2020

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This article was originally published as:
Plumb, M. S., Hands, B., McIntyre, F., & Timler, A. (2020). Self-report motor competence in adolescents aged 12-18 years in regional and rural Victoria (Australia). *Research Quarterly for Exercise and Sport,*.

Original article available here:
https://doi.org/10.1080/02701367.2020.1739606

Plumb, M.S., Hands, B., McIntyre, F., and Timler, A. (2020). Self-report motor competence in adolescents aged 12-18 years in regional and rural Victoria (Australia). *Research Quarterly for Exercise and Sport,* https://doi.org/10.1080/02701367.2020.1739606

Self-report Motor Competence in Adolescents Aged 12 – 18 years in Regional and Rural Victoria (Australia)

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Manuscript type: Original research

Abstract

Background: Poor motor skills are an increasing issue for adolescents in our local communities. In regional Victoria, almost 20% of children starting school in 2018 were considered at risk or developmentally vulnerable in the domain of physical health and wellbeing.

Purpose: The aim of the current study was to examine factors (how adolescents perceive their fine and gross motor skills, activities of daily living, comparison to peers) of motor competence that may be important to adolescents in regional Victoria, Australia, using the Adolescent Motor Competence Questionnaire (AMCQ).

Methods: A sample of 183 Australian adolescents ([138 females (M_{age} = 15.59 years, *SD* = 1.56); 45 males, (M_{age} = 15.82 years, *SD* = 1.95); 12 – 18 years old] completed the AMCQ.

Results: The mean AMCQ score was 87.86 (*SD* = 7.55), with no significant difference between males (*M* = 89.67 *SD* = 7.29) and females [*M* = 87.28 *SD* = 7.56; *t* (181 = 1.86 *p* = .065)]. A Principal Component Analysis (PCA), extracted five factors (Eiqenvalue of 1.389) explaining 43.46% of variance, representing, *Ball Skills and Kinesthesis; Activities of Daily Living; Fine Motor and Gross Motor; Proprioception and Exteroception; Public Performance.*

Conclusion: The results highlight key factors important in describing an adolescent's motor competence within regional Victoria. With physical health a priority in local communities, understanding these factors is an important first, that which may inform development of physical activity interventions for adolescents.

Key words: Self-report ; Motor competence ; Adolescents ; AMCQ

What this paper adds

This paper reports results collected in regional and rural western Victoria, Australia, using the Adolescent Motor Competence Questionnaire (AMCQ). The questionnaire was designed for adolescents aged between 12 and 18 years to self-report their level of motor competence. Recent statistics from the Australian Government report approximately 50% of children entering school are classed as developmental vulnerable in areas such as fundamental motor skills (FMS). It is known that motor competence and FMS impacts on participation in physical activities into adolescence, which may negatively affect their health in later years. So, understanding what factors are important for an adolescent's motor competence may be one way of supporting their engagement with physical activity, development of FMS and afford us the opportunity to develop interventions at community level.

Self-report Motor Competence in Adolescents Aged 12 – 18 years in Regional and Rural Victoria (Australia)

In Australia, great importance is placed on participating in physical activity (PA) and sporting achievements, especially among adolescents. Nearly 50% of children and adolescents have fundamental motor skills (FMS) below that expected for their age (Brian et al, 2017; Bardid, Rudd, Lenoir, Polma & Barnett, 2015; Foulkes et al, 2015; Gallahue, Ozmun, Goodway, 2012; Hardy, Barnett, Espinel & Okely, 2013; O'Brien, Belton, Issartel, 2016), which may influence their involvement in PA. Of concern are those who live in rural and remote communities as many do not receive the same opportunities to participate in physical activities and sport compared to those living in more urban areas (Barnett, Cliff, Morgan, & van Beurden, 2013). In 2018, almost 20% of children starting school who lived in rural and remote Victoria were considered at risk or developmentally vulnerable in the physical health domain, which focuses on physical readiness for school, physical independence, and developing fine and gross motor skills. (Australian Government, 2018). In the Ballarat region difficulties in the physical health domain increased from 8.0% in 2015 to 11.1% in 2018, which is higher than the Victorian state national average, of 7.9% in 2015, and raised to 8.2% in 2018. This lower than average developmental delay may continue into adolescence unless further research is undertaken on the underlying mechanisms as to why this may be occurring (Australian Government, 2018).

