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Recommendations for policy and practice of physical education in culturally and linguistically diverse Australian secondary schools based on a two-year prospective cohort study

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Abstract

Physical activity affords a host of physical and cognitive benefits for children. Physical education classes are one such venue where children can reap recommended amounts of physical activity. However, little research has explored evidence-based physical education instruction, particularly in culturally and linguistically diverse schools. No studies to date have provided recommendations for a range of educational stakeholders that serve these students. The Physical Activity in Linguistically Diverse Communities study examined the evidence-based physical education opportunities and barriers at six culturally and linguistically diverse high schools in New South Wales, Australia. This article provides implications and synthesized recommendations based on Phase One

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(systematic review) and Phase Two (prospective cohort study of students in six schools) of Physical Activity in Linguistically Diverse Communities for school leadership and psychologists targeting policy and practice changes on a systems level.

Keywords

Australia, culturally and linguistically diverse students, enjoyment, physical activity, physical education

Lack of physical activity (PA) in youth is becoming a growing concern. Although there is increasing evidence for the importance of PA in our daily routine, children in most developed nations do not meet the recommended criteria of at least 60 minutes of moderate-vigorous physical activity (MVPA) per day (Hillman, Erickson, & Kramer, 2008; World Health Organization [WHO], 2014). According to the WHO (2014), less than one-third of adolescents today meet their recommended PA standards, and therefore do not receive the essential physical, mental, and social benefits of PA (WHO, 2014). Recent research suggests that the decline in physical activity is due to increasingly sedentary lives among youth, both within and outside of school (Ahamed et al., 2007; Hillman et al., 2008; Stevens, To, Stevenson, & Lochbaum, 2008; WHO, 2014). Students from culturally and linguistically diverse (CALD) backgrounds have been shown to participate in even lower bouts of PA (Hardy, King, Espinel, Cosgrove, & Bauman, 2011).

Context of physical education in Australia and other developed nations

According to the Australian Government Department of Immigration and Citizenship (2013), the majority of Australians from CALD backgrounds settle in major metropolitan cities with Sydney (New South Wales) and Melbourne (Victoria) (Australian Bureau of Statistics, 2013). In New South Wales (where this study was conducted), PE is taught within a larger subject called Personal Development, Health, and Physical Education (PDHPE) and is a compulsory subject for student in grades K–10. The New South Wales PDHPE curriculum in Grades 7–10 (Secondary school) states that students learn: ‘... through movement experiences that are both challenging and *enjoyable*, and improving their capacity to *move with skill* and confidence in a variety of contexts. It promotes the value of *physical activity* in their lives’ (New South Wales Office of the Board of Studies, 2007, p. 9) and

... Young people’s motivation to be physically active is influenced by their level of enjoyment, perceived competence and social support. Trends toward inactivity in young people are of particular concern due to the associated range of short-term and long-term health implications. PDHPE plays a key role in promoting physical activity

and developing competency in movement skills. It provides opportunities for students to *develop, adapt and improvise their movement skills* in a wide variety of challenging contexts and environments that appeal to their needs and interests, *enhance enjoyment* and excitement in their lives, and ultimately increase the likelihood of lifelong *physical activity*. (NSW Office of the Board of Studies, 2007, p. 9, emphasis added)

These rationale emphases are consistent with many Australian physical education (PE) curricula and that of most Organization for Economic Cooperation and Development countries including Canada, UK, New Zealand, Belgium, France, and the USA (Dudley, Okely, Pearson, & Cotton, 2010). Furthermore, Australian Government policy (Australian Government Independent Sport Panel, 2009; Australian Government Preventative Health Taskforce, 2010) have argued for evidence-based PE to promote the development of movement skill, physical activity participation, and enjoyment of PA in youth.

