

Adolescents' competence metaperceptions and self-perceptions, motivation, intention to be physically active and physical activity

Meta-percepciones y auto-percepciones de competencia en adolescentes, motivación, intención de práctica de actividad física y actividad física

Metapercepções e auto-percepções de competência em adolescentes, motivação, intenção da prática de atividade física e atividade física

Fernandez-Rio, J.^{1*}, Cecchini, J. A.¹, Mendez-Gimenez, A.¹, y Mendez-Alonso, D.²

¹ Educational Sciences Department, Faculty of Teacher Training and Education.

² University of Oviedo (Spain); Faculty Padre Ossó, University of Oviedo (Spain).

Abstract: It is widely acknowledged that physical activity can play a potentially important role in enhancing public health. However, rapid and significant decreases in physical activity practice occur during adolescence. Elements such as parents' perceptions of their children competence, children's self-perceptions of competence and motivation appear to be important in this process. The main goal of this study was to test the following sequence of motivational processes related to physical activity: Competence Metaperceptions (parents) - Competence Self-Perception - Self-Determined Motivation - Intention to be Physically Active - Physical Activity. 459 adolescents (257 males, 202 females), age range 12-17 years, agreed to participate. Descriptive and exploratory analysis, bivariate correlations and path analysis were performed. The testing of the hypothesized model showed a good fit to the data. Results reinforce the influence of parents' views on their children's physical activity competence perception, and its consequences on the adolescents' physical activity.

Keywords: health; parents; self-determined motivation

Resumen: Es ampliamente reconocido que la actividad física puede jugar un papel potencialmente importante en el aumento de la salud pública. Sin embargo, durante la adolescencia tienen lugar disminuciones significativas y rápidas de los niveles de práctica de actividad física. Elementos como las percepciones de los padres de la competencia de los hijos, las auto-percepciones de estos de su propia competencia y la motivación parecen ser importantes en este proceso. El objetivo principal del presente estudio fue testar la siguiente secuencia de procesos motivacionales relacionados con la actividad física: Metapercepción de Competencia - Auto-percepción de Competencia - Motivación Auto-Determinada - Intención de ser

Físicamente Activo - Actividad Física. 459 adolescentes (257 varones y 202 mujeres), con un rango de edad de 12 a 17 años, accedieron a participar. Se realizaron análisis exploratorios y descriptivos, correlaciones bivariadas, y un análisis Path. La evaluación del modelo hipotetizado mostró un buen ajuste a los datos. Los resultados refuerzan la influencia de la visión de los padres en la percepción de competencia de actividad física de los hijos y sus consecuencias en los niveles de actividad física.

Palabras clave: salud; padres; motivación auto-determinada

Resumo: É amplamente reconhecido que a atividade física pode desempenhar um papel potencialmente importante no aumento da saúde pública. No entanto, as diminuições significativas e rápidas nos níveis de prática de atividade física ocorrem na adolescência. Elementos como a percepção dos pais sobre a competência das crianças, auto-percepção de sua própria competência e motivação parecem ser importantes neste processo. O objetivo principal do presente estudo foi testar a seguinte sequência de processos motivacionais relacionados à atividade física. Metapercepção de Competência - Auto-percepção de Competência - Motivação Autodeterminada - Intenção de ser Físicamente Ativo - Atividade Física. 459 adolescentes (257 homens e 202 mulheres), com faixa etária de 12 a 17 anos, concordaram em participar. Foram realizadas análises exploratórias e descritivas, correlações bivariadas e uma análise Path. A avaliação do modelo de hipótese mostrou um bom ajuste para os dados. Os resultados reforçam a influência da visão dos pais sobre a percepção da competência de atividade física das crianças e suas consequências sobre os níveis de atividade física.

