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RELATIONSHIP BETWEEN ACTUAL MOTOR COMPETENCE AND SELF-PERCEPTION IN ADULTS

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ABSTRACT

Introduction: Scientific evidence indicates that perceived competence is associated with motor performance in children and adolescents; however, little is known about this phenomenon in the adult population. The aim of the present study was to examine the relationship between self-perception and performance of fundamental motor skills (FMS) in adults. Materials and Methods: A total of 119 adults (M = 19.8 ± 4.5 years) volunteered to participate in the study. The Self-Perception Profile for Adults (Messer & Harter, 2012) and the Test for Fundamental Motor Skills in Adults (Jiménez-Díaz et al., 2013) were used to evaluate self-perception and motor performance, respectively. Multivariate analysis of variance and canonical correlations were used to analyzed the data. Results and Discussion: The results showed that participants with efficient performance in locomotor skills had greater perceived competence in athletic abilities. In addition, men were found to have a more positive self-perception of their physical appearance than women. Also, it was found that perceived competence in athletic abilities is more related to FMS than it is to the dimensions of physical appearance and global self-worth. In conclusion, the level of performance of FMS is associated with perceived competence in athletic abilities in adults.

Key words: perceived competence, fundamental motor skills, education, pedagogy

RELACIÓN ENTRE COMPETENCIA MOTORA Y AUTOPERCEPCIÓN EN ADULTOS

RESUMEN

Introducción: La evidencia científica indica que la competencia percibida está asociada al desempeño motor en la población infantil y adolescente, sin embargo, se conoce poco sobre este fenómeno en la población adulta. El objetivo del presente estudio fue examinar la relación entre la autopercepción y el desempeño de los patrones básicos de movimiento (PBM) en personas adultas. Materiales y Métodos: Un total de 119 adultos (M = 19.8 ± 4.5 años) participaron de forma voluntaria en el estudio. Se utilizó la prueba del "Perfil de autopercepción para adultos" (Messer & Harter, 2012) y el "Instrumento para evaluar los patrones básicos de movimiento" en adultos (Jiménez-Díaz et al., 2013), para evaluar autopercepción y desempeño motor respectivamente. Los datos se analizaron por medio de análisis multivariado de varianza y correlación canónica. Resultados y Discusión: Se encontró que los participantes con desempeño eficiente en patrones de locomoción, presentaban mayor competencia percibida en habilidades deportivas. Además, se encontró que los hombres presentaban mayor autopercepción en su apariencia física que las mujeres. También, se encontró que la competencia percibida en las habilidades deportivas presenta mayor relación con los PBM, en comparación a las dimensiones de apariencia física y autopercepción global. En conclusión, el nivel de desempeño de los patrones básicos de movimiento está asociado a la competencia percibida de las habilidades deportivas en adultos.

Palabras clave: competencia percibida, patrones básicos de movimiento, educación, pedagogía

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INTRODUCTION

A physically active lifestyle provides physical and mental benefits (American College of Sports Medicine [ACSM], 2018; Correa-Burrows, Burrows, Ibaceta, Orellana, & Ivanovic, 2017; Guertin, Pelletier, Émond, & Galnde, 2017; Hargreaves, Lucock, & Rodriguez, 2017). However, there is a high percentage of people in the world who are not physically active (British Heart Foundation, 2017; González, Fuentes & Márquez, 2017; WHO, 2017). The causes of sedentary lifestyles are not fully understood, but in the last decade the impact of motor performance and perceived competence on the levels of physical activity in childhood and adolescence has been studied (Robinson et al., 2015; Stodden et al., 2008).

Motor performance is a term used to define the characteristics or the quality of the movement of each person's motor skills (Stodden et al., 2008). Motor performance in childhood has been assessed mainly using fundamental motor skills. These skills include locomotor –e.g., running, jumping, and hopping– and object control –e.g.: throwing and catching– (Jiménez-Díaz, Salazar, & Morera-Castro, 2013; Robinson et al., 2015); and are essential to participate in sports and recreational physical activities (Gallahue & Ozmun, 2005).

On the other hand, self-perception is understood as the interpretation that each person has of oneself based on a specific characteristic (Gabbard, 2012; Robinson et al., 2015). The characteristics can include self-perception of physical appearance or physical abilities, or perceived competence in sports (Gabbard, 2012; Messer & Harter, 2012). Self-perception is commonly assessed with multidimensional self-report scales (Messer & Harter, 2012).

