend/colleague social support (<i>n</i> = 288)				
Low	139 (48.3)	52.0	42.5	
Mid	53 (18.4)	22.9	11.5	<0.05
High	96 (33.3)	25.1	46.0	
Social participation (<i>n</i> = 290)				
Low	109 (37.6)	44.6	27.0	<0.01
Mid	88 (30.3)	27.4	34.8	
High	93 (32.1)	28.0	38.3	
Sport/recreation club membership (<i>n</i> = 290)				
Yes	42 (14.5)	9.1	22.6	0.25
No	248 (85.5)	90.9	77.4	
Dog owner (<i>n</i> = 291)				
Yes	141 (48.5)	45.7	52.6	
No	150 (51.6)	54.3	47.4	0.15
Environmental factors				
Perceived aesthetics (<i>n</i> = 287)				
Low	112 (39.0)	43.0	33.0	
Medium	98 (34.2)	33.7	34.8	0.16
High	77 (26.8)	23.3	32.2	
Perceived safety (<i>n</i> = 287)				
Low	120 (41.8)	44.4	37.9	0.06
Medium	74 (25.8)	27.5	23.3	
High	93 (32.4)	28.1	38.8	
Local access to places to walk (<i>n</i> = 289)				
No	47 (16.3)	19.5	11.3	0.15
Yes	242 (83.7)	80.5	88.7	
Local access to places to be vigorously active (<i>n</i> = 290)				
No	100 (34.5)	37.7	29.6	
Yes	190 (65.5)	62.3	70.4	0.25
Local footpaths in good condition (<i>n</i> = 290)				
No	89 (30.7)	28.2	34.5	
Yes	201 (69.3)	71.8	65.5	
Interesting local walks (<i>n</i> = 291)				<0.05
No	130 (44.7)	50.3	36.2	
Yes	161 (55.3)	49.7	63.8	
Busy roads to cross when walking (<i>n</i> = 291)				
No	117 (40.2)	45.7	31.9	<0.05
Yes	174 (59.8)	54.3	68.1	

Table II. *Continued*

Personal, social and environmental factors	<i>n</i> (%)	LTPA (%)		<i>P</i>
		<150 min week ⁻¹	≥150 min week ⁻¹	
Heavy traffic in neighbourhood (<i>n</i> = 291)				
No	147 (50.5)	54.9	44.0	0.07
Yes	144 (49.5)	45.1	56.0	

bivariable associations with achieving recommended LTPA.

While social–ecological models posit that social and physical environmental factors are likely to have a role in determining physical activity levels [14], the results of this study suggest these factors were less important than were personal factors. The findings suggest that interventions aimed at promoting physical activity among women from low SEP backgrounds should focus on personal factors, in particular, enhancing women's belief in their ability to be active (self-efficacy), enjoyment of activity, intentions to be active and developing set routines for physical activity. These findings are consistent with previous literature that suggests the importance of personal factors such as self-efficacy across a variety of studies [5, 18], although research simultaneously examining the relative contribution of personal, social and environmental factors is scarce.

Reasons why personal factors were more strongly associated with achieving recommended physical activity levels than social or environmental factors in women from low SEP warrant further explanation. A key feature of resilient women may be their ability to remain self-efficacious, have good intentions, enjoy and set routines for physical activity despite unsupportive social and environmental influences. Alternatively, categories created for social and environmental variables may have been unable to effectively discriminate between small differences in these conditions. Another possible explanation is that the number of personal variables examined in this study (12 factors) compared with the number of social (five factors) and environmental (eight factors) variables increased the likelihood of

observing significant associations between personal variables and recommended LTPA. However, a study of women that examined equal numbers of personal, social and four environmental factors similarly found that personal factors were most strongly associated with walking for leisure [16].

It is possible that the results of the current study would have differed if objective environmental measures were used. It is plausible that some of the environmental items may have lacked specificity, which could explain the lack of association with physical activity. For instance, questions that asked about access to local places to walk or be vigorously active may not be relevant to those who participate in activities such as moderate-intensity swimming. Mixed findings have been observed when perceived and objective measures of the environment have been used [44, 45]. For example, a study in the United States found that objective environmental measures of access to exercise facilities were associated with physical activity, but self-reports of the same measures were not [45], while another US study found that physical activity was related to self-reported but not objectively measured facilities [44]. However, perceptions of the environment may be just as important as or even more important for physical activity than the measured environment. For example, if women believe that their neighbourhood lacks appropriate facilities, even if they do exist, they are unlikely to use them. Furthermore, objective measures of the environment are unable to capture other considerations that may be important for women's physical activity behaviour, such as road or personal safety. An alternate explanation is that women from disadvantaged backgrounds may also

