

Parent's Social Support for Children's Outdoor Physical Activity: Do Weekdays and Weekends Matter?

Michael W. Beets · Randy Vogel · Stanley Chapman ·
Kenneth H. Pitetti · Bradley J. Cardinal

Published online: 5 January 2007
© Springer Science + Business Media, LLC 2007

Abstract In this study we examined the relationships among parental social supportive behaviors for children's weekday and weekend outdoor physical activity (OPA). Thirty-nine girls and 29 boys 8 to 11 years wore pedometers for 7 days. Sixty-five mothers and 50 fathers responded to a social support questionnaire about OPA that was comprised of four dimensions: encouragement, playing with, use of activity as family recreation, and watch. After controlling for age and sport participation, regression analyses indicated that mothers' use of activity as recreation was positively associated with girls' weekday OPA. On the weekend, fathers' play with son was positively related to OPA. The effectiveness of family-based activity interventions depends on when parents have opportunities to be present for their child's activity and gender differences in the support provided.

Keywords Pedometer · Family · Children · Health-related parenting practices

The importance of parents in the acquisition of the physical activity behaviors of children cannot be overstated (Brustad, 1993). Involvement by parents in their child's activity has both an immediate impact on a child's current activity levels and lasting effects on subsequent activity during adulthood (Thompson, Humbert, & Mirwald, 2003).

Parents can influence activity, directly and indirectly, through a variety of similar, yet distinct behaviors. They can serve as role models of appropriate and inappropriate activity levels (Raudsepp & Viira, 2000) and as reinforcers of activity as well as inhibitors of sedentary behaviors (Epstein, 1998). Parents also promote activity and are motivators for future engagement through verbal encouragement and praise (Brustad, 1996). Of these various influences, parental provision of activity-related social support (e.g., encouragement, praise, perform activity with child) has demonstrated the most consistent relationship with increased activity levels of children (Beets, Vogel, Forlaw, Pitetti, & Cardinal, 2006; Brustad, 1993; S. C. Duncan, T. E. Duncan, & Strycker, 2005; Trost et al., 2003). Yet despite the evidence that parents are important facilitators, interventions targeting parental involvement in promoting children's activity have resulted in limited successes (Kahn et al., 2002).

Both mothers and fathers influence their child's activity, but they do so differently. Mothers have been found to provide more assistive support (e.g., payment of fees), whereas fathers more overtly influence their child's activity, such as by planning family outings specifically to engage in activity and participating in activity directly with their child (Davison, Cutting, & Birch, 2003). These qualitative differences in maternal and paternal involvement are possibly a reflection of parenting styles. Mother-child interactions are characterized as nurturing, caring, and providing protection (Paquette, 2004). In the context of activity behaviors, these functions may manifest as promoting involvement through the reduction of barriers (e.g., payment of fees) and the provision of verbal encouragement. Fathers, on the other hand, are characterized as fulfilling an 'activation' role in the development of their children and this is primarily seen as increased levels of

M. W. Beets (✉) · B. J. Cardinal
Department of Public Health, Oregon State University,
256 Waldo Hall, Corvallis, OR 97331-6406, USA
e-mail: beetsm@onid.orst.edu

R. Vogel
U.S.D. 264, Clearwater, KS, USA

S. Chapman · K. H. Pitetti
Wichita State University, Wichita, KS, USA

father–child physical play (Paquette, 2004). Explicit use of one's own activity to influence the child's activity would serve as a direct representation of the activation role.

Gender differences in activity behaviors, socialization of activity involvement, and the amount of time parents have to spend with their child may also explain the differences in parent–child interactions for activity. Fathers engage in greater amounts of physical activity with their sons (MacDonald & Parke, 1986), whereas mothers are more likely to influence their daughters' activity (O'Loughlin, Paradis, Kishchuk, Barnett, & Renaud, 1999). In comparisons to the rough-and-tumble play characteristic of father–child activity, mothers are more likely to initiate less physically demanding forms of activity (e.g., object oriented play) with their child (Isley, O'Neil, Clafelter, & Parke, 1999; MacDonald & Parke, 1986). Both fathers and mothers promote greater sports involvement for boys than for girls (Eccles & Harrold, 1991), which suggests societal norms for gender-appropriate activities. A further difference between maternal and paternal involvement is likely to arise from the traditional provider role fathers serve (Christiansen & Palkovitz, 2001). Western cultures characterize fathers as the primary provider of economic resources (Hewlett, 2003). This leads fathers to spend less time with their children than mothers do, and that time reduction occurs primarily during the weekdays. Recent studies indicate that fathers spend over 3 h on a typical weekend day with their child but only a little over 1 h per day during the week (Yeung, Sandberg, Davis-Kean, & Hofferth, 2001). If fathers are limited in their ability to engage in activities with their children during the week, they may compensate for this on the weekend. It would seem reasonable, therefore, to expect the weekend to be the primary time when fathers have the opportunity to be active with their children.