Stodden et al. (2008) hypothesized that motor competence and perceived motor competence are primary mechanisms that directly influence the level of physical activity in children and are indirectly related to the risk of obesity. Robinson et al. (2015) reviewed scientific evidence to determine the strength of association between variables of the model proposed by Stodden et al. (2008), and concluded that there is consistent evidence of positive relationships between: the level of physical activity and motor competence; the level of physical activity and perceived motor competence; and the level of motor competence and health-related physical fitness. In addition, Robinson et al. found an inverse and significant relationship between motor competence and body weight in children and adolescents. However, there was not sufficient evidence to provide a consistent conclusion about the relationship between motor competence and perceived motor competence in childhood or adolescence (Robinson et al., 2015).

In addition, systematic literature reviews agree that there is a positive relationship between motor competence and the level of physical activity in

childhood and adolescence (Holfelder & Schott, 2014), and that motor competence is positively related to cardiorespiratory and musculoskeletal fitness, and inversely related to body weight (Cattuzzo et al., 2016).

Previous studies have contributed with different results regarding the relationship between motor competence and self-perception in children. In a group of children between 4 and 5 years of age, no significant relationship was found between these two variables, while in 6- and 7- year-olds there was a significant relationship between motor competence and perceived motor competence (Spessato, Gabbard, Robinson, & Valentini, 2012). Other researchers concluded that performance in object control skills was associated with perceived motor competence in a sample of 4- and 8- year-old (Barnett, Ridgers, & Salmon, 2014). Also, a positive and significant relationship between motor performance and perceived competence was found in a group of 11-year-olds (Vedul-Kjelsås, Sigmundsson, Stensdotter, & Haga, 2011).

In general, it is accepted that children with a high level of motor competence (efficient performance) also show a high level of perceived motor competence (De Meester et al., 2016). However, there is little evidence of this relationship in adults (Robinson et al., 2015). Nonetheless, it was found that motor performance of a basketball skill was related to perceived competence in young-adults (Wang, Liu, & Bian, 2013).

In addition, there is no conclusive information about differences in levels of self-perception and perceived motor competence according to sex (Barnett et al., 2014). Robinson (2010) found that perceived physical competence is lower in girls compared to boys. Barnett et al. (2014) also found that girls have lower levels of perceived competence in object control skills than boys. On the other hand, LeGear et al. (2012) found that girls have a higher level of perceived physical competence than boys.

To establish the relationship with actual motor competence, self-perception has been assessed in domains such as, perceived motor competence (Wang et al., 2013; Barnett et al., 2014), self-concept (Carraro, Scarpa, & Ventura, 2010), self-worth, and self-perception itself (Piek, Baynam, & Barrett, 2006). But, there is little evidence of the relationship between self-perception (assessed by the domains of physical appearance, athletics abilities, and self-worth) and motor competence in adults. Therefore, the aim of the present study was to examine the relationship between actual motor competence and physical appearance, athletics abilities, and self-worth of fundamental motor skills in adults, as well as exploring gender differences.

METHOD

Participants

A total of 119 student volunteers from a Costa Rican university (55 women and 64 men), between 18 and 28 years of age (M = 19.8 ± 4.5) participated in this study. The participants were healthy students enrolled in a physical activity class offered by the university as a graduation requirement. None of the participants have motor problems or majored in Kinesiology, Physical Education or Human Movement Sciences. Written informed consent was obtained from the participants. The study received institutional approval and followed Helsinki statement.

Instruments

Motor performance was measured using the *Test for Fundamental Motor Skills in Adults* (TFMSA), an instrument that has been shown to have acceptable logical validity, intraclass reliability (R = .92) and interrater reliability (R = .86) (Jiménez-Díaz et al. 2013). TFMSA is a process-oriented test that assesses performance of 10 fundamental motor skills (FMS): five locomotor skills (running, hopping, galloping, jumping, and sliding) and five of object control (striking, bouncing, catching, throwing, and kicking). The TFMSA protocol establishes that each movement is evaluated in two attempts, using six observable characteristics (or criteria), which together determine an efficient performance. It is scored as "1" if the criterion is present, and "0" if it is not present. The score obtained for each movement ranges from 0 to 12 points. The score for the locomotor subscale (LM) and object control (OC) is calculated as the average for the five respective skills, while the score for total performance is the average for the 10 movements. A score greater than or equal to 9 implies that the performance is efficient.