The need for quality physical education

Unfortunately, the Worldwide Survey of Physical Education (Hardman & Marshall, 2009) showed that the inclusion and recognition of the importance of PE by policy makers to child development has done little to deter the recent decline of quality PE provision in schools. Despite the positive rhetoric and evidence suggesting that certain governments and regional bodies have improved PE delivery in recent years, many countries fall behind in the implementation of evidence-based policy recommendations (Hardman & Marshall, 2009). Current negative trends in PE provision linked with factors such as deterioration in the fitness levels of young people, an increase in sedentary lifestyles, and rising rates of obesity among school-aged children and youth (Tremblay et al., 2011) pose a serious risk to the health and rounded development of all citizens around the world. Furthermore, the benefits to psychological well-being and performance at school are finding greater empirical support (Carlson et al., 2008; Fedewa & Ahn, 2011; Taras, 2005; Telford et al., 2012; Trudeau & Shepherd, 2008), as is the preventative role of PA as a means of managing behavioural issues (Sandford, Armour, & Warmington, 2006). Therefore, the need for effective evidence-based policies is increasingly profound.

It is important to define evidence-based practice to understand the methodologies required to achieve it. According to Thomas and Pring (2004), evidence-based practice in education is defined as being derived from empirical studies that can speak to causation. Evidence-based practice has been emphasized by many educational professional organizations in this way, including the field of school psychology (Lilienfeld, Ammirati, & David, 2011). Specifically, such evidence used to inform educational decision making should: (a) pose significant questions that can be investigated empirically; (b) link research to theory; (c) use methods that permit direct investigation of the question; (d) provide a coherent chain of rigorous reasoning; (e) replicate and generalize; and (f) ensure transparency and scholarly debate (Eisenhart & Towne, 2003). Many professional bodies and institutions

now stress the importance of members implementing investigations to provide evidence supporting or rejecting the use of specific interventions or teaching practices (Lilienfeld et al., 2011; Thomas & Pring, 2004). Encouragement toward evidence-based practice has also come from government and private education sectors, which have often refused funding for practices lacking in evidence of causality (Eisenhart & Towne, 2003).

Based on these definitions from the research literature and policies from the Australian Government, observable elements of evidence-based PE can be proposed. The evidence-based components of implementing effective PE instruction would include observable instruction time dedicated to: (1) promoting high levels of PA participation; (2) movement skill instruction and practice; and (3) active learning strategies with an emphasis on enjoyment.

The importance of adopting evidence-based PE in secondary schools is apparent when we consider that recent data report only 15% of Australian adolescents participate in adequate amounts of PA (National Heart Foundation and Cancer Council, 2012) and those students from CALD backgrounds, namely Asian cultural backgrounds and girls from Middle-Eastern backgrounds in Grades 6–12 are significantly less active than their peers from English-speaking backgrounds (Hardy et al., 2011). According to recent evidence, students in Grades 6, 8, and 10 from Asian or Middle-Eastern cultural backgrounds in New South Wales (NSW), Australia are significantly less active than their peers from English-speaking backgrounds during school terms (Hardy et al., 2011).

Increasing physical activity within physical education

One domain within schools where PA can occur regularly, regardless of cultural background or socio-economic status, is during PE. To achieve this, previous research indicates that PE lessons should dedicate sufficient time to skill development and fitness, whilst reducing the amount of time spent managing students (McKenzie et al., 2001; Sallis et al., 1997; van Beurden et al., 2003). Additionally, the social support adolescents receive from their peers, parents, and teachers are all important correlates of PA participation (Sallis, Prochaska, Taylor, Hill & Geraci, 1999). Teachers have the opportunity during their PE classes to provide social support for their students to be physically active in class via the interaction they have with them. It is also commonly accepted that quality or evidence-based PE should be enjoyable for young people to maximize the lifelong development of motor skills, health-related fitness, and health-enhancing physical activity behaviour (Centers for Disease Control and Prevention, 2011).

