

Parental influence on children's physical activity in urban green spaces

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Abstract: This study explores parents' influence on children's physical activity (PA) in urban green spaces (UGS). In this study, "children" includes both younger children and adolescents, ages 1-18. Data (n= 422) were collected through face-to-face personal interviews with parents between April 1 and May 31, 2015 in city of Aydın, Turkey. We analyzed associations between parents' physical co-activity, frequency and duration of parents' PA with children and frequency and duration of children's PA with bivariate correlations and multivariate regression analyses while controlling for children's age and sex, parent's marital status, education level, occupation, and household income level. Results showed that closer distance to UGS from home was associated with more frequency of children's PA, whereas parents' participation in children's PA was negatively associated with children's PA. On the other hand, frequency of parents' PA with children was positively associated with frequency of children's PA while duration of parents' PA with children was positively associated with duration of children's PA. We also found older children were negatively associated with frequency of children's PA, whereas household income was positively associated with frequency and duration of children's PA while more educated parents were negatively associated with frequency and duration of children's PA. The findings indicate that "physically more active parents bring up physically more active children."

Keywords: Adolescents, parents' physical co-activity, parks, distance, Turkey.

Kentsel yeşil alanlarda çocukların fiziksel aktivitesi üzerinde ebeveynlerin etkisi

Özet: Bu çalışma kentsel yeşil alanlarda çocukların fiziksel aktivitesi üzerinde ebeveyn etkisini araştırmaktadır. Bu araştırmada "çocuklar" yaşları 1-18 arasında değişen küçük çocukları ve ergenleri içermektedir. Veriler (n= 422) Aydın kentinde 1 Nisan-31 Mayıs 2015 tarihleri arasında ebeveynlerle yüz yüze bireysel görüşmeler yapılarak toplanmıştır. Çocukların yaşı ve cinsiyeti, ebeveynlerin medeni durumu, eğitim seviyesi, iş durumu ve aylık hane geliri kontrol edilerek iki değişkenli korelasyon ve çok değişkenli regresyon ile ebeveynlerin fiziksel aktivite birlikteliği, çocuklar ile birlikte fiziksel aktive sıklığı ve süresi ile çocukların fiziksel aktivite sıklığı ve süresi arasındaki ilişki incelenmiştir. Sonuçlar, kentsel yeşil alanların eve olan mesafesiyle çocukların fiziksel aktivite sıklığı arasında anlamlı pozitif ilişki olduğunu; diğer taraftan ebeveynlerin çocukların fiziksel aktivitelerine katılımıyla çocukların fiziksel aktivite sıklığı arasında anlamlı negatif ilişki olduğunu göstermiştir. Buna karşılık, ebeveynlerin çocukları ile birlikte fiziksel aktivite sıklığı ile çocukların fiziksel aktivite sıklığı arasında anlamlı pozitif ilişki bulunurken, aynı zamanda ebeveynlerin çocukları ile birlikte fiziksel aktivite süresiyle çocukların fiziksel aktivite süreleri arasında da anlamlı pozitif ilişki bulunmuştur. Ayrıca, sonuçlar yaşı daha büyük çocuklarla çocukların fiziksel aktive sıklığı arasında anlamlı negatif ilişkisi olduğunu gösterirken, ebeveynlerin hane aylık gelirinin çocukların fiziksel aktivite sıklığı ve süresi arasında anlamlı pozitif ilişki olduğunu; diğer taraftan da daha eğitilmiş ebeveynlerle çocukların fiziksel aktivite sıklığı ve süresi arasında anlamlı negatif ilişki olduğunu göstermiştir. Çalışmanın sonuçları "fiziksel olarak daha aktif ebeveynler fiziksel olarak daha aktif çocuklar yetiştirmektedir" düşüncesini desteklemektedir.

Anahtar kelimeler: Ergenler, ebeveyn fiziksel aktivite birlikteliği, parklar, mesafe, Türkiye.

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1. INTRODUCTION

Today, there is a growing concern about the reduction of children's outdoor play in green environment (Kellert, 2005; Louv, 2008) and the growing obstacles of children's independent access to outdoor play areas such as urban parks (Woolley, 2006; Hillman, 2006). Therefore, declining and/or low levels of physical activity (PA) have been reported among children (Dollman, et al., 2005; Knuth and Hallal, 2009). In Turkey, according to Turkish Ministry of Health data, 58.4% of children aged 6-11, 57% of children aged 12-18 do not perform any PA (Sağlık Bakanlığı, 2014). Low rates of PA among children is a growing concern given the importance of PA for children's healthy growth and development. Physical inactivity poses serious health risks for children and most of the chronic diseases observed at later ages have started to emerge during childhood periods (The Ministry of Health, 2014). PA during the childhood, on the other hand, is associated with many health benefits, including improving cardiovascular health (Janssen & LeBlanc, 2010; Timmons, et al., 2012; The Ministry of Health, 2014), better cognitive functioning (Sibley & Etnier, 2003; Timmons, et al., 2012), bone and skeletal health (Gunter, et al., 2012; Timmons, et al., 2012), motor skill development and psychosocial health (Timmons, et al., 2012), reducing obesity (Trost, et al., 2001; Steinbeck, 2001; The Ministry of Health, 2014) and lower symptoms of depression and anxiety (Strong, et al., 2005; Motl, et al., 2004; The Ministry of Health, 2014). Likelihood that development of healthy lifestyles later in adulthood is contributed by PA during childhood (Hallal, et al., 2006), including early childhood (e.g. 0-5 years) (CEECD, 2011).