The self-reporting instrument *Self-Perception Profile for Adults* developed by Messer and Harter (2012) was used to evaluate self-perception. This instrument focuses in 11 specific domains (sociability, job competence, nurturance, athletic abilities, physical appearance, adequate provider, morality, household management, intimate relationships, intelligence and sense of humor), and a domain of global self-worth, for a total of 12 domains. The domains of athletic abilities, physical appearance and global self-worth were used in the present study. The instrument has a score from 1 to 4 points, for each item. Assessments were carried following its protocol (Messer & Harter, 2012).

Procedure

Data collection was carried out in two sessions of 60 minutes each. In the first session, informed consent forms were signed, and personal information

was collected from each participant using a questionnaire designed for that purpose. Subsequently, the self-perception questionnaire was answered in the domains of athletic abilities, physical appearance and global self-worth.

Motor performance measurement was carried out in the second session. Participants were individually videotaped performing two consecutive trials of each skill. Performance was assessed through the video in slow motion, following the instrument´s protocol (Jiménez-Díaz et al., 2013).

Statistical analyses

Means and standard deviations were calculated to describe the sample. The multivariate analysis of variance (MANOVA) technique was first used to determine if the levels of self-perception in the domains of athletic abilities, physical appearance and global self-worth varied according to the level of total motor performance and its sub-scales (locomotor and object control), and sex; if a significant result was found, differences by components were analyzed using the Bonferroni correction. For a better understanding of the relationship between variables, the association between motor performance and the self-perception domains were analyzed using canonical correlation analysis. A level of p <.05 was established as indicating statistical significance. The IBM-SPSS® version 23 program (IBM Corporation, New York, USA) was used in the analysis.

RESULTS

Actual motor competence

Table 1 shows the means and standard deviation of actual motor competence scores by motor skill, and sex. In general, the sample shows efficient performance (scores greater than or equal to 9.0) in the skills of running, galloping and catching. This is not true for in the remaining patterns, where throwing has the lowest motor performance score. When analyzing motor performance by sex, it was found that men showed efficient performance in the skills of running, jumping and kicking, while women showed efficient performance only in catching.

TABLE 1
Characteristics of participant motor skills by sex.

Motor skills	Male (*n* = 64)		Female (*n* = 55)		Total (*n* = 119)	
	M	±*SD*	*M*	±SD	*M*	±*SD*
Run	9.8	±1.5	8.1	±1.1	9.1	±1.6
Gallop	9.0	±1.7	9.0	±0.9	9.0	±1.4
Hop	9.1	±1.9	7.8	±1.7	8.5	±1.9
Jump	8.2	±2.4	6.4	±2.6	7.4	±2.6
Slide	8.9	±1.6	8.9	±1.5	8.9	±1.5
Total LM	9.0	±1.1	8.0	±0.9	8.6	±1.1
Bounce	8.6	±2.0	7.6	±1.5	8.2	±1.9
Throw	6.5	±2.7	3.0	±3.0	5.0	±3.3
Catch	8.2	±1.1	10.0	±1.3	9.2	±1.6
Kick	9.9	±2.6	7.1	±2.1	8.7	±2.8
Strike	8.0	±2.8	6.6	±2.2	7.4	±2.6
Total OC	8.3	±1.5	7.0	±1.2	7.7	±1.5
Overall FMS	8.6	±1.1	7.6	±0.8	8.2	±1.1

Note: M = mean, SD = standard deviation, LM= locomotor, OC= object control. Scale of 1-12 points.

Self-perception

Table 2 shows descriptive statistics for the three domains assessed: athletic abilities, physical appearance and overall self-worth. In general, overall self-worth was the domain that showed the highest score, while the domain with the lowest score was perceived competence in athletic abilities. The same results were found when results were analyzed by sex.

TABLE 2
Descriptive characteristics for the domains of perceived competence by sex.

Domain	Male (*n* = 64)		Female (*n* = 55)		Total (*n* = 119)	
	M	±*DE*	*M*	±*DE*	*M*	±*DE*
Athletic Abilities	2.4	±0.7	2.2	±0.6	2.3	±0.7
Physical Appearance	2.8	±0.7	2.3	±0.6	2.5	±0.7
Overall Self-worth	2.9	±0.8	2.8	±0.6	2.9	±0.7

Note: M = mean, SD = standard deviation. Scale of 1-4 points.