Measuring motor competence is a complex and time consuming process. Other methodologies such as self-report have been recognized to complement formal movement assessment batteries such as the McCarron Assessment of Neuromuscular

Development (Hardy et al, 2011; Robinson, 2011, Vandrope et al., 2012). These studies have demonstrated that children and adults self-reported motor skills are correlated, showing higher levels of perceived motor competence being positively linked to higher participation rates in PA. Therefore, understanding what motor competence represents during adolescence may be one way to encourage and engage them in PA and sports and consequent physical health.

Adolescent perceptions of a number of different domains such as academic ability, social support, athletic proficiency, physical appearance and close friendships have been identified and reported by a number of researchers (Harter, 2012; Rose, Larkin, Parker, & Hands, 2015). Rose and colleagues (2015) found that level of motor competence among 14 year old adolescents also influenced the number of domains and which domains they valued. For example, those with lower motor competence may place less focus on their athletic competence and focus on other areas such as academic achievements. Harter (2012) defines athletic competence as an adolescent's ability and preference to participate in sports and PA, such as recreation activities and outdoor games. To the authors' knowledge, only one study has previously identified factors that contribute to an adolescent's motor competence (Timler, McIntyre, & Hands, 2018a). These were identified as Participation in PA and Sports, Activities of Daily Living, Public Performance, and Peer Comparisons. Timler et al. (2018a) also found that males had higher self-reported motor competence compared to females, except in regards to activities of daily living.

Gender should also be considered (Cliff, Okely, Smith, & McKeen, 2009; Reed, Metzker, & Phillips, 2004; Ziviani, Poulsen, & Hansen, 2009), as participation in PA and level of motor competence often differs between males and females throughout their lifespan (Cairney, Hay, Faught, Mandigo & Flouris, 2005; Hands, Larkin, Parker, Straker, & Perry, 2009; Hands, Parker, Rose, & Larkin, 2015; Hill, Brown, & Sorgardt, 2011; Piek, Baynam, & Barrett, 2006). An adolescent's level

of motor competence is an important aspect to consider as participation in PA often declines for both genders by around 7% per year throughout adolescence (Dumith, Gigante, Domingues, & Kohl, 2011), with a greater reduction occuring among females (Okely, Booth, & Patterson, 2001). Although there is some evidence to suggest that females gain greater health benefits from participating in less intense and vigorous PA than males (Hands, Parker, Larkin, Cantell, & Rose, 2016) and prefer to participate in non-sports based activities such as yoga, walking or gym based exercises (Australian Institute for Health & Welfare, 2019). Males usually place greater importance on their motor competence and participate in more high-intensity physical activities and find ways to participate regardless of their level of motor competence (Hands et al., 2016). On the other hand, females place greater importance on social interactions, looking presentable and physically attractive and therefore often participate in less vigorous activity (Harter, 2012; Vannatta, Gartstein, Zeller, & Noll, 2009), as well as their level of self-esteem, self-confidence, and even social support (Harter, 2012; Phillips & Pittman, 2007; Vannatta et al., 2009).

A number of motor competence questionnaires are available, some use parent proxy-reports (van der Linde et al., 2013; Wilson et al., 2009), others use self-report for adolescents (Timler et al., 2018a) and adults (Clark, Thomas, Khattab & Car, 2013; Kirby, Edwards, Sugden, & Rosenblum, 2010; Tal-Saban, Ornoy, & Parush, 2014). In older populations, self-report is a reliable and realistic way to capture an individual's perceptions of their motor competence (Timler, McIntyre, & Hands, 2018b), is closely linked to their actual motor competence and determining level of PA participation (Barnett, Morgan, van Beurden, & Beard, 2008a). The aim of the current study is to identify what factors are important for an adolescents level of motor competence in regional and rural Victoria, Australia, using the Adolescent Motor Competence Questionnaire (AMCQ; Timler et al, 2016) and determine if these differ from adolescents in a main city of Western Australia. A

secondary aim of this study was to examine if gender differences existed in response to individual items.