Previous studies show that parents who are generally the primary decision makers for their children's daily schedules may be an important means for encouraging children to be more PA (Sigmund, et al., 2008; Brockman, et al., 2009; Zecevic, et al., 2010). Children who received more parental support for PA, for instance, were found to be 6.3 times more likely to be highly active than inactive (Zecevic, et al., 2010). Similarly, according to Sigmund, et al. (2008) study, children who participated in organized PA with their mothers significantly performed longer period of time for vigorous PA than those children who participated in organized PA without their mothers. In addition, one of the studies show that the maintenance of PA habits later in adolescence is found to be contributed by the parental support of child PA (Dowda, et al., 2007). On the other hand, due to the variety of methods applied, findings of some studies are contradictory. For instance, 12 review papers have examined the association between child's PA and parent's PA (for review see (Yao and Rhodes, 2015)). Three of 12 studies do not support the link between child's PA and parent's PA (Trost and Loprinzi, 2011; Bauman, et al., 2012; Sterdt, et al., 2013) while eight of them found the relationship inconclusive (Sallis, et al., 2000; Biddle, et al., 2005; Gustafson and Rhodes, 2006; Van Der Horst, et al., 2007; Edwardson and Gorely, 2010; Craggs, et al., 2011; Biddle, et al., 2011; Webber and Loescher, 2013). Due to different findings, more research on this topic is needed.

Besides parental support, a mounting body of research examines the potential environmental factors that influence the levels of children's PA (Davison and Lawson, 2006; Ferreira, et al., 2006). One of the potential environmental factors is urban green spaces (UGS) (Lachowycz, et al., 2012). Research shows that exercising in green environments is effective in improving psychological well-being (Thompson Coon, et al., 2011) as well as cardiovascular and mental health (Pretty, et al., 2005). Studies indicate that access to UGS is associated with many health benefits for children. Studies, for instance, show that children who live in greener surroundings or have views of and access to green environments are healthier (Grahn, 1996), cope better with stressful life events (Wells and Evans, 2003), have lower rates of depression (Maas, et al., 2009), less stress and anxiety (Chawla, et al., 2014), reduced symptoms of attention deficit disorder (ADD) and attention deficit hyperactivity disorder (ADHD) (Kuo and Faber Taylor, 2004; Faber Taylor and Kuo, 2009), and higher self-discipline (Faber Taylor, et al., 2002), and show more focused attention (Grahn, 1996; Wells, 2000) and reduced inattentiveness (Dadvand, et al., 2015).

While risks of physical inactivity and benefits of UGS for children are known, the results from previous international studies are inconsistent and research from developing countries is inconclusive. Kabisch, et al. (2015) highlights in their review about UGS that research on UGS has been mostly conducted in the developed countries, regardless of the subthemes of the studies outlined. Therefore, developing countries also need actively contributing to scientific research in order to help establish a global framework for the use of UGS (Kabisch, et al., 2015). In addition, previous studies focused on very specific age-ranges (Yao

and Rhodes, 2015) and a few studies conducted with very young children (Zecevic, et al., 2010), which reduces our understanding if parents' physical co-activity and UGS affect all children. Therefore, we wanted to examine if physically more active parents bring up physically more active children as Sigmund, et al., (2008) suggested. In this respect, the aims of this study were to (1) investigate the influence of parents physical co-activity with children on their children's PA (2) and examine the influence of frequency and duration of parents' PA on frequency and duration of children's PA.

2. METHODS

2.1 Study area

Data in this study were collected in Aydın (Figure / Şekil 1), a metropolitan city having 1.38 m² active green space per capita (Department of Parks and Gardens, 2014) in Turkey with a population of 265,234 (Turkish Statistical Institute, 2013). The city of Aydın is located in Aydın Province of Turkey's Aegean Region (37° 43' to 38° 0' North, 27° 45' to 28° 67' East). This city has a typical Mediterranean climate with hot, dry summer and cool, wet winters. The long-term average annual temperature is 17.73 C°. The average maximum temperature is 36.1 C° in July and the average minimum temperature is 4.3 C° in January. The average annual rainfall and number of rainy days are 643.3 mm and 79.8 days, respectively (Meteoroloji Genel Müdürlüğü, 2015).



Figure 1. Study area showing all urban green space (UGS) within city limit (İmar ve Şehircilik Dairesi Başkanlığı, 2013)
Şekil 1. Şehir sınırları içerisindeki tüm kentsel yeşil alanları gösteren çalışma alanı (İmar ve Şehircilik Dairesi Başkanlığı, 2013).

2.2 Data collection-Questionnaire

The dataset was collected through face-to-face personal interviews between April 1 and May 31, 2015 in UGS with parents who gave information about their physical co-activity with children and the children's levels of PA. Seven different UGS such as neighborhood parks, urban parks, and urban greenways were selected throughout the city to reach the parents. The selected UGS were Atatürk Koşuyolu Greenway, Refleksoloji Greenway, Özgecan Aslan Park, Mehmet Selim Kiraz Park, Nevzat Biçer Park, İsmet Sezgin Park, and Tataristan Buğulma Park. Each visit lasted 2-3 hours and took place on weekdays and weekends

in the morning (7-9 a.m.) and in the evening (5-8 p.m.). Parents who agreed to participate in the survey were asked to complete the questionnaire onsite. The questionnaire was prepared to survey a broad range of respondents so as to capture different demographic and socio-economic groups, which took approximately 6 minutes to complete. To determine the optimal sample size for the study, we used the formula of Smith (2013), which was “Necessary sample size = (Z-score)² x StdDev x (1-StdDev) / (margin of error)²”. We chose 95% confidence level, .5 standard deviation, and a margin of error (confidence interval) of +/- 5%. Then, we calculated that minimum 385 respondents were needed. In total, 580 potential respondents were approached of which 420 (72.4%) agreed to answer the questionnaire. Among 420 respondents, 288 parents (68.57%) who had kid(s) were chosen to complete the questionnaire. In total, 422 children aged between 1 and 18 years were reported by parents.