Relationship between motor performance and self-perception

To determine if the level of motor performance and sex-related factors affect self-perception, participants were first classified into two groups according to their level of motor performance: efficient performance (score ≥ 9) or inefficient (score <9), following the FMS protocol. A multivariate analysis of variance was then carried out in three phases (see Figure 1). First, an analysis was carried out of the multivariate effect of sex-related factors and total motor performance, as well as their interaction, on the average score vector of self-

perception domains (athletic abilities, physical appearances, global self-worth) (phase 1). Multivariate effects of sex and locomotor performance, and their interaction, on the same self-perception domains (phase 2) were then analyzed, and, finally, the multivariate effects of sex and object control performance and their interaction on those domains were analyzed (phase 3).

In the first phase, a statistically significant result was found for the linear combination of self-perception domains by sex; specifically, men were found to have a more positive self-perception of physical appearance than women. No statistically significant results were found for the motor performance factor, or for the interaction between motor performance and sex.

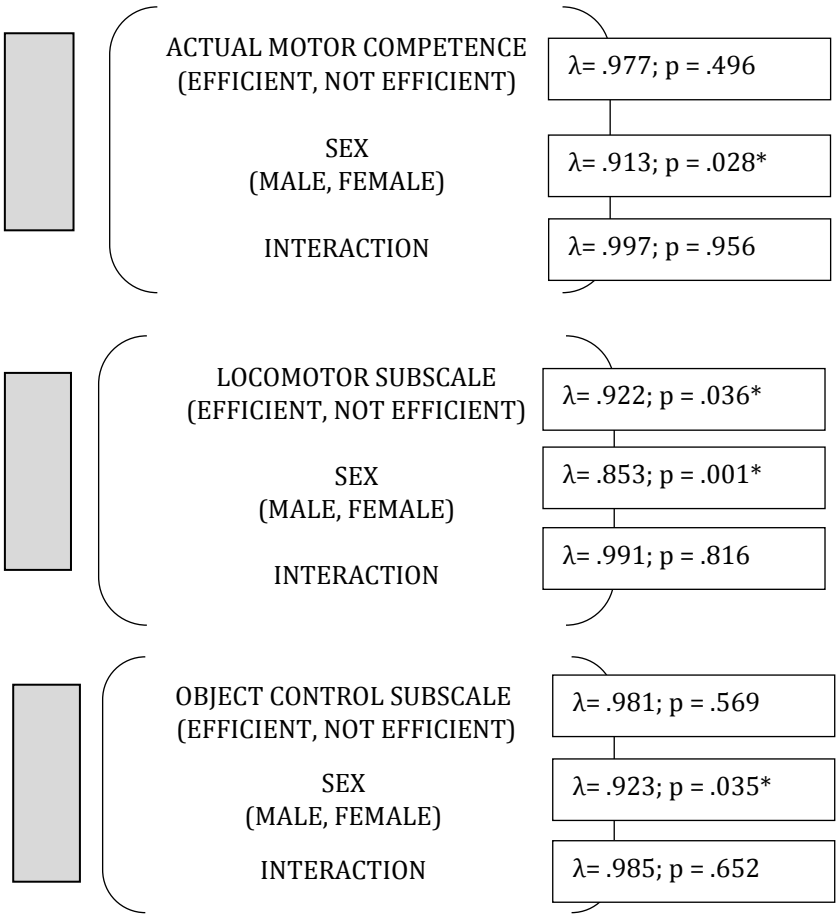

FIGURE 1: *Summary of the procedures and results of the three multivariate analyses applied. Each MANOVA had the three dimensions of self-perception indicated (athletic abilities, physical appearances, overall self-worth) as dependent variables. * p <.05*

In phase 2, a statistically significant result was found in the linear combination of self-perception domains by sex and performance in the locomotor subscale. In detail, the post-hoc analysis indicated that people with greater perceived competence in athletic abilities have efficient performance in locomotor skills. The difference in the sex factor indicates that men had a more positive self-perception of physical appearance than women. No statistically significant results were found in the performance-sex interaction.

In phase 3, a statistically significant result was found in the linear combination of the self-perception domains according to sex; specifically, men were found to have a more positive self-perception of physical appearance than women. No statistically significant results were found for the factor of object control skills, or in their interaction.