The role of school psychologists and educational leadership

Beyond the obvious health argument, there is another wider debate that even in the short term, school leadership (including principals, school boards, school psychologists and policy makers) should promote more effective PE lessons in CALD

schools in terms of increased PA levels, enjoyment, promoting PA outside of school, and building student self-esteem (Fedewa, Candelaria, Erwin, & Clark, 2013). Numerous studies have documented the benefits of PA on children's psychological well-being, classroom performance, and in-class behaviour (Carlson et al., 2008; Fedewa & Ahn, 2011; Taras, 2005; Telford et al., 2012; Trudeau & Shepherd, 2008). Given these benefits for youth health and cognitive outcomes, PA has been integrated into a public service health delivery model that can be applied in schools across a three-tiered approach (Fedewa et al., 2013). Considering the health and other school-related benefits of increasing student PA participation, school psychologists and school leadership should be privy to the evidence base regarding the effects of PE practices in order to advocate for effective systems change that will inevitably promote adaptive outcomes for students, particularly those from culturally diverse backgrounds. For these reasons, more effective PE may offer all stakeholders a relatively uncontroversial, easy-to-enact and effective strategy for promoting well-being and allowing youth to reach their full potential during their years of schooling.

Purpose of the PALDC study

The Physical Activity in Linguistically Diverse Communities (PALDC) study sought to ascertain if evidence-based PE was informing the delivery of PE practice and policy in secondary schools with a high proportion of CALD students. This is the fifth article published from the PALDC secondary school study. Its purpose is to provide synthesized recommendations that have not occurred in the previous publications, based on the evidence collected across the study from all instruments. Furthermore, this article specifically makes recommendations for PE teachers, educational leaders, school psychologists, and other policy makers on adopting evidence-based PE practice in secondary schools with a high proportion of students from CALD backgrounds. Reviewing the literature on the role of school psychologists and educational leaders also provides new insight into the interpretation and application of these data from the PALDC study.

Research process of the PALDC study

The methods and findings of the PALDC study have been reported in previous publications (Dudley et al., 2010; Dudley, Okely, Pearson, Cotton & Caputi, 2012a, 2012b, 2013). Briefly, PALDC was a two-year multicentre observation study of six secondary schools in NSW with a high proportion of CALD students. The primary aim was to examine changes to PA participation, lesson context, teacher interaction, and student enjoyment of PE in the first two years of their secondary education. It consisted of two phases, namely the Systematic Review of controlled interventions that promoted physical activity, skill development and enjoyment of physical activity during physical education (Phase 1) and reported by Dudley et al. (2010). This systematic review then informed the evidence-based

practice that was observed in Phase 2 whereby random direct observations of school PE lessons took place over a six-month period each year observing the physical activity participation, lesson context, and teacher interaction that occurred in conjunction with annual questionnaires of student enjoyment of PE.

Phase 2 included observations of 658 Grade 7 students enrolled in 27 Grade 7 PE classes across the six schools. There were a total of 81 lessons (27 classes \times 3 observations) observed in the first year of the study. When the classes were followed up in Grade 8, there were 17 PE classes across the six schools with a total of 51 lessons being observed. Five hundred and eighty-six students (Boys, $N=266$; Girls, $N=320$; 89% of those enrolled) in these PE classes consented to demographic data being collected from their school enrolment records.

The participants in the study were predominately girls (55%) with those attending single-sex all girls' schools contributing the largest proportion (40%) of study. The mean age of the participants was 12.8 years (0.5 SD) when they were in Grade 7. After English, Middle-Eastern and East Asian dialects were the next most common languages spoken at home (36% and 7%, respectively) and were well above the national average of 1.2% and 2.3% respectively (Australian Bureau of Statistics, 2010). Nearly 60% of participants resided in suburbs in the five deciles of greatest socio-economic disadvantage (Australian Bureau of Statistics, 2006) based on their postcode of residence.