The questionnaire’s three sections were inspired by several other PA studies (Sigmund, et al., 2008; Brockman, et al., 2009; Zecevic, et al., 2010). The first part of the questionnaire asked demographic and socio-economic status (SES) (e.g. gender, age, marital status, education level, occupation, and monthly household income) of parents as studies suggest parents’ SES should be taken into account (Rey-Lopez, et al., 2008; Zecevic, et al., 2010). In the second part, parents were asked to report the walking distance from their home to the nearest UGS. Distances were classified as: less than 100m; 100-250 m; 250–500 m; 500m–1km; 1–3 km; 3–5 km; and more than 5 km. The respondents were also asked if they participate in physical activity with their children in UGS (i.e. yes or no polar question). Parents who answered “yes” were further asked to rate their frequency of PA with their children in UGS on a 5 point Likert scale (seldom or never, 1-2 times a month, weekly, several times per week, and daily.) The respondents were also asked to rate their duration of PA with their children in UGS on a 5 point Likert scale (less than 15 min., 15-30 min., 30 min.–1 h, 1–2 h, and more than 2 h.) In the final part, parents were first asked to give information about their child’s background (e.g. age and gender). Parents who had more than one child also got involved in the survey. Those parents answered questions for their every child who was ≤18 years old. Furthermore, parents were asked “how frequently does your child go to UGS to play, do sports or exercise activities?” on a 5 point Likert scale (seldom or never, 1-2 times a month, weekly, several times per week, and daily) and “how long does your child spend time in UGS to play, do sports or exercise activities?” on a 5 point Likert scale (less than 15 min., 15-30 min., 30 min.–1 h, 1–2 h, and more than 2 h).

2.3 Statistical analysis

All data were checked for normality prior to analysis of variance by using Kolmogorov–Smirnov test. The responses to the frequency and duration of children’s PA were normally distributed. First, bivariate relationships between distance to UGS from home, parents’ physical co-activity, parents’ frequency and duration of PA with children, and children frequency and duration of PA were assessed using correlational analyses (Pearson’s *r*). A *p* value of .05 was used to indicate statistical significance for the bivariate relationships. We viewed the categorical variables of this study as interval-like as they had 5-7 response categories that represent an underlying continuum (DeVellis, 2003).

Next, we performed multivariate linear regression analyses to investigate the association between potential predicting factors (e.g. distance to UGS from home, parents’ physical co-activity, parents’ frequency and duration of PA with children) as independent variables and children’s frequency and duration of PA as dependent variables while controlling for covariates (children’s gender, age, and parents’ marital status, education level, occupation, and household income level) (Table / Tablo 1). The results are presented as unstandardized coefficients (β and SE) with 95% confidence intervals (CI). A *p*-value of .05 is used to indicate statistical significance. SPSS version 18 was used for all statistical analyses (SPSS Inc., 2009).

Table 1. The relationships between variables.
Tablo 1. Değişkenler arasındaki ilişki.

	1	2	3	4	5	6	7	8	9	10	11
1-Children's gender	-										
2-Children's age	-.23*	-									
3-Parent marital status (married)	.21**	-.18***	-								
4-Parent education	.17*	-.12*	-.01	-							
5-Parent occupation (employed)	.06	.05	.11*	.31***	-						
6-Household income	.07	.05	.04	.47***	.18***	-					
7-Distance to UGS from home	.10	.01	.02	-.04	-.02	-.26	-				
8- Frequency of children PA	.15**	-.28***	.12*	-.13**	-.07	.09	-.19***	-			
9- Duration of children's PA	.13	-.05	.03	-.07	-.01	.12**	-.09	.45***	-		
10- Parents' physical co-activity	-.11	-.08	-.03	-.04	-.07	.03	-.20***	.13**	.19***	-	
11-Frequency of parents' PA with children	.10	-.13**	-.06	-.09	-.13*	.03	-.15**	.29***	.19***	.68***	-
12-Duration of parents' PA with children	.06	-.01	-.06	-.06	.01	.14**	-.13**	.15***	.28***	.72***	.57***

Note: *** $p \leq .001$, ** $p \leq .01$, * $p \leq .05$

3. RESULTS

3.1 Characteristics of the study participants

48.1% (203) of the participants were boys and 52.9% (219) were girls among the 422 participants (Table / Tablo 2). The average age of the children was 8.9. 32.5% of children do PA in UGS several times per week while 10.0% do PA in UGS 1-2 times a month. 33.5% of children spend 30 min.-1 h in UGS for PA, which is followed by 1-2 h with 31.3%, whereas 25.8% spends less than 30 min. PA in UGS (Figure 2/Şekil 2). 79.6% of parents participated in physical activity with their children, whereas 20.4% did not. While 28.5% of parents' frequency of PA with their children was weekly, only 6.9% of parents' frequency of PA with their children was daily. Finally, 27.1% of parents' duration of PA with their children was 1-2 h., whereas 12.2% of parents' duration of PA with their children was 15-30 min.

