PEDAGOGICS PSYCHOLOGY
medical-biological problems of physical training and sports

ACHIEVEMENT GOALS AND INTENSITY OF PHYSICAL ACTIVITY DURING FREE PLAY IN CHILDREN: THE MODERATING ROLE OF PERCEIVED SPORT CONFIDENCE

Marc R. Lochbaum[1], Emeka T. Okafor[1], David C. Brenner[1], Zişan Kazak Çetinkalp[2]

[1]Department of Kinesiology and Sport Management, Texas Tech University, USA
[2]Department of Physical Education and Sports Teaching, Ege University, Izmir, Turkey

Abstract. *Purpose:* to examine the moderating role of sport confidence and resultant achievement goal profile with physical activity intensity during free play. *Material:* participants were 28 children participating in an after-school program. The 28 children completed measures of task and ego goal orientations and sport confidence two weeks prior to having their heart rate monitored during a free play session. *Results:* indicated that children with high sport confidence were characterized ($p < .05$; Cohen's ds > 1.10) by higher task and ego orientations and average heart rate over the course of the free play session when compared to the low sport confidence children. The moderate sport confidence children were not significantly different than the other groups expect for ego orientation though effect sizes indicated this group tended towards being more similar to the high sport confidence group. The results were confounded as all children in the low sport confidence condition were girls. *Conclusions:* Sport confidence moderates physical activity intensity during free play in children and is characterized by a higher ego orientation and generally higher task orientation. But given all of the low confident children were females, intervention work is needed at early ages with girls to build sport confidence and motivations for both goal orientations to hopefully increase physical activity intensity during free play.

Keywords: goal orientations, exercise intensity, physical activity, confidence.

Introduction

In all developed nations, daily physical activity participation of sufficient intensity and duration for health benefits for children and youth are alarmingly low. Across all health organizations (i.e. World Health Organization, Centers for Disease Control and Prevention), children and youth are strongly recommended to engage in at least 60 minutes of moderate to vigorous physical activity daily. The benefits of physical activity across one's lifespan have been known for decades such as reduction in the risk of hypertension, coronary heart disease, diabetes, depression and some forms of cancer. Children who are active are more likely to be active adults, and thus, they will reap the benefits of lifelong physical activity. For instance, a fairly recent research [1] reported that after 50 years of being initially surveyed, the number one predictor of later-life physical activity in an initially healthy sample who were surveyed as children in the 1940's was participation in a high school varsity sport.

Unfortunately, children and youths are insufficiently active, especially girls, thereby setting up another generation of inactive adults. Certainly, we must encourage children's activity levels so they might be interested and talented enough to even participate in high school athletics because currently physical activity participation rates are very across today's youth. For instance in the United States, only 17.7% of female and 36.6% of male high school students surveyed in 2013 indicated that they were active at least 60 minutes a day for the surveyed 7-day period [2]. In Spain, a recent survey found that only 37% of boys and 26% of girls between the ages of six and seven were engaging in at least five hours of physical activity per week [3]. In short, children and adolescent are overwhelmingly physical inactive. The disparity between boys and girls is also a major concern. Understanding determinants of physical activity is one key to increasing physical activity participation. Researchers have examined physical activity through the lens of a number of motivational theories, one through Achievement Goal Theory (AGT) frameworks [4–7] that is the focus of the current investigation.

Since the late 1970's, competency thoughts have been investigated within the achievement goal frameworks [8]. The most studied achievement goal framework is the dichotomous framework. In the sport context alone, at least 236 published reports with the two most used task and ego goal orientation measures exist [9]. In this framework, there are two orientations by which personal competency are judged [8]. Individuals endorsing a task orientation are primarily motivated by personal mastery or improvement. Because of their personal mastery orientation, these individuals reflect a self-referenced standard of personal achievement to gauge their personal competency for a desired behavior. In contrast, an ego oriented person strives to attain high normative standards of ability which is typically

http://dx.doi.org/10.15561/18189172.2015.1111

defined by winning or beating intended others. Ego-oriented individuals evaluate their success and failure and thus personal competence on other-referenced standards.