Integrated findings of the PALDC study

Direct observation of PE lesson using system of observed fitness instruction time

The percentage of PE class time spent in various intensities of physical activity, the lesson context and the teacher interaction with student was recorded using the System of Observed Fitness Instruction Time (SOFIT) and its protocols as detailed by McKenzie, Sallis, and Nader (1991) and reported in [Dudley et al. \(2012a, 2012b\)](#). Briefly, 'skill practice' or explicit skill instruction in Grade 7 was 6.2% of PE class time and this decreased to 5.2% in Year 8 ($MD = -1.0$; $p = 0.644$). Only all boys' schools recorded increases in time spent in skill practice ($MD = 4.5\%$) whilst co-educational and all girls' schools experienced declines of approximately 4 and 2 percentage points, respectively ([Dudley et al., 2012b](#)). These declines are similar to those found in the M-SPAN study ($MD = -0.8\%$; McKenzie et al., 2004) and suggest that PE teachers, contrary to recommendations of evidence-based studies from primary/elementary schools (Dudley et al., 2010), spend a very small proportion of time instructing and practicing skills as students progress through secondary schooling.

Of the 81 Grade 7 and 51 Grade 8 lesson observations, the mean proportion of time spent in moderate to vigorous physical activity (MVPA) during PE in Year 7 was 56.9% with this declining to 52.1% ($MD = -4.8$, $p = 0.777$) by Grade 8. Whilst

not statistically significant, this decline nonetheless equated to a mean loss of 2.7 minutes of MVPA per PE lesson as moved through their first two years of secondary school (Dudley et al., 2012b).

There was a significant decrease ($p = 0.009$) in the percentage of PE class time students spent being 'very active' or engaging in vigorous physical activity (VPA). The mean VPA declined from 20.8% in Year 7 to 12.9% in Year 8 $MD = -7.9$ (Dudley et al., 2012). The medium effect sizes of $\text{Eta}^2 = 0.127$ and $d = -0.66$ showed that these declines of VPA are worthy of further investigation.

The PALDC study also found that teachers spent just under one-third of PE class time (30.8%) promoting PA or teaching movement skills in Grade 7 and that this percentage significantly declined by Year 8 (10.1%, $MD = -20.7\%$, $p < 0.001$) (Dudley et al., 2012b). The effects sizes for these declines were large ($\text{Eta}^2 = 0.475$ and $d = -0.1.39$), and none of the lessons observed in Grade 8 reported more than 35% of class time promoting PA or movement skill. Furthermore, the declines were consistent across all three-school types. Whilst there are no clear justifications for why promotion of PA would drop significantly as students move through secondary school, one explanation could be the autonomy students seek as they move through adolescence and teachers giving them more responsibility for their own physical activity as a result. There is some evidence from longitudinal studies that adolescents' increase their desire for control over their own educational experiences, especially as they move through Years 6 and 7 (Eccles, Lord, & Midgley, 1991). However, given that participation in PA significantly declines over this time, schoolteachers, leaders, and support personnel in secondary schools still have an important role in promoting PA among older students (Centers for Disease Control and Prevention, 2011).

Enjoyment of physical education results using physical activity enjoyment survey (physical education version)

Students were administered the Physical Activity Enjoyment Survey – Physical Education version (PACES-PE) toward the end of the baseline and follow-up sessions of the PALDC study in accordance with the protocols detailed by Motl et al. (2001) and reported in Dudley et al. (2013). At baseline, total enjoyment of PE was 45.8 out of 55 (Range 11–55) (Boys 45.9, Girls 45.7) indicating that the average student responded to the PACES enjoyment items with a response of 'Enjoy a little' to most questions (Dudley et al., 2013). Little variation existed between boys and girls at baseline.