3.2 The relationship between distance to UGS, parents' physical co-activity, and children's PA

As seen in Table / Tablo 3, bivariate correlations showed that there is a significant weak negative associations between distance to UGS from home and parents' physical co-activity ($r = -.20, p \leq .001$), frequency of parents' PA with children ($r = -.15, p \leq .01$), duration of parents' PA with children ($r = -.13, p \leq .01$), and frequency of children's PA ($r = -.19, p \leq .001$). The results revealed that there is a significant weak positive relationships between parents' physical co-activity and frequency of children's PA ($r = .13, p \leq .01$) and duration of children's PA ($r = .19, p \leq .001$). Bivariate correlations also showed a significant moderate positive association between frequency of parents' PA with children and frequency of children's PA ($r = .29, p \leq .001$) and a significant weak positive relationship with duration of children's PA ($r = .15, p \leq .001$). In addition, the results showed a significant weak positive relationship between duration of parents' PA with children and frequency of children's PA ($r = .19, p \leq .001$) and a significant moderate positive relationship with duration of children's PA ($r = .28, p \leq .001$).

3.3 Regression analyses of parents' physical co-activity and children's PA

A series of multivariate linear regression analyses were performed to explore the factors that are associated with children's PA while controlling for covariates (child's gender, age, and parents' marital status, education level, occupation, and household income level) in UGS. In the multivariate regression analysis (Table / Tablo 4), after controlling for the covariates, the findings showed that distance to UGS from home was associated with frequency of children's PA ($\beta = -.13$, SE= .04, 95% CI $-.20 - -.05$), where closer distance to UGS from home was related to more frequency of PA. The results also indicate a significant negative relationship between parents' physical co-activity and frequency of children's PA ($\beta = -.54$, SE= .21, 95% CI $-.96 - -.12$), whereas frequency of parents' PA with children was positively associated with frequency of children's PA ($\beta = .29$, SE= .06, 95% CI $.18 - .40$). In terms of covariates, regression analysis revealed that older children were negatively associated with frequency of PA ($\beta = -.07$, SE= .01, 95% CI $-.09 - -.05$), whereas household income was positively associated with frequency of children's PA ($\beta = .12$, SE= .04, 95% CI $.04 - .19$) while more educated parents were negatively associated with frequency of children's PA ($\beta = -.24$, SE= .06, 95% CI $-.35 - -.13$).

Regarding the duration of children's PA, the regression analyses showed that duration of parents' PA with children was positively associated with duration of children's PA ($\beta = .21$, SE= .06, 95% CI $.10 - .33$). In terms of covariates, the findings indicate that household income was positively associated with duration of children's PA ($\beta = .10$, SE= .04, 95% CI $.02 - .18$), whereas more educated parents were negatively correlated with duration of children's PA ($\beta = -.13$, SE= .06, 95% CI $-.23 - -.02$). No other variable was significantly contributed to the model.

Table 2. Characteristics of the study participants (N= 422)
Tablo 2. Çalışmaya katılanların özellikleri (N= 422)

Variables		Results
Gender	Boys:	48.1%
	Girls:	52.9%
Age	1 to 6:	33.5%
	7 to 12:	39.8%
	13 to 18:	26.7%
Frequency of children's PA	Seldom or never:	11.8%
	1-2 times a month:	10.0%
	Weekly:	28.5%
	Several times per week:	32.5%
	Daily:	17.2%
Duration of children's PA	Less than 15 min.:	10.0%
	15-30 min.:	15.8%
	30 xmin.-1 h.:	33.5%
	1-2 h.:	31.2%
	More than 2 h.:	9.5%
Parents' physical co-activity	Yes:	20.4%
	No:	79.6%
Frequency of parents' PA with children	Seldom or never:	24.4%
	1-2 times a month:	14.9%
	Weekly:	28.5%
	Several times per week:	25.3%
	Daily:	6.9%
Duration of parents' PA with children	Less than 15 min.:	19.9%
	15-30 min.:	12.2%
	30 min.-1 h.:	26.7%
	1-2 h.:	27.1%
	More than 2 h.:	14.0%