A critical variable within the dichotomous framework is that of perceived competence [10]. Perceived competence is theorized moderate the relationship between the ego orientation and outcomes in that an individual endorsing the ego goal orientation with high perceived ability should engage in more adaptive achievement behaviors and thoughts than one with low perceived ability and a high ego goal orientation [10]. The relationship between an ego orientation and adaptive achievement behaviors though is at times complex [11, 12]. Though theorized with perceived competence to lead to adaptive achievement behaviors, an ego orientation by itself is correlated with less desirable achievement strategies such as a positive attitude concerning doping in sports [11]. Though when combined with perceived sport confidence, it seems the absence of the ego orientation with high perceived competence is associated with high regard for sportspersonship [12].

In the physical education context, research has verified the theorized moderation of adaptive achievement behaviors, perceived competence, and the ego orientation [13]. Important to the present investigation, perceived competence has been shown to be a very most important determinant of physical activity [4, 14]. For instance, within the AGT [4] in a sample (N = 611) of university females, perceived competence was the most important predictor of stage of exercise participation above that of the task or ego goal orientation. In addition, very recent research in a large sample (N = 1,552) of 3rd to 12th graders, reported that perceived competence referenced towards games and sport play directly predicted physical activity in school and away from school [14]. To date, examination of AGT within children and objectively measured physical activity is nonexistent as the measure of physical activity participation has been self-reported [4, 12]. Hence, the purpose of the present investigation was to examine AGT and objectively measured physical activity intensity in children during free play through the lens of perceived competence.

Purpose, materials and methods

The purpose of the research was to examine whether sport confidence moderated children's objectively measured physical activity intensity over the course of an hour of free play while taking into account the children's goal orientation profiles. The purpose was achieved by the following materials and methods. Participants were initially 38 elementary students in either 4th (n = 20) or 5th (n = 18) grade, participating in an after-school program at their elementary school a part of a large United States of America Department of Education funded grant. Of the initial 38 students, 28 were in attendance the day heart rate was recorded during the free play session. All of the children on average were of an optimal body mass index (BMI) or even slightly underweight (BMI mean = 18.36 $\pm$ 2.97). All participants are enrolled at an elementary school comprised of nearly 100% eligible for subsidized food programs. An appropriate human subject participation form for the children was signed by the children's parent or guardian for participation in the after-school program along with many other programs. The after-school program consent allows for measurement and evaluation of physical activity participation and motivations. The majority of the children were Hispanic or African-American.

Concerning the measures taken, achievement goals were measured by the Perceptions of Success Questionnaire (POSQ) [15]. When completing the questionnaire, the participants were asked to respond to "What does success in sport mean to you? There are no right or wrong answers. We ask you to X out the letter that best indicates how you feel. When playing sport, I feel most successful when:" All questions were answered using a 5-point scale ranging from A "Strongly Agree" to E "Strongly Disagree". The POSQ has an equal number of items assessing both goal orientations. An example task orientation question is, "I really improve." An example ego orientation question is, "I show other people I am the best."

Sport competence was measured by an adapted version of the Perceived Competence Scale (PCS) [16]. The PCS is a 4-item questionnaire with high face validity. As with the POSQ, all questions were answered using a 5-point scale ranging from A "Strongly Agree" to E "Strongly Disagree" if reference to the following instructions: "Over the course of the after school program, we will play a number of sports. How confident are you in your ability to play a number of sports well? There are no right or wrong answers. We ask you to X out the letter that best indicates how you feel." An example question is "I feel confident in my ability to play many sports well."

Last, heart rate was measured in real time by use of © Polar Electro 2015 [17] group solution product. This product allows for simultaneous group collection of heart rate data. The children were provided a sensor and strap. They were instructed on the proper placement of the sensor. All sensors were checked as to their transmission to the iPad prior to the start of the free play session for any adjustments required.

Informed consent was obtained from all of the children's parents or guardians at the beginning of the school year (i.e. August 2015). The children completed the measures in a group setting two weeks prior to the free play

session. The first author read the questions aloud and asked for any questions from the children. In addition, several of the after-school staff assisted children who might have had a question. Free play is a common activity in the after school program. The children were allowed to play for an hour with 58 minutes being recorded. A variety of sport equipment was provided as always and the children are also allowed to play on the playground equipment.