Method

Participants

A sample of 183 adolescents (138 females, M_{age} = 15.59 years, *SD* = 1.56; 45 males, M_{age} = 15.82 years, *SD* = 1.95) completed the Adolescent Motor Competence Questionnaire (AMCQ). Data were collected from participants from seven Government schools in regional and rural Western Victoria via a Victoria Certificate of Education (VCE) program run at Federation University (n = 142). Additional individuals were recruited via the University (newsletter; n = 14), ballet (n = 6), trampolining (n = 7), WestVic Academy (n = 11) and commencing University students (n = 3).

The inclusion criteria specified adolescents to be aged between 12 and 18 years; have English as their first language, good linguistic and cognitive ability sufficient to comprehend questions and no other diagnosed disability such as cerebral palsy, learning difficulties or muscular dystrophy. This project was approved by the Human Research Ethics Committee of Federation University Australia, Ballarat, Victoria. Further ethics was obtained from the Department of Education, Victoria and the Catholic Diocese in Ballarat to approach and access schools within the Western Victoria region.

Measures

The Adolescent Motor Competence Questionnaire (AMCQ; Timler et al., 2016) is a self-report motor competence questionnaire developed for adolescents between the ages of 12 and 18 years of age. It consists of 26 items examining the ecological presence of motor tasks and functional activities of daily living and was informed by the DSM-V criteria for Developmental Coordination Disorder (DCD;

American Psychiatric Association [APA], 2013). Participants respond on a 4-point Likert scale of Never (1), Sometimes (2), Frequently (3), and Always (4). The maximum AMCQ score is 104, with a higher score indicating a higher level of motor competence. A score of 83 and below indicates suspected motor difficulties. To account for response bias, fifteen items are negatively worded. These are reverse scored for the analyses to Never (4), Sometimes (3), Frequently (2) and Always (1). The questionnaire was originally designed in consultation with adolescents diagnosed with DCD to ensure the items discriminated between high and low motor competence. The questionnaire has evidence of concurrent validity against the McCarron Assessment of Neuromuscular Development (MAND; McCarron, 1997), test re-test reliability (intra-class correlation coefficients = 0.956), internal consistency ($\alpha = 0.902$; Timler et al., 2016) and can be completed in less than 10 minutes.

Procedures

Data collection took place over an 18-month period. The questionnaire and written consent forms were distributed to all individuals who agreed to take part in the study, as outlined under the participants section.

Data Analysis

SPSS version 25 (SPSS Inc., Chicago, IL, USA) was used to analyse the data. Descriptive statistics were derived for the total sample, males and females. The data were tested for normality, and the skewness (+/-1) and kurtosis (+/-1) values indicated that parametric tests could be used for analyses (Pallant, 2013). Firstly, a Principal Component Analysis (PCA) of the participant's responses was conducted using varimax rotation to examine how many factors would emerge from the 26 items. This method was chosen as PCA is a form of factor analysis that is commonly used during scale development and evaluation (Pallant, 2013). The

factors were named according to the best representation of similar items. As 15 items were negatively worded, scores were reversed and reworded into positive language. The authors grouped the responses into negative (sometimes and never) or positive (frequently and always). These terms were chosen to represent responses where activities or experiences were easy or positive compared to difficult or negative (e.g. coming last in a running race). Individual item responses were compared between males and females within each factor. Treating the responses at this nominal level made it easier to interpret individual item responses. With the AMCQ Total score as the dependent variable, a General Linear Model (GLM) analysis was completed separately for each of the 26 items controlling for response category (positive or negative) and gender. Finally, a chi square analysis compared the percentage of positive and negative responses by males and females for each item. Given the same dataset was used for multiple statistical analyses, to reduce the chance of Type 1 error statistical significance was set at p<.001.