Palabras chave: saúde; pais; motivação autodeterminada

Significant evidence exists supporting the numerous health benefits of engaging in regular physical activity during the early stages of life (Warburton, Nicol, & Bredin, 2007). Different studies have showed that children who exhibit

adequate levels of health-related fitness have a reduced risk of experiencing anxiety and depression (Parfitt, Pavey, & Rowlands, 2009), and they are more likely to do better academically (Van Dusen, Kelder, Kohl, Ranjit, & Perry, 2011). In spite of the widespread evidence supporting the protective effects of physical activity, physical inactivity during adolescence continues to increase (Heitzler, Lytle, Erickson, Sirard, Barr-Anderson, & Story, 2011), and insufficient physical activity among youngsters has been

Dirección para correspondencia [Correspondence address]: Javier Fernandez-Rio. Educational Sciences Department, Faculty of Teacher Training and Education, University of Oviedo (Spain). c/ Aniceto Sela s/n, despacho 219. 33005, Oviedo, Asturias (Spain).
E-mail: javier.rio@uniovi.es

linked to increased risk of obesity and related metabolic disorders (Ekelund, Tomkinson, & Armstrong, 2012).

The Social Cognitive Theory (Bandura, 1986) considers that individuals both influence and are influenced by different personal, environmental and behavioural factors. Researchers have stressed the need to distinguish between direct perceptions and metaperceptions (Webster & Whitmeyer, 1999). Direct perceptions relate to the beliefs that individuals hold for themselves or others, while metaperceptions are estimations formed by people regarding the thoughts of significant others (Kenny & Acitelli, 2001). In other words, metaperceptions are perceptions of how other people view us (Kaplan, Santuzzi, & Ruscher, 2009) and they are notably important coming from others such as parents. The role of metaperceptions has long been the subject of research within social psychology (Kenny & DePaulo, 1993), but not in relation to physical activity.

Shrauger & Schoeneman (1979) believe that there is a hierarchical nature of metaperception formation. Individuals are more concerned about the evaluations of those more powerful, but also more knowledgeable or expert, such as parents (Kaplan et al., 2009). Current models describe parental influences on adolescents' physical activity (Trost et al., 2003). These models are guided by the Expectancy Value Theory (Eccles et al., 1983) which considers that an individual's behaviour is regulated by outcome expectations and the values placed on those outcomes.

On the other hand, Deci, Vallerand, Pelletier, and Ryan (1991) reported that self-determined motivation has been linked to a number of positive outcomes. When people are intrinsically motivated to exercise, they tend to be physically active for long life periods (Hein, Müür, & Koka, 2004). Similarly, individuals who experienced greater support for physical activity evidenced greater autonomous self-regulation for physical activity, and better attendance in physical activity intervention programs (Edmunds, Ntoumanis, & Duda, 2009).

However, few studies have tested the predictive capacity of social cognitive theories to explain physical activity (Plotnikoff, Costigan, Karunamuni, & Lubans, 2013). Rooted in the theoretical framework of the Self-Determination Theory (Ryan & Deci, 2000), it was hypothesized that adolescents' competence metaperception (their parents' views of them) will positively predict their competence self-perception. The second hypothesis was that competence self-perception will predict self-determined motivation. The third hypothesis was that self-determined-motivation will predict intention to be physically active. The final hypothesis was that the intentions to be physically active will positively predict PA levels.

Method

Participants

A total of 459 secondary education students (257 males, 202 females), age range 12-17 years ($M = 14.34$, $SD = 1.90$) from 8 different high schools of the same city in the northern part of Spain agreed to participate.

Measures

Competence Self-Perception. The Competence subscale of the Intrinsic Motivation Inventory (IMI; McAuley, Duncan, & Tammen, 1989) was used to assess adolescents' competence self-perception. Participants were asked to rate their agreement/disagreement with several statements (e.g. "I am pretty skilled doing physical activity") in a likert scale (1= strongly disagree, 5= strongly agree). It showed acceptable internal consistency ($\alpha = .89$).

Competence Meta-Perception. In order to assess parents' meta-perceptions of their children's competence, the IMI (McAuley et al., 1989) was modified. The stem "My parents believe that..." was added to each item. The Cronbach's alpha coefficient was acceptable ($\alpha = .87$).

Motivation. Participants completed the Situational Motivation Scale (SIMS; Guay, Vallerand, & Blanchard, 2000) which measures amotivation, external regulation, identified regulation and intrinsic motivation in a likert scale (1 = strongly disagree, 7 = strongly agree). Given that the SIMS assesses motivation across the range of the self-determination continuum, a self-determination index (SDI) was calculated ($SDI = 2 \times \text{intrinsic motivation} + \text{identified regulation} - \text{external regulation} - 2 \times \text{amotivation}$; Lemyre, Treasure, & Roberts, 2006).