Outdoor play is associated with increased levels of activity (T. Baranowski, Thompson, DuRaunt, J. Baranowski, & Puhl, 1993; Burdette & Whitaker, 2005; R. C. Klesges, Eck, Hanson, Haddock, & L. M. Klesges, 1990). However, relatively little attention has been given to this important domain of physical activity; the majority of the social support and physical activity studies have been focused on supportive behaviors for sports participation (Baxter-Jones & Maffulli, 2003; Eccles & Harrold, 1991; Fredricks & Eccles, 2005) or overall levels of physical activity (Prochaska, Rodgers, & Sallis, 2002; Sallis, Alcaraz, McKenzie, & Hovell, 1999; Sallis et al., 1992), regardless of the type. Outdoor play, apart from its potential to increase energy expenditure and, subsequently, to reduce obesity rates, may also promote positive affect, affiliation, and attention, aspects suggested to promote overall well-being (Burdette & Whitaker, 2005). It is essential, therefore, that, when practitioners are attempting to design effective family-based

physical activity interventions, they give the necessary attention to the role parents play in fostering outdoor play opportunities.

The examination of paternal and maternal social support for children's activity has to date focused on the overall provision of social support without taking into context the timeframe when parents are more or less available to be involved with their child. Although the distribution of economic responsibilities is shifting toward a more egalitarian family structure, fathers remain the primary provider (Hochschild & Machung, 1989), and as a result, they this are likely to exhibit considerable differences in the amount of time they have on weekdays or weekends to support their child's activity. Further, differences in the type of support provided between mothers and fathers, and who the recipient is (i.e., daughters or sons) may also vary. Therefore, the purpose of this study was to examine the relationship among the provision of social support by mothers and fathers for weekday and weekend day physical activity of elementary boys and girls. We hypothesized the contribution of mothers and fathers social support would vary as a function of the gender of the child (i.e., boys vs. girls) and the timeframe specified (i.e., weekdays vs. weekend days). Specifically, we hypothesized that the fathers' supportive behaviors would influence weekend activity, with greater influence for boys than girls. Conversely, we hypothesized that the mothers' social support would be related to weekday activity, with greater influences for girls than boys.

Method

Participants

A stratified (grade level) cluster (classrooms) sample of children were randomly selected from one rural school district in the Midwest to participate in the study. Classes were stratified by grade with two third, two fourth, and one fifth grade class representing the final sample. We chose to include more third and fourth graders in the final sample based on a priori assumptions that parents exhibit greater influence over younger children's physical activity (Sallis, Prochaska, & Taylor, 2000). Same sex sibling pairs ($n=3$) were excluded from the final sample due to non-independence of responses from parents. All procedures outlined in the following section were approved by the school administrators, teachers, and a university's Institutional Review Board. Parents were informed and asked to participate through informational material developed specifically for this study. Children provided verbal assent to participate in the study. Data were collected during the 2005 spring academic term.

Table 1 Descriptive characteristics for girls ($n=39$) and boys ($n=29$).

Variable	Girls		Boys	
	Mean	SD	Mean	SD
Age (decimal)	10.0	±0.8	10.1	±0.8
Standing height (cm)	139.4	±8.4	139.9	±8.3
Weight (kg)	36.5	±8.0	39.1	±13.2
Body mass index	18.6	±2.6	19.7	±5.1
Steps weekday	11,738.7	±3,046.4	12,203.8	±3,412.2
Steps weekend	13,023.7	±4,981.3	14,638.9	±6,010.4

A total of 65 mothers and 50 fathers, of the 103 children in the sample, responded. This resulted in a 63.1 and 48.5% response rate for mothers and fathers, respectively, and a final sample size of 68 children. The final sample was comprised of 39 girls ($M=10.0$ years, $SD=0.8$) and 29 boys ($M=10.1$ years, $SD=0.8$). The majority of the sample was self-designated as White non-Hispanic (97%) and all attended one elementary school located in a rural Midwestern town (population 2,178) outside a large Metropolitan city (US Census Bureau, 2000). Descriptive characteristics of the final sample are presented in Table 1.

Measures

Height (cm) and weight (lbs) were measured (without shoes) during regularly scheduled physical education class. Where appropriate, units were converted to metric (e.g., lbs to kg) and body mass index (BMI) computed for descriptive purposes. Participants' age in decimal was calculated by subtracting their date of birth from the date of assessment.