Results

The mean score for the AMCQ was 87.86 (*SD* = 7.55). There were no significant differences in the mean AMCQ score between males (*M* = 89.67 *SD* = 7.29), compared to females (*M* = 87.28 *SD* = 7.56; *t* (181 = 1.86 *p* = .065). A greater proportion of adolescents were identified as High Motor Competence (HMC; n = 141, *M* = 91.04, *SD* = 4.69), compared to Low Motor Competence [(LMC; n = 42, *M* = 72.21, *SD* = 5.18; *t* (181) = 16.35, *p* < 0.001)].

Factors contributing to self-reported motor competence

Five factors with an Eiqenvalue of 1.389 or above explained 43.46% of variance and were supported by the scree plot. The Kaiser-Meyer-Olkin value was 0.710 (*p* <.001) which indicated the sample was suitable for analysis (Pallant, 2013) as it exceeded the recommended value of 0.6. The five factors were named (Table

1), *Ball Skills and Kinesthesis; Activities of Daily Living; Fine Motor and Gross Motor; Proprioception and Exteroception; Public Performance.*

Factor 1, *Ball Skills and Kinesthesis,* consisted of seven items about ball skills, balance, learning new games, and being able to identify right and left sides. Factor 2, *Activities of Daily Living,* consisted of seven items related to flossing teeth, getting ready to go out, completing tasks, using a knife and fork, handling objects, changing clothes, and walking in a straight line and upstairs. Factor 3, *Fine Motor and Gross Motor,* consisted of six components including items about being clumsy, less coordinated than friends, and easy to read and fast handwriting. Factor 4, *Proprioception and Exteroception* consisted of four components that all require complex coordination, spatial awareness, planning, dexterity, and balance components. Factor 5, *Public Performance,* consisted of two components looking at whether they participated in general sports games and participation in school sports (see Table 1).

To investigate the construct validity of the AMCQ a second order analysis was undertaken using the five first order factors. This yielded a one factor solution with an Eigenvalue of 2.13 explaining 42.68% of the variance with factor loadings ranging between 0.492 and 0.733 and supported by the scree plot. The Kaiser-Meyer-Olkin value was 0.717 (p <.001).

Factor loadings for all items ranged between 0.244 and 0.729. Some items such as catch a ball consistently, use a knife and fork, compete tasks and do not break objects loaded to a similar extent onto several factors. However, for the purpose of this paper, the factor with the highest loading was used.

Insert Table 1 about here

With the Total AMCQ score as the dependent variable, a GLM analysis was completed separately for each of the 26 items controlling for response category

(positive or negative) and gender. Not surprisingly, there were significant differences (p<.001) in the participants' mean AMCQ scores between response categories (positive or negative) for 18 of the 26 items (except, Ride a bicycle (6), Easy to get ready to go out (7), Use a knife and fork (14), Do not stumble upstairs (21), Change clothes easily (22), Do not break objects (23), Balance on one foot (24), and Learn new outdoor games (26; see Table 2). For all twenty-six questions, those who responded negatively to items had lower Total AMCQ scores than those who responded positively. Significant gender difference (p<.001) in mean AMCQ was found for one item (see Table 3), which was easy to read handwriting in favour of the females. No interactions between response category (positive or negative) and gender emerged.

Insert Table 2 and 3 about here

A chi square analysis comparing the percentage of negative and positive responses for males and females for each item revealed that males responded more positively towards items compared to females. There were significant differences for two items (see Table 4). A higher percentage of the females (57%) compared to males (27%) responded negatively to kicking a ball at a target. More males responded negatively (33%) compared to females (11%) for easy to read handwriting.

Insert Table 4 about here

Discussion

The PCA of the AMCQ items identified five factors that contributed to adolescent's self-reported motor competence who were living in rural and remote Victoria. These were related to Ball Skills and Kinesthesis, Activities of Daily Living, Fine Motor and Gross Motor, Proprioception and Exteroception and Public Performance. Interestingly there was no significant difference in the mean AMCQ

297 scores between gender and both males (all 26 items) and females (24/26 items)
298 responded positively to most items. Ball skills (59 positive vs 79 negative) and
299 'thinking one is clumsy' (66 positive vs 72 negative) were the only items where
300 females reported more negative scores.