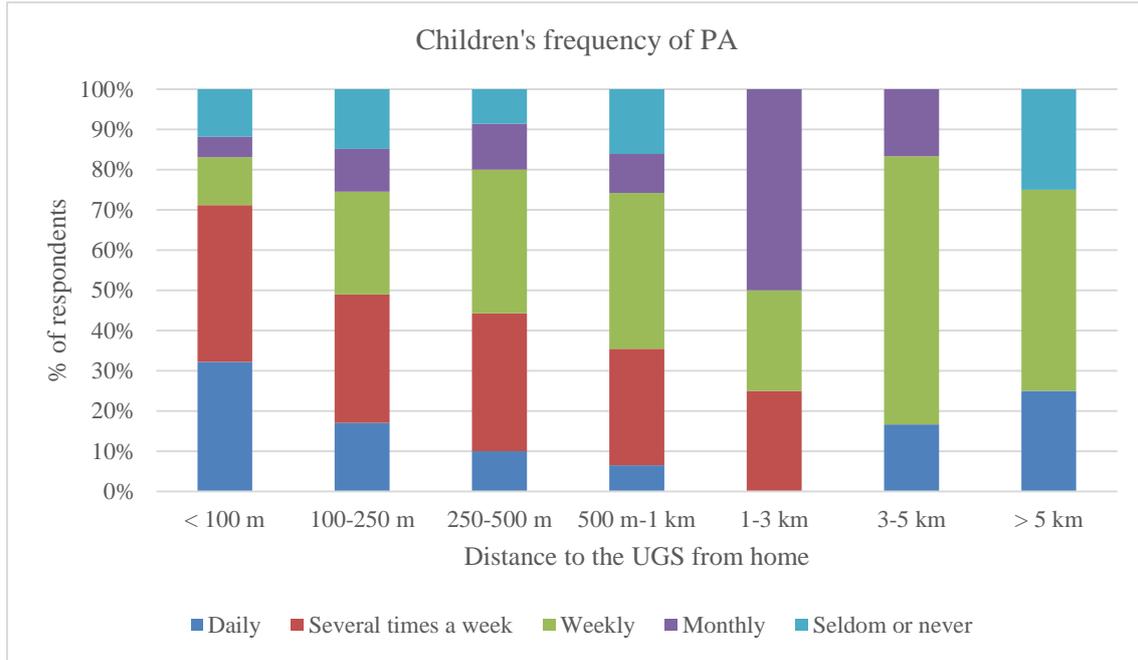


Figure 2. Distance to the UGS from home versus frequency of children's PA, in percent of the respondents.
Şekil 2. Evden kentsel yeşil alana mesafenin çocukların fiziksel aktivite sıklığına göre yüzde olarak durumu.

4. DISCUSSION

This study investigated the influence of parents' physical co-activity and socio-economic status (SES) on children's PA behaviors. As previous research examined (Ferreira, et al., 2006; Hinkley, et al., 2008; Brockman, et al., 2009), we looked at the environmental, personal, and familial factors that may affect children's PA. In terms of environmental factors, our findings in both the bivariate correlation and regression analyses show that closer distance to UGS from home is associated with children's increased frequency and duration of PA. This finding suggests that urban green space should be located within walking distance as the European Environment Agency (EEA) recommends (Stanners and Bourdeau, 1995). Therefore, access to green space within a 15 min. walk of a green space by residents is recommended (Stanners and Bourdeau, 1995; Akpınar, 2014). In addition, green space per capita is an important factor in children's PA. World Health Organization (WHO) recommends that at least 9 m² of green space per person should be provided in cities (OECD, 2013). Similarly, the Turkish Construction Law requires a minimum of 10 m² green space per capita in cities (Ministry of Public Works and Settlement, 1985). Therefore, when distance to UGS from home increases, frequency of children's PA mostly decreases (Figure / Şekil 2).

Table 3. Associations between distance to UGS, parents' physical co-activity, and children's PA.
Tablo 3. Kentsel yeşil alan mesafesi, ebeveynlerin fiziksel aktivite birlikteliği ve çocukların fiziksel aktiviteleri arasındaki ilişki.

Variables	1	2	3	4	5	6	M	SD	Range
1. Distance to UGS from home	-						2.58	1.36	1-7
2. Parents' physical co-activity	-.20***	-					0.80	0.40	0-1
3. Frequency of parents' PA with children	-.15**	.68***	-				2.75	1.26	1-5
4. Duration of parents' PA with children	-.13**	.72***	.57***	-			3.03	1.32	1-5
5. Frequency of children's PA	-.19***	.13**	.29***	.15***	-		3.33	1.21	1-5
6. Duration of children's PA	-.09	.19***	.19***	.28***	.45***	-	3.14	1.11	1-5

Note: ***p ≤ .001, **p ≤ .01, *p ≤ .05, M: Mean, SD: Standard Deviation.

Table 4. Regression analyses of parents' physical co-activity and children's PA.
 Tablo 4. Ebeveynlerin fiziksel aktivite birlikteliği ve çocukların fiziksel aktivitelerinin regresyon analizi

Variables	Frequency of children's PA		Duration of children's PA	
	β	SE	β	SE
Gender (boys)	.10	.10	.06	.04
Age	-.07***	.01	-.15	.11
Parent marital status (married)	.32	.17	.11	.17
Parent education	-.24***	.06	-.13*	.06
Parent occupation (employed)	.04	.11	.03	.11
Household income	.12**	.04	.10*	.04
Distance to UGS from home	-.13**	.04	-.02	.04
Parents' physical co-activity	-.54*	.21	-.14	.21
Frequency of parents' PA with children	.29***	.06	.05	.06
Duration of parents' PA with children	.06	.06	.21***	.06
R ²	.23***		.11***	

Note: *** $p \leq .001$, ** $p \leq .01$, * $p \leq .05$

In regard to parents' influence on children's PA, our findings show that those parents who participate in PA with their children was positively associated with children's frequency and duration of PA with a weaker relationship. However, in general meaning when we added the confounding factors, our results show that parents' physical co-activity was negatively related to frequency of children's PA in UGS, which means parents' participation in children's PA negatively affects frequency of children's PA. On the other hand, similarly to previous studies (Sigmund, et al., 2008; Brockman, et al., 2009; Zecevic, et al., 2010), we found that frequency of parents' PA with children was associated with frequency of children's PA and duration of parents' PA with children was associated with duration of children's PA in UGS. One of the possible explanations for the findings is that when parents take their children to parks or playgrounds for PA, they try to guard them due to the various concerns such as fear of traffic accidents, teenage gangs, or fear of strangers (Clements, 2004; Veitch, et al., 2006), parents may tend to limit children's visit to the UGS for PA. Alternatively, parents' responsibilities at home may have negatively affected frequency of children's PA. If parents, on the other hand, go the UGS to do PA, it positively affects frequency of children's PA. In addition, if parents spend more time in UGS to do PA, this situation have a strong positive effect on duration of children's PA in UGS quite positively. In this respect, our results support "physically more active parents bring up physically more active children" statement made by (Sigmund, et al., 2008).