At follow-up, the overall enjoyment of PE had a mean decline (MD) of -1.8 (Dudley et al., 2013). The 12-months alone between Year 7 and Year 8 has a small negative effect on enjoyment of PE $d = -0.30$. The declines however showed that time had larger negative effect in girls ($MD = -2.3$; $d = -0.39$) compared with boys ($MD = -1.2$, $d = -0.21$) (Dudley et al., 2013). Item 2 'Changing Clothes' and Item 5 'Getting warmed up and sweaty' remained the lowest scoring items ($M = 2.7$, $MD = -0.2$; $M = 3.4$, $MD = 0.0$) for both sexes at follow-up

(Girls $M=2.5$, 3.0 respectively; Boys $M=2.7$, 3.4 respectively). ‘Changing Clothes’ however increased at follow-up and had a small positive effect in boys ($MD=0.1$, $d=0.09$) and notably decreased in girls with a medium negative effect in girls ($MD=-0.5$; $d=0.42$) (Dudley et al., 2014). The relationships that exist within a PE class are also shown to be an important variable. Item 3 ‘Being active with other students’ and item 10 ‘Being with the PE teacher’ were shown to have an overall negative effect of $d=-0.40$ and -0.31 respectively. In ‘Being with the PE teacher’, the decline was greater in girls (Dudley et al., 2013).

The main findings from the PALDC study were that students from CALD backgrounds enjoy PE in Grade 7 but their enjoyment of PE declines slightly as they progress to Grade 8. When examining data by sex, enjoyment of PE in girls declines at a greater rate than boys. Finally, when examining each of the individual items within the PACES PE instrument, there are specific ‘aspects’ of PE that contribute most to this decline which most notably was having to change uniforms to participate in PE.

Implications for school practices and policy based on PALDC Study findings

It is clear from the evidence presented in the introduction to this study that movement skill development needs to be the key focus of PE curriculum for youth well into secondary school in order for them to acquire the movement skills necessary to lead physically active lives. Furthermore, recent Australian data suggest less than 60% of children enter secondary school with 12 of the assessed fundamental movement skills necessary for participation in youth sport and organized PA and this figure appears to be on a downward trend (Hardy et al., 2011). Interestingly, three of the four movement skill intervention studies in the systematic review conducted in phase one of the PALDC study (Dudley et al., 2011) reported significant increases in PA participation (McKenzie et al., 1998; Salmon, Ball, Hume, Booth, & Crawford, 2008; van Beurden et al., 2003). With these findings in mind, movement skill practice and competency must not be viewed as antithetical to quality PE practice or game centred approaches to PE instruction but rather need to be viewed as part of a range of indicators to judge the effectiveness of PE curriculum and PE pedagogy.

For school psychologists and others in school leadership roles, the declines in PA (especially VPA) should also be considered against the literature supporting young adolescents engaging in high levels of regular PA for mental and physical health reasons (Strong et al., 2005). Previous studies have highlighted that for many adolescents, especially from CALD backgrounds, school PE is one of the few opportunities they have to engage in organized PA (Hardy et al., 2011). Furthermore, Australian adolescents from CALD backgrounds (like many in developed nations) are generally more at risk of mental and physical health disorders. According to Paradies (2006) who reviewed the literature on health status of CALD communities in Australia, the strongest and most consistent findings for

CALD communities are negative mental health outcomes and health-related behaviours, with weaker associations existing for positive mental health outcomes, self-assessed health status, and physical health outcomes. In this context, PE with high levels of PA (and VPA specifically) for CALD students should be viewed as a necessary pedagogical practice to potentially offset these negative health outcomes in an at risk population of young people.

The observational data from the PALDC study also showed the percentage of PE class time spent in 'skill practice' remained relatively unchanged from 6.2% to 5.2% ($MD = -1.0$; $p = 0.644$; $d = -0.08$) during the study period but this equated to only an average of 2.9 minutes of skill instruction and practice during PE in Grade 8. Other studies report between 5% and 12% of PE time spent in this context (McKenzie et al., 1998; McKenzie et al., 2000; McKenzie et al., 2004). By these figures, it would appear that both all-girls' and co-educational schools are within what might be expected in a PE lesson. However, all-boys' schools spent only 2% of PE time in skill instruction and practice. These data reveal low instruction percentages in comparison with these other studies. An explanation of why this may occur is that all-boys' schools spend the majority of class time in game play, are more engaged in more MVPA than other school types, and game play is significantly correlated with MVPA (Dudley et al., 2011). As such, PE teachers may be reluctant to interrupt student engagement in MVPA to teach movement skills. Further research may be needed to ascertain whether specific programming variables of PE might explain these results.