301 The five factors from the AMCQ were named according to the best
302 representation of items which were based on supporting evidence of factors
303 developed for other questionnaires such as Fine Motor/Handwriting, Gross
304 Motor/Planning and General Coordination (Wilson et al., 2009), Fine and Gross
305 Motor Function and Writing, Activities of Daily Living, and Organization Skills
306 (Tal-Saban, Ornoy, Grotto, & Parush, 2012) and Participation in PA and Sport,
307 Activities of Daily Living, Public Performance and Peer comparison (Timler et al.,
308 2018a). The five factors identified in this paper were similar to some of the factors
309 identified in the AMCQ completed by adolescents living in Western Australian. For
310 example "Ball skills", "Activities of Daily Living" and "Public Performance" were
311 similar factors that emerged from both studies. However, some differences were
312 seen as additional factors of "Fine and Gross Motor Skills" and "Proprioception and
313 Exteroception" were identified in this study. These differences may have occurred
314 due to the geographic location, availability of resources and money, as reported by
315 Barnett et al. (2013). The items cover a wide range of motor proficiency skills such
316 as sports participation, handwriting, and getting dressed, which may explain why
317 some items loaded onto more than one factor and why differences within Australia
318 were seen.

319 A number of items on the AMCQ loaded onto multiple factors. For
320 example, 'use of fork and knife,' Do not break objects', and 'Walk along a straight
321 line' loaded onto "Activities of Daily Living" factor, but also loaded onto the factor
322 "Fine Motor and Gross Motor", this may have occurred as completing these tasks
323 efficiently require a degree of fine motor coordination. These items may have loaded

onto more than one factor as the adolescents were living in a country setting and perceived environmental factors such as availability to equipment may limit the amount of time they spend completing these types of tasks (Barnett, Hinkley, Okely, & Salmon, 2013). Interestingly 'Co-ordinated like friends' loaded greatest onto the "Fine Motor and Gross Motor" factor but also loaded on "Ball skills and Kinesthesis" and "Public Performance" as this relates to an individual's perception of their movement ability and bumping into objects can be displaced in a public domain. Peer support during adolescence is often influenced by an adolescent's willingness to participate in physical activities and sports, with judgements made around their physical capacity to preform (Haga, Gísladóttír, & Sigmundsson, 2015). Similarly, Barnett et al. (2013) found adolescents felt being a 'skilled performer' was related to being more active and engaging in PA.

The item 'Completing tasks' loaded onto "Activities of Daily Living" and "Public Performance." Asking friends or family for help when completing tasks may publically expose an individual's physical awkwardness. 'Catch a ball consistency' loaded onto "Ball Skills and Kinesthesis" and also "Public Performance", as ball skills are also viewed visibly among peers when participating in PA and sports (Hands et al., 2015). The term balance also relates to the positioning of one's body and limbs, this item loaded onto "Ball Skills and Kinesthesis" as well as "Proprioception and Exteroception". During adolescents, many participate in a range of sports throughout the year (summer versus winter sports) which require a lot of focus given towards positioning and complex movement on the sports field (Toohey & Taylor, 2009). Barnett et al. (2013) interviewed 33 adolescents aged 16- to 18-years about their attitudes towards their childhood skill proficiency and their current movement skills and PA and sport participation. They found that earlier development of a child's actual and perceived movement skills lead to an increase in an adolescent's PA participation, with many of these adolescents reporting that

skill could be acquired at any time given the right circumstance (Barnett et al., 2013). Adolescent's motivation for participation in sport and PA include being in a team environment, participating for fitness and health, for mental health reasons (Barnett et al., 2013), and to improve physical appearance (Barnett, Van Beurden, Morgan, Brooks, & Beard, 2008b). Consequently, lower participation in PA often leads to poor peer support (Hill et al., 2011), lower self-efficacy towards physical play (Cairney et al., 2005; Wilson et al., 2013), and less motivation for sports participation (Bardid et al., 2016). This may also results in adolescents spending more time in sedentary leisure activities (Rivilis et al., 2012), and placing lower perceptions towards their actual and perceived motor competence (Barnett et al., 2008a; Stodden et al., 2008a).