In terms of personal factors, there were no significant differences between boys and girls. We, on the other hand, found an age-effect among children. The results indicate that older children were associated with less frequency of PA, which is consistent with findings of previous studies (Zecevic, et al., 2010). As demonstrated in earlier studies (Sallis, et al., 1992; Zecevic, et al., 2010), parents' positive influence on children's PA is more apparent on younger children. In regard to parents' SES, our findings reveal that parents who have higher income levels were associated with higher frequency of children's PA, which indicates children of parents having higher income are more physically active than the children of parents' who have a lower income (Sallis and Owen, 1999). In contrast, we found that parents who have less education level were associated with higher frequency of children's PA, which is different from findings of previous studies (Sallis and Owen, 1999; Ferreira, et al., 2006). The differences could be due to the methodology of the studies or countries where the studies were conducted. In addition, while previous studies report that parents' marital status and children's PA has not been enough examined (Hinkley, et al., 2008), our study found no association between parents' marital status and frequency and duration of children's PA nor we found any association for parents' occupation.

5. CONCLUSION

Children's attitudes to PA can be both directly and indirectly influenced by their parents. For that reason, parents hold an important position in terms of influencing their children's PA. The results of this study suggest that frequency and duration of parents' PA may positively affect children's frequency and duration of PA. On the other hand, parents could also negatively influence their children's PA due to some concerns

such as fear of traffic accidents, teenage gangs, or fear of strangers. For that reason, this study suggests that parents' intention is important to lead children physically more or less active. If parents aim to be physically more active and encourage their children to join them, this may improve children's level of PA. More importantly, children might develop healthy lifestyles later in adulthood due to PA during childhood including early childhood (e.g. 0-5 years). Findings of the present study also showed that parents' positive influence on children's PA is more apparent in younger children. There were some differences between the present study and earlier studies conducted in developed countries in terms of SES of parents. For that reason, future studies need to examine the differences between developed and developing countries.

The results of this study draw attention to an important environmental factor. Distance, as many studies suggest, seems to affect children's PA in UGS. Findings show that the closer an UGS to each child's home, the more it is used. In this respect, policy makers and urban planners should pay attention to this important environmental factor. Especially in Turkey, government officials or municipal administrations do not tend to allocate valuable urban lands in monetary terms as open and green spaces (Ortacesme, 2005). Therefore, green spaces in Turkey have undergone an important pressure in cities due to the urbanization. On the other hand, health expenditure has increased to a huge amount in Turkey (Yardim, et al., 2010). While health benefits of PA are well-known (The Ministry of Health, 2014), providing UGS in urbanized Turkish cities may help reduce health expenditure in the long run.

REFERENCES (KAYNAKLAR)

- Akpinar, A., 2014. Kullanıcıların kentsel yeşil yolları kullanım sebepleri, algıları ve tercihlerinin Aydın-Koşuyolu örneğinde incelenmesi (Assessing the users' perceptions, preferences, and reasons for use of urban greenway in Aydın-Koşuyolu province). *Journal of the Faculty of Forestry Istanbul University* 64(2): 41-55.
- Bauman, A., Reis, R. S., Sallis, J. F., Wells, J. C., Loos, R. J. F., Martin, B. W., 2012. Correlates of physical activity: Why are some people physically active and others not?. *Lancet* 380: 258–71.
- Biddle, S. J. H., Atkin, A. J., Cavill, N., Foster, C., 2011. Correlates of physical activity in youth: a review of quantitative systematic reviews. *Int Rev Sport Exerc Psychol* 4: 25–49.
- Biddle, S. J. H., Whitehead, S. H., O'Donovan, T. M., Nevill, M. E., 2005. Correlates of participation in physical activity for adolescent girls: a systematic review of recent literature. *J Phys Act Heal* 2: 423–34.
- Brockman, R., Jago, R., Fox, K. R., Thompson, J. L., Cartwright, K., Page, A. S., 2009. "Get off the sofa and go and play": Family and socioeconomic influences on the physical activity of 10–11 year old children. *BMC Public Health* 9(253).
- CEECD (Centre of Excellence for Early Childhood Development), 2011. Physical activity in early childhood: Setting the stage for lifelong healthy habits. *Parenting Series* 1-4.
- Chawla, L., Keena, K., Pevec, I., Stanley, E., 2014. Green schoolyards as havens from stress and resources for resilience in childhood and adolescence. *Health and Place* 28: 1–13.
- Clements, R., 2004. An investigation of the status of outdoor play. *Contemporary Issues in Early Childhood*, Volume 5, p. 68–80.
- Craggs, C., Corder, K., van Sluijs, E. M. F., Griffin, S. J., 2011. Determinants of change in physical activity in children and adolescents: a systematic review. *Am J Prev Med* 40: 645–58.
- Dadvand, P., Nieuwenhuijsen, M. J., Esnaola, M., Forns, J., Basagaña, X., Alvarez-Pedrerol, M., Rivas, I., López-Vicente, M., De Castro Pascual, M., Su, J., Jerrett, M., Querol, X., Sunyer, J., 2015. Green spaces and cognitive development in primary schoolchildren. *PNAS* 112(26): 7937–7942.
- Davison, K. K., Lawson, C. T., 2006. Do attributes in the physical environment influence children's physical activity? A review of the literature. *International Journal of Behavioral Nutrition and Physical Activity* 3(19).

Department of Parks and Gardens, 2014. *Park ve Bahçeler Müdürlüğü (Department of Parks and Gardens)*. [Online] Available at: <http://www.aydin.bel.tr/belediyemiz/111-park-ve-baher-ml>

DeVellis, R. F., 2003. *Scale Development: Theory and Applications*. 2nd Edition ed. Thousand Oaks, CA: Sage.

Dollman, J., Norton, K., Norton, L., 2005. Evidence for secular trends in children's physical activity behaviour. *British Journal of Sports Medicine* 39: 892–897.