Table III. Bivariable associations between recommended LTPA (versus insufficient LTPA) and personal, social and environmental factors

Personal, social and environmental predictor factors	≥ 150 min week ⁻¹ LTPA	
	PR ^a (95% CI)	Adjusted PR ^b (95% CI)
Personal factors		
Self-efficacy for walking		
Low	1.0 (ref)	1.0 (ref)
Mid	1.96 (1.21–3.17)*	1.85 (1.18–2.88)*
High	3.38 (2.09–5.46)*	3.13 (2.00–4.91)*
Self-efficacy for vigorous PA		
Low	1.0 (ref)	1.0 (ref)
Mid	0.87 (0.56–1.33)	0.92 (0.62–1.37)
High	1.63 (1.27–2.09)*	1.59 (1.21–2.10)*
Enjoyment of walking		
Low	1.0 (ref)	1.0 (ref)
Mid	1.60 (1.01–2.52)	1.68 (1.09–2.61)*
High	2.45 (1.64–3.65)*	2.39 (1.63–3.50)*
Barriers to PA		
Low	1.0 (ref)	1.0 (ref)
Mid	0.71 (0.47–1.07)	0.79 (0.59–1.04)
High	0.37 (0.23–0.60)*	0.41 (0.25–0.67)*
Intentions to be active		
Low	1.0 (ref)	1.0 (ref)
Mid	2.05 (1.20–3.49)*	1.94 (1.15–3.28)*
High	4.32 (2.62–7.14)*	3.82 (2.33–6.26)*
Priority for PA—work		
PA low priority	1.0 (ref)	1.0 (ref)
PA medium priority	0.72 (0.43–1.18)	0.71 (0.43–1.18)
PA high priority	1.17 (0.85–1.61)	1.16 (0.88–1.53)
Set routine for PA		
No routine	1.0 (ref)	1.0 (ref)
Neither	1.32 (0.80–2.16)	1.13 (0.68–1.86)
Set routine	2.92 (2.12–4.04)*	2.58 (1.95–3.41)*
Fit in PA around schedule		
Disagree	1.0 (ref)	1.0 (ref)
Neutral	0.97 (0.53–1.77)	0.89 (0.51–1.55)
Agree	1.76 (1.22–2.55)*	1.57 (1.10–2.23)*
Social factors		
Friend/colleague social support		
Low	1.0 (ref)	1.0 (ref)
Mid	0.71 (0.47–1.06)	0.74 (0.49–1.10)
High	1.57 (1.21–2.03)*	1.44 (1.13–1.82)*
Social participation		
Low	1.0 (ref)	1.0 (ref)
Mid	1.60 (1.19–2.14)*	1.44 (1.12–1.86)*
High	1.66 (1.13–2.45)*	1.67 (1.17–2.40)*
Sport/recreation club membership		
No	1.0 (ref)	1.0 (ref)
Yes	1.72 (1.29–2.31)*	1.50 (1.10–2.04)*
Environmental factors		
Interesting local walks		

Table III. *Continued*

Personal, social and environmental predictor factors	≥ 150 min week ⁻¹ LTPA PR ^a (95% CI)	Adjusted PR ^b (95% CI)
No	1.0 (ref)	1.0 (ref)
Yes	1.42 (1.09–1.85)*	1.22 (0.97–1.55)
Busy roads to cross when walking		
No	1.0 (ref)	1.0 (ref)
Yes	1.44 (1.09–1.89)*	1.36 (1.04–1.78)*

^aAdjusted for clustering by suburb.^bAdjusted for clustering by suburb, smoking status and age. * $P < 0.05$ as indicated by bold text.

be more likely to live in neighbourhoods with higher densities, better access to public transport and closer proximity to destinations. If so, reported environmental factors may have demonstrated less heterogeneity among participants than the personal factors assessed. This interpretation is supported by our findings as 84% of the sample reported having local access to places to walk, 66% reported having local access to places to be vigorously active and 69% reported that local footpaths were in good condition.