Easy to read handwriting loaded on the "Fine Motor" factor, but also onto the "Proprioception and Exteroception", the reason for this may be due to the fact that writing requires good visual awareness and appropriate strength and tension to grasp a handwriting utensil. Bo and colleges (2014) found children with lower motor scores had prominent difficulties on the temporal aspect of handwriting and lower legibility scores, particularly with letters such as cursive ''e'' and printed ''I''. Therefore the ease of reading one's handwriting during adolescence is important towards their level of motor competence, which may result from the adolescents being of school age. Adolescents with lower motor competence often experience school difficulties in their handwriting and completing tasks on time (Harrowell, Hollén, Lingam, & Emond, 2018). This item may also be important among those living in rural settings as the amount of students in each classroom year group is smaller resulting in greater comparisons in their writing skills.

Males responded more positively towards the majority of the items compared to females, although no significant differences between individual items were seen. Females only responded negatively towards the items 'Kicking a ball'

and 'Do not think I am clumsy'. This may have occurred as females often participate in more physical activities that require flexibility and agility such as dancing or gymnastics compared to activities that require balls skills (Hands, Parker, Rose, & Larkin, 2015; Okely, Booth, & Patterson, 2001) and gain greater health benefits from participating in less vigorous activities compared to males (Hands, Parker, Larkin, Cantell, & Rose, 2016). The Australian Bureau of Statistics (2013) reported females by the age of 12 years, averaged 21 minutes less moderate to vigorous PA compared to males, with a further 17 minute reduction among female adolescents aged 15–to 17-years. Gilchrist and colleagues (2018) found adolescent males and females were motivated and engaged in more PA if they understood the health behaviors and benefits to being active rather than focusing on body dissatisfaction, which may explain why positive responses were seen regardless of gender. Female adolescents are motivated to participate in physical activities if an appropriate social and supportive environment was provided (Barnett et al., 2013). This may be true for the females who participated in this study as in rural communities, more participation may be provided in co-ed sporting teams.

Parents may encourage greater participation in more vigorous activities and be more aware of their son's ability to master ball skills compared to their daughters (Timler et al., 2018b). Female adolescents also work hard to preserve their image and rely on peer appearance-related feedback through their higher use of social media compared their male counterparts (de Vries, Peter, de Graaf, & Nikken, 2016; Harter, 2012; Vannatta et al., 2009). This self-preservation may explain why female's responded more negatively towards the item 'Do not think I am clumsy' because they do not want others to view them in that way (Harter, 2012). This may also be driven by a female adolescents level of social support, as those with lower motor competence who experience good social communication often report healthier mental states (Harrowell, Hollén, Lingam, & Emond, 2017), positive psychosocial

well-being, and lower levels of conduct problems, hyperactivity and emotional problems (Viholainen Aro, Purtsi, Tolvanen, & Cantell, 2014).

The lack of discrepancy between individual items among male and female responses was a surprising finding, as Timler et al. (2018a) previously found males response more positive towards ball related items compared to females. Gender differences between the AMCQ items may not have occurred in this study for a number of reasons. For example, females may still find ways to get involved, participate, or receive health benefits from less vigorous PA compared to males (Hands et al., 2016). This may be reflective of more female sports being aired on primetime television (Angelini, 2008; Toohey & Taylor, 2009) and weekend and after school sports being a primary form of socialization, including forming stronger social relationships, and developing self-confidence (Ullrich-French & Smith, 2009). Although, one longitudinal study found that motor competence proficiency of kicking, throwing and catching improved from childhood through to adolescence to a greater extent among males compared to females (Barnett, van Beurden, Morgan, Brooks, & Beard, 2010). The females in this study may not experience gender stereotyping among the activities they are participating in (Riemer & Visio, 2003), focus on the greater proficiency exhibited among males, or place greater attention on other areas such as their scholastic ability and physical appearance (Piek et al., 2006).