Results of the research

To examine the moderating role of sport competence, three groups were formed by a one-third split. The high confidence group (n = 11, 9 boys, 2 girls) was certainly a naturally formed group as scored a mean of 5.00 $\pm$ .00 on the scale with the next another (n = 8, 7 boys, 1 girl) with a mean of 4.62 + .13 and the low sport confidence group (n = 9, 9 girls) with a mean of 3.30 $\pm$ .65. The univariate F-test was highly significant, $F(2, 25) = 52.36$, $p < .000$. All Cohen's *d* values (> 2.68) indicated the large meaningful difference between the sport confidence mean values. BMI was checked again across the three sport confidence groups. All means were nearly equal hovering around the entire group average reported in the participant section.

Table 1 contains the descriptive data and Table 2 contains Cohen's *d* for the study variables in reference to the higher sport confident group in each calculation (i.e. high sport confidence – medium sport confidence; high sport confidence – low sport confidence; and medium sport confidence – low sport confidence). To test the main purpose of this investigation, a multivariate analysis of variance (MANOVA) was conducted with sport competence groups as the independent variable and task orientation, ego orientation, and average heart rate as the dependent variables. Significant univariate F-tests were followed up with the Ryan-Einot-Gabriel-Welsch (R-E-G-W) Range post hoc test. Cohen's *d* was calculated to determine meaningfulness of differences with interpretation of d as large (> .80), medium (.50), and small (.20) [18]. To this end, the MANOVA results revealed a significant multivariate effect for sport competence groupings, Wilk's $\lambda = 0.43$; $F(6, 46) = 3.99$, $p = .003$. All three of the follow-up univariate *F*-tests were significant, task orientation, $F(2, 25) = 4.15$, $p = .028$; ego orientation, $F(2, 25) = 5.91$, $p = .008$; and heart rate, $F(2, 25) = 5.63$, $p = .010$.

Table 1. Descriptive data by sport confidence (SC) grouping for study variables

	Measure		
Group	**Task Orientation**	**Ego Orientation**	**Heart Rate (bpm)**
High SC			
Mean	4.39	4.39	149.45
Standard deviation	.64	.56	12.64
95% confidence interval	4.06, 4.72	4.01, 4.77	143.12, 155.78
Medium SC			
Mean	4.16	4.33	144.50
Standard deviation	.43	.25	5.20
95% confidence interval	3.77, 4.55	3.88, 4.77	137.08, 151.91
Low SC			
Mean	3.70	3.51	134.22
Standard deviation	.46	.84	10.03
95% confidence interval	3.33, 4.07	3.09, 3.93	127.22, 141.21

For task orientation and mean heart rate, the R-E-G-W Range post hoc test indicated that the high sport confidence group was significantly higher than the low sport confident group. For ego orientation, the R-E-G-W Range post hoc test revealed both of the higher sport confident groups significantly differed compared to the low sport confident group. All variable differences when compared to the low confident group were very meaningfully with all Cohen's *d*s > 1.0 (see Table 2). The Cohen's *d* values between the highest and medium sport confident group where medium to small in meaningfulness. Thus, the top two sport confident groups tended to be more similar than different.

Table 2. Effect size value comparisons for the goal orientations and heart rate

Comparison	Task Orientation	Ego Orientation	Heart Rate (bpm)
HSC to MSC	0.41	0.14	0.48
HSC to LSC	1.22	1.26	1.31
MSC to LSC	1.03	1.28	1.26

Discussion

Sport confidence moderated physical activity intensity during free play the children who participated in this very unique field investigation. No data exist in the AGT literature with measured heart rate in children during play prior to this study. It is important to highlight that all of the groups on average were sufficiently engaged in free play. For instance, even the lower confident group was within the lower to middle range of moderate intensity physical activity in the free play time with the 95% confidence intervals from approximately 60 to 67% of maximum age predicted heart rate. But, certainly the two higher sport confident groups' physical activity intensities were greater and at the upper end of the 95% confidence intervals were at least 72% of age predicted heart rate maximum or moderate intensity physical activity. These two higher confident groups were highly engaged during the free play session. The two higher sport confidence groups compared to the low sport confidence group were characterized by a higher ego orientation and generally higher task orientation. The higher ego orientation scores present a conundrum of sorts in that yes we wish children to be very active and in these data the most active children were characterized by an ego orientation. But, the endorsement of the ego goal orientation is associated directly with typically viewed upon undesirable sport beliefs [11, 12]. The children in this study, across all of the groups, the children were of optimal weight or even slightly underweight. It does seem that the sample is unique given the worldwide obesity epidemic and could have contributed to the findings that all groups were sufficiently active during the free play session.