The primary outcome measure for the study was total daily activity. Activity was defined as the average number of daily steps (Walk4Life 2525 pedometer; Plainfield, IL) accrued during week and weekend days. Weekday activity was defined as the average number of steps taken from Monday to Friday. Weekend activity was defined as the average number of steps taken from Saturday morning to Monday morning. Children's activity was monitored for seven consecutive days. Prior studies have found that pedometers provide an accurate record of step counts for children (Beets, Patton, & Edwards, 2005).

A questionnaire that assessed the dimensional aspects of social support for activity was modified from previous social support questionnaires (Davison et al., 2003; Prochaska et al., 2002) and filled out by mothers and fathers, separately. The four dimensions of social support used in the present study were: encouragement; watching; playing with; and family use of outdoor play as recreation. These items were selected to reflect types of supportive behaviors that correspond with outdoor play activities (e.g., playing in the yard, free play, riding bikes). Cartoon illustrations of

children participating in various outdoor play activities (e.g., hop scotch, climbing trees, swinging) were included in the questionnaire to assist in the understanding of the specific activities to which items referred. Separately, both mothers and fathers responded to how often, during an average week, they provided social support to their children for two specific timeframes—weekdays (Monday through Friday) and weekends (Saturday and Sunday). Responses ranged from never (0) to everyday (4). The reliability of the items were for mothers: weekday $\alpha=0.71$; and weekend $\alpha=0.69$; and for fathers: weekday $\alpha=0.69$; and weekend $\alpha=0.82$.

Procedures

Prior to the week of data collection, all children were familiarized with placement of the pedometers and the recording protocol. On Monday morning, the children were assigned a pedometer and instructed to wear the device for the entire day until the following morning. Upon arrival at school on the subsequent morning, all children met in the gym where their previous day's step counts were recorded with the assistance of the physical education teacher and research staff members. All information was recorded in an activity logbook provided by the research team. The logbook contained detailed illustrations of how to operate the pedometer (e.g., reset the unit). In the logbook, children indicated whether the pedometer had been worn for the entire past 24 h, if not, why not, and how long the device was not worn. In addition, they were asked to report the number of hours and minutes they spent participating in an individual or team sport activity for each 24 h period. To assist recall, cartoon illustrations that depicted children playing various sports (e.g., basketball, football, swimming) were included in the logbook. Once all the information for the previous day was recorded, the pedometers were reset to zero and affixed to the child's waistline. This protocol was repeated on each successive morning of the weekday. For weekend activity, children (with the assistance of their parents) recorded the pedometer step counts in a take-home version of the activity logbook. On the last day of monitoring (i.e., the following Monday) the children met in the gym as usual, at which time Sunday's activity was

recorded, and Friday's and Saturday's information collected, and the pedometers returned.

The parent social support questionnaires were provided to children during physical education class on the first Monday of the activity collection. Children were instructed to take home the questionnaire, asked their parents to answer the questions, and return the form by the following Monday.

Analysis

All data were screened for missing data and outliers. Missing data occurred with approximately 5% of the sample. We used multiple imputations procedure (mvis) in Stata (v.8) (Royston, 2004) to impute missing data for the regression analysis. Ten imputed data sets were generated and used to compute ten solutions of the final regression analyses (described below). The coefficients (i.e., standardized and unstandardized), 95% confidence intervals (95CI), and effect statistics (i.e., proportion of variance explained) from the ten imputed datasets were averaged to form the final regression output. All regression procedures are reported as the average coefficients, 95CI, and proportion of variance for each of the regression analyses.

The relationship of maternal and paternal social support to their child's activity, for each timeframe, was determined using multiple regression modeling for boys and girls, separately. The dependent variables for the models were weekend or weekday average step counts. Entry of age was

performed to control for its potential influence on pedometer determined activity levels (Le Masurier et al., 2005). Further, because pedometers collect information (i.e., steps) for all daily activities (sports, free play, or other), the average number of minutes the children reported participating in sports for weekdays and weekend days was entered into the models to control for its potential effect on average weekday and weekend step counts, respectively. Overall, a total of eight models were computed which represented: mothers' support for girls' and boys' weekday and weekend activity, and fathers' support for girls' and boys' weekday and weekend activity.

Results

Both boys and girls participated in greater amounts of activity on the weekend than on weekdays. There were no significant differences in the amount of activity between boys and girls for either weekend or weekday. The regression analyses revealed two significant findings by timeframe and parent-child relationship: one for father-sons and one for mother-daughters (see Table 2). For boys' weekend activity, fathers' doing activity with the children was positively associated with increased activity levels; the overall model explained approximately 59.6% of the variance in boys' weekend step counts. For the girls', mothers' using outdoor play as recreation during the weekday was the only significant contributor to activity;

Table 2 Standardized and unstandardized coefficients for fathers' social support for boys' weekend step counts and mothers' social support for girls' weekday step counts.