The correlation data from the PALDC study (Dudley et al., 2012a) emphasized the need to investigate the efficacy of PE practice in the early years of secondary school in NSW. Negative correlations between MVPA across all school sectors (Girls $r = -0.146$; Boys $r = -0.193$; $r = -.288$) during skill practice invite further research into pedagogical models of instruction in PE and professional development strategies at a school level.

Phase one of the study reported a number of effective evidence-based PA studies that adopted cross-curricular approaches (Dudley et al., 2011) and it is clearly apparent from phase two of PALDC that PE should not and cannot be the sole source of PA in CALD schools. It may be pertinent for education and health decision makers to view PA in schools through a whole-school approach. In other words, share the responsibilities of PA across the entire school community and across the curriculum. Much in the same way numeracy and literacy are areas of focus in mathematics and English, respectively, these areas of learning are also cross-curricular in nature and can/have been explored in other curriculum areas. Advocating for a whole-school approach to PA is by no means a new concept and has been supported by numerous studies (Biddle, Gorely, & Stensel, 2004; Cale, 2000; Sallis & Owen, 1999). Yet the absence of PE curricula that explicitly adopt whole school approaches to PA or provide training to teachers in how to do so, suggests that the recommendations proposed in previous studies have gone unheeded.

This study also contributes to the argument that substantial and quality professional development for PE teachers should be embedded in schools and the

systems that manage them. In accordance with numerous other studies ([Armour, Makopoulou, Chambers, & Duncombe, 2010](#); [Armour & Yelling, 2007](#); [Jago et al., 2009](#); [McKenzie et al., 2003](#); [McKenzie et al., 2004](#); [Sallis et al., 1997](#)), ongoing teacher professional development is a key element of an effective PE curriculum. Declines in all the outcome variables in the PALDC study (set against the potential efficacy of teacher professional development at addressing these issues) suggest that CALD schools would be well served by such investment.

Finally, it is clear from findings of this study published in [Dudley et al. \(2013\)](#) that changing clothes in order to participate in a PE lesson is a major barrier to enjoyment of PE in CALD schools regardless of sex or school-type, and that this becomes a larger issue as time progresses. A previous study has identified the difficulty in estimating the influence changing clothes has on enjoyment of PE and PA ([Dishman et al., 2005](#)). Apart from the obvious safety concerns regarding the wearing of appropriate footwear, there are no known studies that show requiring students to change into alternate clothing is a necessary aspect of PE participation or that it improves PE participation. Regardless of any explanation that might appear in the literature, it appears from this study that schools need to reconsider the daily uniform students are required to wear if they are going to engage with PE and participate in school-based PA.

Implications for school psychology and leadership based on PALDC study findings

There is now a strong case for educational leadership and school psychologists to take an active interest in the delivery of PE in their schools—especially in regard to the content and activity levels of classes as well as the encouragement of PA outside of the school context. Based on the findings of the PALDC study, school psychologists and those in roles of educational leadership should consider following strategies as a means of using PE to potentially improve the psychological well-being of adolescents from CALD backgrounds:

- (a) School PE should promote and encourage active play and engagement. School psychologists and leadership should encourage PE teachers that seek to keep adolescents physically active for at least 50% of allocated PE time.
- (b) This recommendation is consistent with the US Department of Health and Human Services, Centers for Disease Control and Prevention, National Center for Chronic Disease Prevention and Health Promotion, Division of Adolescent and School Health's (2010) Strategies to Improve the Quality of Physical Education.
- (c) Physical Education is not the sole source of PA in the school day. Cross-curricula mapping of curricula and wider faculty involvement in promoting student PA should be encouraged.