Intention to be physically active. The Intention to be Physically Active (Hein et al., 2004) is a 5-item scale (e.g., After graduation, I would like to be physically active). It showed adequate internal consistency ($\alpha = .83$).

Physical Activity. Participants' physical activity levels were measured using the following question: "How often have you participated in physical activities for 20–30 min per session during your free time over the past three months?" (Godin, Lambert, Owen, Nolin, & Prud'homme, 2004). Response choices offered were: 1= never, 2= about once per month, 3= about 2-3 times per month, 4= about once per week, 5= about 2 times per week, 6= about 3 times per week, and 7= about 4 times or more per week.

Procedure

The implementation of the project involved three steps: first, permission from the Ethics Committee of the researchers'

University was obtained. Second, an informed consent was signed by all the participants' parents. Third, all questionnaires were administered by one of the researchers.

Data analysis

Analyses were conducted using the SPSS 18.0 and the EQS 6.2 programs. Descriptive statistics and bivariate correlations were conducted to explore the trends and relationships among variables. The hypothesized model was tested through a Path analysis. Given that preanalyses revealed substantial multivariate kurtosis (8.55), analyses were based on the Satorra-Bentler scaled chi-square statistic ($S-B\chi^2$; Satorra & Bentler, 1988), since it serves as a correction for χ^2 when distributional assumptions are violated. In testing the initial model, evaluation of goodness-of-fit to the data was determined on the basis of multiple criteria (Byrne, 2008): Comparative Fit Index (*CFI), Root Mean-Square Error of Approximation (*RMSEA), and Standardized Root Mean Square Residual (SRMR). The *CFI represents the robust version of the CFI and it ranges in value from zero to 1.00. The *RMSEA is a robust version of the usual RMSEA;

values less than .05 indicate good fit and values as high as .08 represent reasonable errors of approximation in the population. To complete the analysis, the 90% confidence interval provided for *RMSEA was included. Lastly, the SRMR is the average standardized residual value derived from fitting the hypothesized variance covariance matrix to that of the sample data with value ranging from zero to 1.00.

Results

Descriptive statistics and bivariate correlations

Table 1 shows means, standard deviations and bivariate correlations among all variables studied. The highest mean scores were obtained in physical activity level and the lowest in competence self-perception. Correlation analysis showed that all variables were positively correlated. As expected, the highest scores were measured between intention to be physically active and physical activity level, followed by competence meta and self-perception. Correlations between SDI and competence self-perception and between SDI and intentions to be physically active were also high.

Table 1. Means, standard deviations and bivariate correlations of all variables.

	M	SD	1	2	3	4
1. Competence meta-perception	3.83	.81				
2. Competence self-perception	3.68	.75	.64**			
3. Self-Determination Index (SDI)	7.46	5.32	.44**	.57**		
4. Intention to be physically active	4.16	.86	.21**	.26**	.52**	
5. Physical activity	4.61	1.15	.13**	.23**	.41**	.66**

** $p < .05$

Path analysis

The initial testing of the hypothesized model yielded a good fit to the data: $S-B\chi^2_{(6)} = 914.87$, $p = .021$; *CFI = .98; SRMR

= .03; *RMSEA (90% CI) = .057 (.020-.094). Therefore, these results reinforce the hypothesized model (Figure 1).

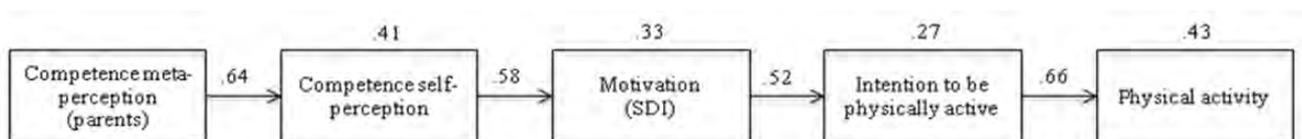


Figure 1. Tested model depicting the predicted relationships among variables.