The potential limitations include the cross-sectional nature of the study and the relatively small sample size, the use of self-report measures (although valid and reliable measures were used where possible), the study was limited to one geographical area and the use of one indicator of SEP (although education tends to be stable and has been used in many other studies, i.e. [39–41]). Non-leisure physical activity was not examined in this study, although our previous work using data from this same study suggests that women of low SEP do not engage in more transportation and work-related physical activity than women of high SEP [16]. All potential correlates were assessed at the individual level only, meaning that associations at the community or neighbourhood level may have been overlooked. The large number of independent variables may be considered a limitation, although we argue that by reducing the likelihood of false positives (a type I error) by adjusting for multiple comparisons, the likelihood of false negatives (a type II error) is increased, offering no real improvement. [46] The strengths

of this investigation include its focus specifically on women of low SEP, a group that has rarely been studied, and the inclusion of a broad range of measures that cover personal, social and physical environmental influences.

In conclusion, this study suggests that personal factors may be important for achieving sufficient amounts of LTPA in women who are socio-economically disadvantaged. Because women from low socio-economic groups are at risk for physical inactivity, it is important to understand the factors that are associated with achieving sufficient amounts of LTPA in this group. A better understanding of why some women from low socio-economic groups have higher levels of self-efficacy for walking, enjoyment of walking, intentions to be active and develop set routines for physical activity more so than others is required. Doing so will provide insights into the complex mechanisms through which socio-economic disadvantage impacts on physical activity behaviours in women. Further research examining the effectiveness of interventions that include strategies promoting self-efficacy for walking, enjoyment of walking, intentions to be active and developing set routines for physical activity in women of low SEP is warranted. Doing so with careful consideration to the broader socio-economic, environmental and political context may be an example of how future research has the potential to integrate resilience theory and social-ecological frameworks in order to better understand and promote physical activity behaviours among women of low SEP.

Table IV. Multivariable associations between recommended LTPA (versus insufficient LTPA) and personal, social and environmental factors

Personal, social and environmental factors	150+ min week ⁻¹ LTPA	
	PR ^a (95% CI)	Adjusted PR ^b (95% CI)
Personal factors		
Self-efficacy for walking		
Low	1.0 (ref)	1.0 (ref)
Mid	1.79 (1.00–3.21)	1.59 (0.98–2.60)
High	2.20 (1.20–4.04)*	2.05 (1.19–3.53)*
Self-efficacy for vigorous PA		
Low	1.0 (ref)	1.0 (ref)
Mid	0.61 (0.40–0.93)	0.71 (0.40–1.24)
High	0.92 (0.69–1.23)	1.07 (0.73–1.55)
Enjoyment of walking		
Low	1.0 (ref)	1.0 (ref)
Mid	1.16 (0.67–2.01)	1.26 (0.84–1.91)
High	1.24 (0.71–2.18)	1.48 (1.04–2.12)*
Barriers to PA		
Low	1.0 (ref)	1.0 (ref)
Mid	0.94 (0.72–1.22)	0.87 (0.59–1.27)
High	0.76 (0.51–1.12)	0.72 (0.48–1.09)
Intentions to be active		
Low	1.0 (ref)	1.0 (ref)
Mid	1.53 (0.90–2.60)	1.64 (0.99–2.73)
High	1.94 (1.09–3.45)*	1.97 (1.12–3.45)*
Set routine for PA		
No routine	1.0 (ref)	1.0 (ref)
Neither	1.04 (0.59–1.82)	1.26 (0.74–2.15)
Set routine	1.77 (1.10–2.85)*	1.91 (1.18–3.09)*
Fit in PA around schedule		
Disagree	1.0 (ref)	1.0 (ref)
Neutral	1.09 (0.57–2.08)	0.86 (0.53–1.38)
Agree	1.06 (0.75–1.49)	0.90 (0.56–1.45)
Social factors		
Friend/colleague social support		
Low	1.0 (ref)	1.0 (ref)
Mid	0.78 (0.42–1.44)	0.65 (0.42–1.01)
High	0.70 (0.49–1.00)	0.69 (0.48–0.99)
Social participation		
Low	1.0 (ref)	1.0 (ref)
Mid	1.30 (0.93–1.81)	1.19 (0.83–1.72)
High	1.05 (0.72–1.51)	1.27 (0.85–1.90)
Sport/recreation club membership		
No	1.0 (ref)	1.0 (ref)
Yes	1.14 (0.87–1.48)	1.10 (0.77–1.58)
Environmental factors		
Busy roads to cross when walking		
No	1.0 (ref)	1.0 (ref)
Yes	1.08 (0.84–1.39)	1.17 (0.89–1.53)

^aAdjusted for clustering by suburb.^bAdjusted for clustering by suburb, smoking status and age. **P* < 0.05 as indicated by bold text.

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Conflict of Interest Statement

None declared.

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