Of great concern was the finding that all of the low confident children were all females. Though past research [19] and even meta-analytic [20] work exists on this topic, it is still very concerning that only girls comprised the low confident group. Past research would certainly not have predicted that all of the low confident group would have been girls. The differences in worldwide statistics concerning girls being consistently lower than boys in daily activity could be due partly in nature to lower sport confidence as strongly suggested by this investigation's results. Certainly, with the exception of structured physical education and sport practices, children spend the majority of their time in free play. If in fact, girls with low sport confidence shy away from higher intensity play, future intervention research is needed at early ages with girls to build sport confidence and motivations for both goal orientations to hopefully increase physical activity intensity during free play. In addition, future research should determine if the differences in sport confidence could be minimalized with more structure to free play sessions especially in an organized after-school program where areas of the playground could contain a greater variety of sport equipment allowing for choice of activities and or placing the children on "activity teams" that mix high and low sport confident children. It might be that by placing children with low sport confidence with higher sport confident children that they will be active at higher physical activity intensities.

Conclusions

1. Sport confidence is very important when studying objectively measured physical activity.
2. The ego orientation might come at a price in sport contexts as it certainly was a characteristic of children in the higher level of sport confidence that engaged on average in higher intensity activity. It is possible that during free play, these children engaged in unsportspersonship like behaviors.
3. Future research needs to play close attention enhancing sport confidence in girls.
4. AGT especially when considered with a measure of sport confidence has an important place in combating the physical inactivity epidemic in developed countries worldwide.

References

1. Dohle S, Wansink B. Fit in 50 years: participation in high school sports best predicts one's physical activity after Age 70. *BMC Public Health*. 2013, 13(1), 110–120.
2. *Nutrition, physical activity and obesity data, trends and maps web site.* U.S. department of health and human services, centers for disease control and prevention (CDC), national center for chronic disease prevention and health promotion, division of nutrition, physical activity and obesity, Atlanta, GA [document on the internet]; 2015. Available from: http://www.cdc.gov/nccdphp/DNPAO/index.html (accessed 23.07.2015).