Dowda, M., Dishman, R. K., Pfeiffer, K. A., Pate, R. R., 2007. Family support for physical activity in girls from 8th to 12th grade in South Carolina. *Preventive Medicine* 44(2): 153–159.

Edwardson, C. L., Gorely, T., 2010. Parental influences on different types and intensities of physical activity in youth: a systematic review. *Psychol Sport Exerc*. 11: 522–35.

Faber Taylor, A., Kuo, F. E., 2009. Children with attention deficits concentrate better after walk in the park. *JAD*, 12, : 402–409.

Faber Taylor, A., Kuo, F. E., Sullivan, W. C., 2002. Views of Nature and Self-Discipline: Evidence from Inner City Children. *Journal of Environmental Psychology* 22: 49–63.

Ferreira, I., van der Horst, K., Wendel-Vos, W., Kremers, S., van Lenthe, F. J., Brug, J., 2006. Environmental correlates of physical activity in youth—a review and update. *Obesity Reviews* 8(2): 129–154.

Grahn, P., 1996. Wild nature makes children healthy. *Swedish Building Research* 4: 16–18.

Gunter, K. B., Almstedt, H. C., Janz, K. F., 2012. Physical Activity in Childhood May Be the Key to Optimizing Lifespan Skeletal Health. *Exerc Sport Sci Rev* 40(1): 13–21.

Gustafson, S. L., Rhodes, R. E., 2006. Parental correlates of physical activity in children and early adolescents. *Sports Med*. 36: 79–97.

Hallal, P. C., Victora, C. G., Azevedo, M. R., Wells, J. C. K., 2006. Adolescent physical activity and health: a systematic review. *Sports Medicine* 36: 1019–1030.

Hillman, M., 2006. Children's Rights and Adults' Wrongs. *Children's Geographies* 4: 61–67.

Hinkley, T., Crawford, D., Salmon, J., Okely, A. D., Hesketh, K., 2008. Preschool children and physical activity. A review of correlates. *American Journal of Preventive Medicine* 34(5): 435–441.

İmar ve Şehircilik Dairesi Başkanlığı, 2013. *Aydın Büyükşehir Belediyesi Nazım İmar Planı*. [Art] (Aydın Büyükşehir Belediyesi).

Janssen, I., LeBlanc, A. G., 2010. Review Systematic review of the health benefits of physical activity and fitness in school-aged children and youth. *International Journal of Behavioral Nutrition and Physical Activity* 7(40).

Kabisch, N., Qureshi, S., Haase, D., 2015. Human–environment interactions in urban green spaces — A systematic review of contemporary issues and prospects for future research. *Environmental Impact Assessment Review* 50:25–34.

Kellert, S. R., 2005. *Building for Life: Designing and Understanding the Human–Nature Connection*. Washington, DC: Island Press.

Knuth, A. G., Hallal, P. C., 2009. Temporal trends in physical activity: A systematic review. *Journal of Physical Activity and Health* 6: 548–559.

Kuo, F. E., Faber Taylor, A., 2004. A Potential Natural Treatment for Attention-Deficit/Hyperactivity Disorder: Evidence From a National Study. *American Journal of Public Health* 94(9): 1580–6.

Lachowycz, K., Jones, A. P., Page, A. S., Wheeler, B. W., Cooper, A. R., 2012. What can global positioning systems tell us about the contribution of different types of urban greenspace to children's physical activity?. *Health and Place* 18: 586–594.

Louv, R., 2008. *Last child in the woods: Saving our children from Nature-Deficit Disorder*. s.l.:Algonquin Books.

Maas, J., Verheij, R. A.; De Vries, S., Spreeuwenberg, P., Schellevis, F. G., Groenewegen, P. P., 2009. Morbidity is related to a green living environment. *Journal of Epidemiology and Community Health* 63(12): 967-973.

Meteoroloji Genel Müdürlüğü, 2015. *Resmi İstatistikler (İllerimize Ait İstatistik Veriler) (Official Statistics (Statistical data of our provinces))*. [Online]

Available at: <http://www.mgm.gov.tr/veridegerlendirme/il-ve-ilceler-istatistik.aspx?m=AYDIN>

Ministry of Public Works and Settlement, 1985. *Construction Law No. 3194*, Ankara: Ministry of Public Works and Settlement.

Motl, R. W., Birnbaum, A. S., Kubik, M. Y., Dishman, R. K., 2004. Naturally occurring changes in physical activity are inversely related to depressive symptoms during early adolescence. *Psychosomatic Medicine* 66: 336-342.

OECD, 2013. *Frameworks and sector policies for urban development in Chile*, Chile: OECD Urban Policy Reviews.

Ortacesme, V., 2005. *Planning, Legislation and Implementation Problems of Green Spaces in the Case of Antalya City, Turkey*. Vienna, s.n., : 1-7.

Pretty, J., Peacock, J., Sellens, M., Griffin, M., 2005. The mental and physical health outcomes of green exercise. *International Journal of Environmental Health Research* 15(5): 319-337.

Rey-Lopez, J. P., Vicente-Rodriguez, G., Biosca, M., Moreno, L. A., 2008. Sedentary behaviour and obesity development in children and adolescents. *Nutrition, Metabolism and Cardiovascular Diseases* 18: 242-251.

Sağlık Bakanlığı, 2014. *Türkiye Beslenme ve Sağlık Araştırması 2010: Beslenme Durumu ve Alışkanlıklarının Değerlendirilmesi Sonuç Raporu (Turkey Nutrition and Health Survey 2010: Status and Assessment of Nutritional Habits Final Report)*, Ankara: Sağlık Bakanlığı Sağlık Araştırmaları Genel Müdürlüğü, Hacettepe Üniversitesi Sağlık Bilimleri Fakültesi Beslenme ve Diyetetik Bölümü, Ankara Numune Eğitim ve Araştırma Hastanesi.