Discussion

The purpose of this study was to explore a motivational sequence hypothesizing relationships between adolescents'

competence metaperceptions (parents' views), self-perceptions and physical activity levels of practice. The results of the study provided strong support for our hypothesis.

Adolescents' competence metaperception (their parents'

views of them) significantly predicted their competence self-perception (explaining 41% of its variance). Parents become involved in their children's sport activities taking them to practice, but also providing feedback and influencing their self-perceptions (Lorenzo & Sampaio, 2005).

Adolescents' competence self-perception significantly predicted SDI (explaining 33% of its variance) which is congruent with Vallerand's hierarchical model (1997). The need for competence self-perception drives the efforts to achieve goals and feel successful and it increases self-determined motivation (Sarrazin, Vallerand, Guillet, Pelletier, & Cury, 2002).

Furthermore, SDI positively predicted adolescents' intentions of being physically active (explaining 27% of its variance), which is consistent with previous research: promoting self-determined motivation may be an effective means of ensuring that physical education programs are

able to increase physical activity levels, foster self-initiated physical activity behaviours and enhance adolescents' health (Lonsdale, Sabiston, Raedeke, Ha, & Sum, 2009).

Finally, adolescents' intentions of being physically active significantly predicted their physical activity levels (explaining 43% of its variance). Sallis, Prochaska and Taylor (2000) reported that physical activity intentions had consistent and positive associations with adolescent physical activity behaviour.

In conclusion, the tested model reflects how important parents' influence is on their children's physical activity levels. Parental physical activity is not transmitted to their children to the degree that is often believed (Andersen, Wold, & Torsheim, 2006), but our results show that their influence is still strong. This study provides additional information to help reduce the rapid decreases in physical activity detected among adolescents.