- (d) This recommendation is consistent with the systematic review on effective PE conducted by [Dudley et al. \(2010\)](#) and earlier calls for PA to be a cross curricula issue ([Biddle, Gorely, & Stensel, 2004](#); [Cale, 2000](#); [Sallis & Owen, 1999](#)).
- (e) Student enjoyment of PE is hindered by many existing school policies and the relationships they form with peers and teachers. School policies (such as changing into PE uniforms) for PE should not restrict participation in these lessons. Furthermore, school psychologists could assist PE teachers to ensure that group allocations and the actions of teachers during PE are promoting strong and significant social relationships.

This recommendation is consistent with a review qualitative studies that suggests the inconvenience and possibility of PE/PA exclusion because of school uniforms and teacher/student relationships are significant barriers to enjoyment of PE/PA ([Allender, Cowburn, & Foster, 2006](#)).

The benefits to psychological well-being and achievement levels at school are becoming increasingly well-evidenced ([Carlson et al., 2008](#); [Fedewa & Ahn, 2011](#); [Taras, 2005](#); [Telford et al., 2012](#); [Trudeau & Shepherd, 2008](#)), and the preventative role of PA in managing behavioural issues is also gaining prominence ([Sandford, Armour, & Warmington, 2006](#)). At the very least, school psychologists should support teachers, principals and policy-makers in making the informed decision to enhance PA during both classroom and PE time and to combat the drops in quality instruction, time spent being physically active, promotion of PA, and enjoyment of PE that have been observed in this study. School psychologists can encourage higher-level administrative systems to support evidence-based practice in PE just as practitioners use best-practices in their own assessment and intervention roles. Yet with any systems-change or behaviour-change process (e.g., [Prochaska & DiClemente, 1982](#)), informational support in the early stages, followed by practical resources and supportive coaching should help with any transitions towards optimal PE delivery.

With specific reference to improving the quality of PE delivered to students from CALD backgrounds, school psychologists and educational leadership must be aware of the detrimental effect that migration to Western societies has on the health status and health behaviours of CALD groups. Specifically, there is evidence that physical inactivity is common in migrant CALD groups and this may be caused by the cultural, religious, socioeconomic environmental and perceptual barriers they face ([Caperchione, Kolt, & Mummery, 2009](#)). Quality PE in schools provides an effective early intervention strategy that may assist with overcoming these challenges and should include an element of cultural sensitivity to ensure that poor health status and behaviours do not become systemic in CALD populations.

Limitations

The recommendations provided in this article provide original insights into the nature of PE, PA, movement skill instruction and enjoyment of PE in NSW secondary schools in context of published international interventions into proven

aspects of effective PE. There are however, some general limitations that warrant consideration and should be addressed in future research.

The previous articles from the PALDC study reported findings from a small number of schools using a direct observation instrument (SOFIT) and the number of lesson observations declined in the second year. This made it difficult to infer PA, lesson context, and teacher interaction data based on school-type. Secondly and whilst not strictly a limitation, it is worth noting that the collection of enjoyment of PE data in Dudley et al. (2013) was collected via an instrument using a five-point Likert scale. The scores from the Likert scale items were treated as a continuous measure (variable) of enjoyment. Whilst this practice is common among social scientists/educational researchers (Carifio & Perla, 2007; Glass, Peckham, & Sanders, 1972) and has been used in the past when measuring enjoyment of PE and PA (Cairney et al., 2007; Carroll & Loumidis, 2001; Dudley et al., 2010; Fairclough, 2003), there is a body of thought that Likert scales cannot elicit a continuous variable response for parametric analysis (Jamieson, 2004). In order to permit transparency of the findings and these synthesized recommendations pertaining to enjoyment of PE from the PALDC study, only parametric statistical analyses were performed. To mediate this perceived limitation, the calculation of effect sizes using Cohen's *d* (Cohen, 1992) and the presence of strong alpha results (many with *p* values <0.001) reported in the previous PALDC articles strengthened the claims for using a parametric analysis in the PALDC study.

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