3. Viñas Fort J, Pérez Villalba M. *Los hábitos deportivos de la población escolar en España* [Sporting habits of the school population in Spain]. Madrid: Consejo Superior de Deportes, Fundación Alimentum y Fundación [document on the internet]; 2011. Available from: http://www.csd.gob.es/csd/estaticos/dep-escolar/encuesta-de-habitos-deportivos-poblacion-escolar-en-espana.pdf (accessed 23.07.2015). (in Spanish)
4. Lochbaum MR, Stevenson S, Hilario D, Surles J, Havenar J. Achievement goal profiles for female exercise participants. *International Journal of Fitness*. 2008;4,39–48.
5. Lochbaum MR, Stevenson SJ, Hilario D. Achievement goals, thoughts about intense physical activity, and exerted effort: A mediational analysis. *Journal of Sport Behavior*. 2009;32 53–68.
6. Lochbaum M, Litchfield K, Podlog L, Lutz R. Extraversion, emotional instability, and self-reported exercise: The mediating effects of approach-avoidance achievement goals. *Journal of Sport and Health Science*. 2013;2,176–183.
7. Lochbaum M, Podlog L, Litchfield K, Surles J, Hilliard S. Stage of physical activity and approach-avoidance achievement goals in university students. *Psychology of Sport & Exercise*. 2013; 14, 161–168.
8. Roberts GC, Treasure DC, Conroy DE. Understanding the dynamics of motivation in sport and physical activity. In: Tenebaum G, Eklund R, editors. *Handbook of sport psychology*. Hoboken, NJ: John Wiley and Sons; 2007. p. 3–30.
9. Lochbaum M, Kazak Çetinkalp Z, Graham KA, Wright T. (unpublished manuscript). *Task and ego goal orientations in the competitive sport contexts:* A quantitative review of the literature from 1989 – 2015.
10. Roberts GC. Understanding the dynamics of motivation in physical activity: The influence of achievements goals, personal agency beliefs, and the motivational climate. In: G. C. Roberts (Ed.). *Advances in motivation in sport and exercise* (pp. 1–50). Champaign, IL: Human Kinetics; 2001.
11. Lemyre PN, Roberts GC, Ommundsen Y. Achievement goal orientations, perceived ability, and sportspersonship in youth soccer. *Journal of Applied Sport Psychology*. 2002, 14(2), 120–136.
12. Allen J, Taylor J, Dimeo P, Dixon S, Robinson L. Predicting elite Scottish athletes' attitudes towards doping: examining the contribution of achievement goals and motivational climate. *Journal of Sports Sciences*. 2014, 33(9), 899–906.
13. Vlachopoulos S, Biddle SH. Modeling the relation of goal orientations to achievement-related affect in physical education: Does perceived ability matter? *Journal of Sport & Exercise Psychology*. 1997; 19(2), 169–187.
14. Bai Y, Chen S, Vazou S, Welk GJ, Schaben J. Mediated effects of perceived competence on youth physical activity and sedentary behavior. *Research Quarterly for Exercise and Sport*. 2015, 1–8.
15. Roberts GC, Treasure DC, Balagué G. Achievement goals in sport: the development and validation of the Perception of Success Questionnaire, *Journal of Sport Sciences*. 1998; 16, 337–347.
16. Williams GC, Deci EL. Internalization of biopsychosocial values by medical students: A test of self-determination theory. *Journal of Personality and Social Psychology*. 1996; 70, 767–779.
17. *Polar: Physical education* [document on the internet]; 2015. Available from: http://www.polar.com/us-en/b2b_products/physical_education (accessed 23.07.2015).
18. Crano WD, Brewer MB, Lac A, editors. *Principles and methods of social research*. Routledge; 2014.
19. Lee AM, Fredenburg K, Belcher D, Cleveland N. Gender differences in children's conceptions of competence and motivation in physical education. *Sport, Education & Society*. 1999, 4(2), 161.
20. Lirgg CD. Gender differences in self-confidence in physical activity: A Meta-analysis of recent studies. *Journal of Sport & Exercise Psychology*. 1991, 13(3), 294–310.

Information about the authors:

Marc R. Lochbaum, Ph.D.; http://orcid.org/0000-0001-7640-7075; marc.lochbaum@ttu.edu; Department of Kinesiology and Sport Management; Texas Tech University, Lubbock, Texas 79409-3011 USA.

Emeka T. Okafor; http://orcid.org/0000-0001-6771-2270; emeka.okafor@ttu.edu; Graduate College; Texas Tech University, Lubbock, Texas 79409-3011 USA.

David C. Brenner; http://orcid.org/0000-0002-6487-3594; david.brenner@ttu.edu; Graduate College; Texas Tech University, Lubbock, Texas 79409-3011 USA.

Zişan Kazak Çetinkalp, Ph.D.; http://orcid.org/0000-0001-7588-411X; f.zisan.kazak@ege.edu.tr; Department of Physical Education and Sports Teaching; Ege University, Bornova, 35040, Izmir, Turkey.

Cite this article as: Marc R. Lochbaum, Emeka T. Okafor, David C. Brenner, Zişan Kazak Çetinkalp. Achievement goals and intensity of physical activity during free play in children: the moderating role of perceived sport confidence. *Pedagogics, psychology, medical-biological problems of physical training and sports*, 2015;11:72–77. http://dx.doi.org/10.15561/18189172.2015.1111

The electronic version of this article is the complete one and can be found online at: http://www.sportpedagogy.org.ua/html/arhive-e.html

Received: 18.08.2015
Accepted: 29.08.2015; Published: 02.09.2015