References

- Andersen, N., Wold, B., & Torsheim, T. (2006) Are parental health habits transmitted to their children? An eight-year longitudinal study of physical activity in adolescents and their parents. *Journal of Adolescence* 29, 513–524.
- Bandura, A. (1986). *Social foundation of thought and action: A social cognitive theory*. Englewood Cliffs, NJ: Prentice-Hall.
- Byrne, B. M. (2008). Testing for multigroup equivalence of a measuring instrument: A walk through the process. *Psicothema*, 20(4), 872–882.
- Deci, E. L., Vallerand, R. J., Pelletier, L. G., & Ryan, R. M. (1991). Motivation and Education: The Self-Determination Perspective. *Educational Psychologist*, 26(3–4), 325–346.
- Eccles, J. S., Adler, T. F., Futterman, R., Goff, S. B., Kaczala, C. M., Meece, J. I., & Midgley, C. (1983). Expectations, values and academic behaviors. In J. T. Spence (Ed.), *Achievement and achievement motives* (pp. 75–145). San Francisco, CA: W. H. Freeman.
- Edmunds, J., Ntoumanis, N., & Duda, J. L. (2009). Helping your clients and patients take ownership over their exercise: Fostering exercise adoption, adherence and associated well-being. *ACSMs Health and Fitness Journal*, 13, 20–25.
- Ekelund, U., Tomkinson, G., & Armstrong, N. (2011). What proportion of youth are physically active? Measurement issues, levels and recent time trends. *British Journal of Sports Medicine*, 45, 859–865.
- Godin, G., Lambert, L. D., Owen, N., Nolin, B., & Prud'homme, D. (2004). Stages of motivational readiness for physical activity: A comparison of different algorithms of classification. *British Journal of Health Psychology*, 9, 253–267.
- Guay, F., Vallerand, R. J., & Blanchard, C. (2000). On the assessment of the situational intrinsic and extrinsic motivation: The Situational Motivation Scale (SIMS). *Motivation and Emotion*, 24, 175–213.
- Hein, V., Müür, M., & Koka, A. (2004). Intention to be physically active after school graduation and its relationship to three types of intrinsic motivation. *European Physical Education Review*, 10(1), 5–19.
- Heitzler, C., Lytle, L., Erickson, D., Sirard, J., Barr-Anderson, D., & Story, M. (2011). Physical activity and sedentary activity patterns among children and adolescents: a latent class analysis approach. *Journal of Physical Activity and Health*, 8, 457–467.
- Kaplan, S. A., Santuzzi, A. M., & Ruscher J. B. (2009). Elaborative metaperceptions in outcome-dependent situations: The diluted relationship between default self-perceptions and metaperceptions. *Social Cognition*, 27(4), 601–614.
- Kenny, D. A., & Acitelli, L. K. (2001). Accuracy and bias in perceptions of the partner in close relationships. *Journal of Personality & Social Psychology*, 80, 439–448.
- Kenny, D. A., & DePaulo, B. M. (1993). Do people know how others view them? An empirical and theoretical account. *Psychological Bulletin*, 114, 145–161.
- Lemyre, P. N., Treasure, D. C., & Roberts, G. C. (2006). Influence of variability in motivation and affect on elite athlete burnout susceptibility. *Journal of Sport & Exercise Psychology*, 28, 32–48.
- Lonsdale, C., Sabiston, C. M., Raedeke, T. D., Ha, A. S. C., & Sum, R. K. W. (2009). Self-determined motivation and students' physical activity during structured physical education lessons and free choice periods. *Preventive Medicine*. 48, 69–73
- Lorenzo, A., & Sampaio, J. (2005). Reflexiones sobre los factores que pueden condicionar el desarrollo de los deportistas de alto nivel [Reflexions on factors that can influence high level athletes' development]. *Apunts*, 63–70.
- McAuley, E., Duncan, T. E., & Tammen, V. V. (1989). Causal attributions and affective reactions to disconfirming outcomes in motor performance. *Journal of Sport and Exercise Psychology*, 11, 187–200.
- Parfitt, G., Pavey, T., & Rowlands, A. V. (2009). Children's physical activity and psychological health: the relevance of intensity. *Acta Paediatrica*, 98, 1037–1043.
- Plotnikoff, R. C., Costigan, S. A., Karunamuni, N., & Lubans, D. R. (2013). Social cognitive theories used to explain physical activity behavior in adolescents: A systematic review and meta-analysis. *Preventive Medicine*, 56, 245–253.
- Ryan, R. M., & Deci, E. L. (2000). The darker and brighter sides of human existence: Basic psychological needs as a unifying concept. *Psychological Inquiry*, 11(4), 319–338.
- Sallis, J. F., Prochaska, J. J., & Taylor, W. C. (2000). A review of correlates of physical activity of children and adolescents. *Medicine and Science in Sport and Exercise*, 32(5), 963–975.
- Sarrazin, P., Vallerand, R. E., Guillet, E., Pelletier, L., & Cury, F. (2002). Motivation and dropout in female handballers: a 21-month prospective study. *European Journal of Social Psychology*, 32, 395–418

24. Satorra, A., & Bentler, P. M. (1994). Corrections to test statistics and standard errors in covariance structure analysis. In A. von Eye & C.C. Clogg (Eds.): *Latent variables analysis: Applications for developmental research* (pp. 399-419). Thousand Oaks, CA: Sage.
25. Shrauger, J. S., & Schoeneman, T. J. (1979). Symbolic interactionist view of self-concept: Through the looking glass darkly. *Psychological Bulletin*, *86*, 549-573.
26. Trost, S. G., Sallis, J. F., Pate, R. R., Freedson, P. S., Taylor, W. C., & Dowda, M. (2003). Evaluating a model of parental influence on youth physical activity. *American Journal of Preventive Medicine*, *25*, 277-282.
27. Vallerand, R. J. (2007). Intrinsic and Extrinsic Motivation in Sport and Physical Activity. In G. Tenenbaum & R. C. Eklund (Eds.), *Handbook of sport Psychology* (3^a ed., pp. 59-83). New York: Wiley.
28. Van Dusen, D. P., Kelder, S. H., Kohl, H. W., Ranjit, N., & Perry, C. L. (2011). Associations of physical fitness and academic performance among schoolchildren. *Journal of School Health*, *81*, 733-740.
29. Warburton, D. E. R., Nicol, C. W., & Bredin, S. S. D. (2007). Health benefits of physical activity: the evidence (review). *Canadian Medical Association Journal*, *174*, 801-809.
30. Webster, M., & Whitmeyer, J. M. (1999). A theory of second-order expectations and behavior. *Social Psychology Quarterly*, *62*, 17-31.