In addition, the relationship between self-perception domains and motor performance skills was investigated using canonical correlation analysis. The analysis was completed in three phases. In phase 1, the three domains of self-perception were correlated with the ten FMSs. In the second phase, the same three self-perception domains were correlated with the five locomotor skills and in the third phase, the self-perception domains were correlated with the five object control skills (see Figure 2).

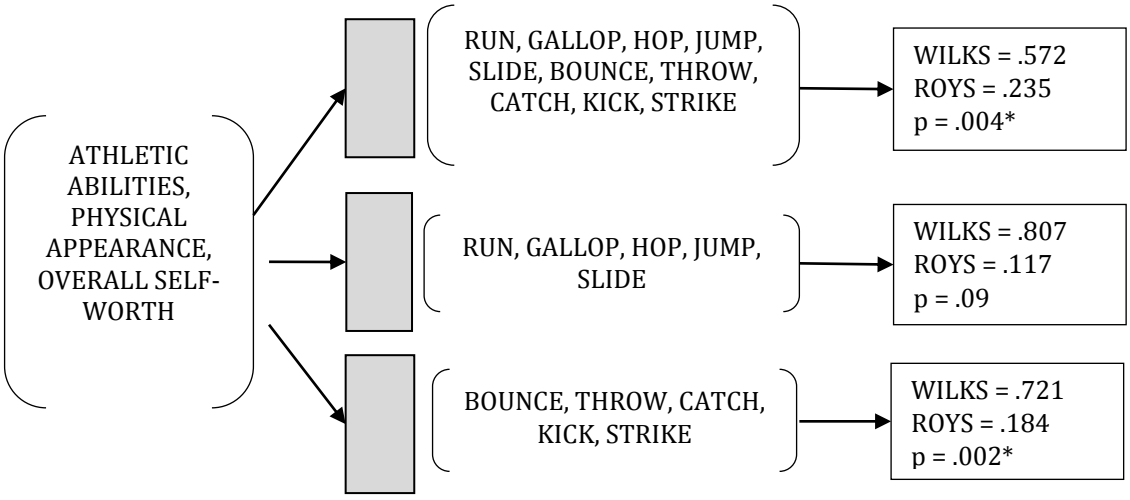

FIGURE 2: *Summary of the procedures and results of the three canonical correlation analyses. * p <.05.*

In phase 1, a statistically significant relationship was found. This relationship suggests that the 10 FMSs explain 42.8% the variance in the three domains of self-perception. The canonical coefficients indicate a high and positive relationship between perceived competence in athletic abilities and

FMS (r = .990), while the relationship between physical appearance and overall self-perception with FMS is low and positive (r = .315; r = .209, respectively). Specifically, bounce, jump, slide, kick and hop have low and positive relationships with the three domains of self-perception (r = .336, r = .244, r = .135, r = .055, r =. 032, respectively); while throw, catch, strike, run and gallop have low and negative correlations (r = -.061, r = -.067, r = -.099, r = -166, r = -.092, respectively).

In phase 2, no statistically significant relationship was found between the three domains of self-perception and the five locomotor skills.

Finally, in phase 3, results suggest that the five object control skills explain approximately 28% of the variance in the three self-perception domains analyzed. The canonical coefficients indicate a high positive relationship between perceived competence in athletic abilities and performance in OC skills (*r* = .882), while the relationship between physical appearance and OC is moderate and positive (*r* = .574). Finally, the relationship between global self-perception and OC is low and positive (*r* = .159). Bounce shows a moderate positive relationship with the self-perception domains (*r* = .464), kick has a positive low relation (*r* = .089); while throw, catch, and strike have a low and negative relationship (*r* = -.038, *r* = -.197 and *r* = -.059, respectively) with the self-perception domains.

In general, the results suggest that performance in the 10 FMS are positively associated with perceived competence in athletic abilities in adults. Although the relationship between self-perception and OC movements is significant, the explained variance found is greater in the relationship between self-perception and the 10 FMSs. Individuals with an efficient level of performance in locomotor skills also have a more positive perceived competence in athletic abilities. Finally, women have a less positive perception of their physical appearance than men.

DISCUSSION

The purpose of the present study was to examine the relationship between self-perception and performance of fundamental motor skills in adults. The results suggest that there is a relationship between perceived competence in athletic abilities and FMS. In addition, participants that had an efficient performance in LM skills had more positive perceptions of their competence in athletic abilities. It was also found that men had a more positive self-perception in the domain of physical appearance than women.