The items on the AMCQ may represent motor competence during adolescence, resulting in no gender bias among the items (Hands & Larkin, 1997), and an opportunity for females to report their motor competence. The geographic location (rural and remote) may also explain the female's positive responses towards the items as the adolescents may participate in more co-ed or cross-gendered (males participating in female sports and vice versa) sports (Schmalz & Davison, 2006). Schmalz and Davison (2006) found adolescents who participated in cross-gender

sports had higher physical self-concept compared to those who participated only in only single gender-typed sports.

The AMCQ is the first questionnaire available for 12- to 18- year olds to self-report their level of motor competence. Therefore, this questionnaire could be utilized as a tool for early detection of motor difficulties as there is no cost associated with administering, and does not require the help of a professional. The AMCQ could also be used as a screening tool for professionals working with those with motor difficulties, to inform their inclusion into PA interventions. Cultural adaptations of the questionnaire items could be completed for the use of the AMCQ in other countries. The results from this study illustrates that the 26-items represent different factors towards motor competence during adolescents compared to those that were reported by Timler et al. (2018a), which seem to be due to geographical location.

Strengths and limitations

Recruiting participants to complete the AMCQ was a limitation of this study, as it was difficult to access an adolescent population. Unfortunately, less males than females participated in this study due to the limited access to this group. The lower number of male participants may explain why only small gender differences were seen. Replicating this study with more males will allow for greater generalizability of the results and a chance to control for gender bias. Although, participants were drawn from a range of sources, the generalization of the results to the broader Australian population may not be possible due to recruitment strategies. At first glance we thought there maybe differences in the AMCQ scores between areas individuals were recruited but on further analysis, there were no significant differences in the Total AMCQ scores found between those recruited through the VCE program (M= 87.47, SD = 7.51) compared to those recruited elsewhere (M=

89.22, SD = 7.62; t (181 = -1.31, p = .192). On reflection, for future studies we need to ensure the recruitment process has a greater representation of individuals at the lower end of motor competence levels. This may be achieved by recruiting through a range of clubs, through online media platforms compared to traditional sporting avenues. The use of a self-report survey compared to an objective measure of motor competence may also be considered a limitation in this study. The adolescents may have provided socially desirable responses, or have limited knowledge on their personal motor ability. To try to account for this, the participants completed the questionnaire on their own, and with no influence by the researchers. Some items loaded onto multiple factors, which may be a limitation as individual items may represent multiple components of motor competence.

A strength of this study is that it is the first study to examine what factors are important towards an adolescent's motor competence among those living within rural and remote Victoria. This study has come out of community consultation with the Ballarat local council who has identified 'Physical health', which includes areas such as participating in PA and sport and motor skill proficiency. Physical health is one of five developmental factors important during childhood and adolescence. Therefore, understanding what factors are important for an adolescent's motor competence is an important first, that can be used to inform the development of PA interventions for adolescents.

Conclusions

In summary, five factors contributed to adolescents' self-reporting of their motor competence were identified, which were, Ball Skills and Kinesthesis, Activities of Daily Living, Fine Motor and Coordination, Proprioception and Exteroception and Public Performance. Although males had higher mean AMCQ scores compared to females, only small gender differences were observed between individual item response, indicating that male and female adolescents view their

motor competence similarly. However, understanding of why no gender difference occurred is not understood but may be due to females participating in more cross-gender sports and higher reported motor competence, which is reflective of the location and setting in which adolescents live and grow up. Further research should include adolescents living in a wide range of locations to understand if different factors towards motor competence exist across Australia.

Acknowledgements

The authors would like to acknowledge the Government schools, Federation University including the VCE program and community organizations (ballet, trampolining, and WestVic Academy) for their assistance in promoting and providing participants for the current study.

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