Sallis, J. F., Alcaraz, J. E., McKenzie, T. L., Howel, M. F., Kolody, B., Nader, P. R., 1992. Parental behavior in relation to physical activity and fitness in 9 year old children. *American Journal of Diseases of Children* 146: 1383-1388.

Sallis, J. F., Owen, N., 1999. *Physical activity and behavioral medicine*. Thousand Oaks, London: SAGE.

Sallis, J. F., Prochaska, J. J., Taylor, W. C., 2000. A review of correlates of physical activity of children and adolescents.. *Med Sci Sports Exercise* 32: 963-75.

Sibley, B. A., Etnier, J. L., 2003. The relationship between physical activity and cognition in children: A meta-analysis. *Pediatric Exercise Science* 15: 243-256.

Sigmund, E., Turoňová, K., Sigmundová, D., Přidalová, M., 2008. The effects of parents'physical activity and inactivity on their children's physical activity and sitting. *Acta Univ. Palacki. Olomuc., Gymn.* 38(4): 17-24.

Smith, S., 2013. *Determining Sample Size: How to Ensure You Get the Correct Sample Size*. [Online]

Available at:<http://www.qualtrics.com/blog/determining-sample-size/> [Accessed 10 April 2014].

SPSS Inc. Released 2009. PASW Statistics for Windows, Version 18.0. Chicago: SPSS Inc.

Stanners, D., Bourdeau, P., 1995. The urban environment. In: D. Stanners and P. Bourdeau, eds. *Europe's Environment: The Dobris Assessment*. Copenhagen: European Environment Agency, p. 261-296.

Steinbeck, K. S., 2001. The importance of physical activity in the prevention of overweight and obesity in childhood: a review and an opinion. *Obesity Reviews* 2: 117-130.

Sterd, E., Liersch, S., Walter, U., 2013. Correlates of physical activity of children and adolescents: a systematic review of reviews. *Health Education Journal* 73: 72-89.

Strong, W. B., Malina, R. M., Blimkie, C. J. R., Daniels, S. R., Dishman, R. K., Gutin, B., Hergenroeder, A. C., Must, A., Nixon, P. A., Pivarnik, J. M., Rowland, T., Trost, S., Trudeau, F., 2005. Evidence Based Physical Activity for School-age Youth. *The Journal of Pediatrics* 146(6): 732-737.

The Ministry of Health, 2014. *Physical Activity Guidelines for Turkey*, Ankara: The Ministry of Health of Turkey, Public Health Institution, Department of Obesity, Diabetes and Metabolic Diseases.

Thompson Coon, J., Boddy, K., Stein, K., Whear, R., Barton, J., Depledge, M. H., 2011. Does participating in physical activity in outdoor natural environments have a greater effect on physical and mental wellbeing than physical activity indoors? A systematic review.. *Environ. Sci. Technol.* 45: 1761–1772.

Timmons, B. W., LeBlanc, A. G., Carson, V., Gorber, S. C., Dillman, C., Janssen, I., Kho, M. E., Spence, John C.; Stearns, Jodie A.; Tremblay, Mark S. 2012. Systematic review of physical activity and health in the early years (aged 0–4 years). *Appl. Physiol. Nutr. Metab.* 37: 773–792.

Trost, S. G., Kerr, L. M., Ward, D. S., Pate, R. R., 2001. Physical activity and determinants of physical activity in obese and non-obese children. *International Journal of Obesity* 25: 822–829.

Trost, S., Loprinzi, P. D., 2011. Parental influences on physical activity behavior in children and adolescents: A brief review. *Am J Lifestyle Med.* 5: 171–81.

Turkish Statistical Institute, 2013. *Seçilmiş göstergelerle Aydın 2013 (With selected indicators Aydın 2013)*, Ankara: TÜİK.

Van Der Horst, K., Paw, M. J. C., Twisk, J. W. R., Van Mechelen, W., 2007. A brief review on correlates of physical activity and sedentariness in youth. *Med Sci Sport Exerc.* 39: 1241–50.

Veitch, J., Bagley, S., Ball, K., Salmon, J., 2006. Where do children usually play? A qualitative study of parents' perceptions of influences on children's active freeplay. *Health and Place* 12: 383–393.

Webber, K. J., Loescher, L. J., 2013. A systematic review of parent role modeling of healthy eating and physical activity for their young African-American children. *J Spec Pediatr Nurs.* 18: 173–88.

Wells, N. M., 2000. At Home With Nature Effects of “Greenness” on Children's Cognitive Functioning. *Environment and Behavior* 32(6): 775-795.

Wells, N. M., Evans, G. W., 2003. Nearby nature: A buffer of life stress among rural children. *Environment and Behavior* 35(3): 311-330.

Woolley, H., 2006. Freedom of the city: contemporary issues and policy influences on children and young people's use of public open space in England. *Geographies* 4: 45–59.

Yao, C. A., Rhodes, R. E., 2015. Parental correlates in child and adolescent physical activity: a meta-analysis. *International Journal of Behavioral Nutrition and Physical Activity* 12(10).

Yardim, M. S., Cilingiroglu, N., Yardim, N., 2010. Catastrophic health expenditure and impoverishment in Turkey. *Health Policy* 94: 26–33.

Zecevic, C. A., Tremblay, L., Lovsin, T., Michel, L., 2010. Parental Influence on Young Children's Physical Activity. *International Journal of Pediatrics*, 2010.