The relationship between athletic abilities and motor performance found in the current study is supported by results of previous studies. Wang et al. (2013) found a significant relationship in a group of university students between performance in dribbling in basketball and perceived motor competence in

basketball. Similar results have also been reported in children and adolescents, where other studies (Barnett et al., 2014; LeGear et al., 2012; Spessato et al., 2012; Vedul-Kjelsås et al., 2011; Wang et al., 2013) also found a positive and significant relationship between performance in FMS and self-perception, assessed in terms of physical competence, cognitive competence, peer acceptance, and maternal acceptance (Spessato et al., 2012; Vedul-Kjelsås et al., 2011) or motor competence (Barnett et al., 2014). The results in the present study, found that actual motor competence is only related to athletics abilities – and not to self-worth or physical appearance–; one possible explanation is that the items assessed in this domain (athletics abilities) are more congruent with movement. Therefore, relationship could be more accurate (Barnett, Ridgers, Zask, & Salmon, 2015). Another plausible explanation is due to the age of the participants, considering that perceived competence is more 'real' as one is older (Robinson, 2010); hence, the self-perception in this specific domain will be also more accurate.

The results of the present study suggest that both the locomotor and object control components of performance are associated with perceived competence in athletic abilities. However, it was found that people with efficient performance in locomotor skills have a more positive perception of their competence in athletic abilities. Similar results have been found in previous studies. Robinson (2010) found that both components have a significant relationship with self-perception. On the other hand, Goodway and Rudisill (1997) reported that the object control component is more related to self-perception in a group of children, than the locomotor component. In addition, LeGear et al. (2012) indicated that the relationship between perceived competence and locomotor skills is stronger than the relationship between perceived competence and object control skills in a group of children. A plausible explanation why, locomotor skills presented a stronger association with athletic abilities, is that the assessment of self-perception in this domain does not have sport/skill specific items (it has general sport questions), given that the sample had a better performance in locomotor skills than in object control skills, may be that participants thought about sports in which locomotor skills are more used, while answering the scale.

The results of the present study also indicated that women had a less positive perception of themselves than men in the domain of physical appearance, but not in the domains of athletic abilities and global self-worth. Previous studies have found that girls had less positive perceptions of their competence than boys, specifically ages between 4 and 8 years (Barnett et al., 2014; Robinson, 2010, 2011) and between 11 and 14 years of age (Morano, Colella, Robazza, Bortoli, & Capranica, 2011). The difference between men and women in perceived competence, might be attributed to socio-cultural factors

(Robinson, 2010), in the present study the difference found were in physical appearance, it will be reasonable to believe that women have more social pressure to have an appearance similar to the one models have in magazines, therefore their comparative standard might be higher, consequently their physical appearance perception will be lower than men. Also, family pressure had influence in physical appearance and eating disorders in Hispanic women (Ordaz et al., 2018).

Evidence from previous studies indicated that children and adolescents with a high level of motor performance have a more positive level of self-perception and perceived competence (Barnett et al., 2014; De Meester et al., 2016; Robinson et al., 2015). The results of the present study suggest that this relationship is also present in adults. Hence, understanding the relationship between self-perception and motor performance in a group of adults provides valuable insights into why people maintain their levels of physical activity (Barnett et al., 2015), since, as stated earlier, perceived motor competence is considered a factor that can affect the intrinsic motivation of the person, to engage in physically active lifestyle (Barnett et al., 2015; Goodway, Famelia, & Bakhtiar, 2014), and therefore gain the benefits in health-related physical fitness and consequently affect weight in a healthy way, according to the model proposed by Stodden et al. (2008).

Few studies have analyzed the relationship between FMS and self-perception in adults. Future studies should increase the evidence of this relationship, given the lack of studies for this population, and thus establish whether the model proposed by Stodden et al. (2008) applies to adults.

In conclusion, performance of FMS is associated with perceived competence in athletic abilities in adults, although no relationship was found between motor performance and physical appearance or overall self-worth. Individuals with efficient performance of locomotor skills have greater perceived competence in athletic abilities than people with inefficient performance. It is also concluded that women have a less positive self-perception of their physical appearance than men, and there is no difference between men and women in overall self-perception or perceived competence in athletic abilities.

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