Girls' weekday steps	Unstandardized	β	<i>p</i> value	95CI ^a
Child characteristics				
Age (yrs)	-688.0	-0.186	0.176	(-1,685.0, 309.0)
Sports (min) ^b	40.6	0.412	0.007	(11.3, 69.9)
Mothers' social support				
Encourage	377.4	0.102	0.536	(-817.7, 1,572.5)
Watch	328.6	0.100	0.593	(-876.3, 1,533.4)
Use as recreation	1,653.2	0.371	0.036	(104.0, 3,202.4)
Do activity with	-362.2	-0.073	0.704	(-2,231.9, 1,507.4)
Boys' weekend steps				
Child characteristics				
Age (yrs)	494.5	0.059	0.785	(-3,065.9, 4,055.0)
Sports (min) ^b	-13.1	-0.118	0.624	(-65.8, 39.5)
Fathers' social support				
Encourage	-2,860.9	-0.335	0.158	(-6,830.0, 1,108.2)
Watch	-1,626.5	-0.236	0.454	(-5,888.4, 2,635.4)
Use as recreation	367.2	0.061	0.820	(-2,787.5, 3,521.8)
Do activity with	7,146.1	0.855	0.020	(1,131.4, 13,160.7)

^a 95% Confidence Intervals for Unstandardized estimates.

^b Average number of minutes reported participating in team/individual sports for each timeframe (weekday or weekend days), separately.

the overall model explained approximately 45% of the variance in girls' weekday activity. No other significant relations were observed for boys' weekday activity and social support from either mother or father, or weekend activity with mothers' social support, or for girls' weekend activity and social support from mother or father, or weekday activity and fathers' social support.

Discussion

Parents are an important component in the development of both health-enhancing and health-compromising behaviors of their children (Perry, Crockett, & Pirie, 1987). In the context of children's activity levels, parents are considered the "gatekeeper," that is depending on their own behaviors they either inhibit or promote the activity of their children. As Charles Swindoll stated, "Each day we [parents] make deposits in the memory banks of our children" (Roberts, 2005). One of the primary mechanisms by which parents influence activity levels is through the provision of social support (Sallis et al., 2000) and this may vary according to when parents have the opportunity to interact with their children (Yeung et al., 2001). In the present study we investigated these issues by examining the relationship among paternal and maternal support for activity for boys and girls during weekdays and weekends.

Two differences emerged between maternal and paternal provision of support: who received the support, and when the support was provided. Mothers' use of outdoor play as recreation was the only support type associated with girls' activity (i.e., weekday activity), which suggests that planning outdoor play as family recreation is a primary form of support for girls' physical activity during after school hours. The item "use of outdoor play as recreation" referred to such examples as ride bikes, play at a local park/playground, and walking, and it may have been interpreted by the respondents as the scheduling of outdoor-type activities for their daughter. This would be consistent with prior research that indicated that mother's contributions are in the form of logistic support (e.g., enrolling daughter activities; Davison et al., 2003). Such an interpretation would account for the lack of relationship of the "do activity with" social support question. It is feasible for mothers to use outdoor play as recreation without being directly involved in their daughter's activity. For instance, at a playground/park a child can play on the equipment (e.g., jungle gym) while the mother sits on the park bench. Thus, taking one's child to the park may be interpreted as use of outdoor play as family recreation whether the mother herself is active or not. The question we used did not indicate if the mother was directly involved in the activity selected as

family recreation, and that limitation complicates our understanding of the data. Also, pedometers do not register activity that does not involve hip movement, therefore the reference to biking as a form of family outdoor recreation may mask the relationship further if biking is a primary form of activity in which the family engages. Nonetheless, mothers' use of outdoor play as recreation suggests that providing amenities (e.g., safe parks and neighborhoods) within which mothers can take their daughter to be physically active may be an effective strategy for promoting physical activity (Sallis, McKenzie, Elder, Broyles, & Nader, 1997). If mothers are not directly involved in their daughter's activity, providing amenities tailored to the mother (e.g., comfortable benches, opportunity to interact with other mothers) may increase the likelihood that outdoor play is chosen as a recreational activity. Girls are also more likely to be supervised by their parents than boys are (Fagot, 1994); "supervision" in the current sample could have come in the form of the mothers use of outdoor play as recreation, which would necessitate the mothers' presence. These are interesting questions to consider, but these postulations require empirical support.

The relationship between fathers' play with sons and sons' activity levels suggests future interventions should target fathers' interactions with their sons on the weekend. Programs might focus on building relationships with community institutions, such as local recreation facilities (e.g., YMCA) to offer discounts for father-son pairs. Communities could also sponsor local events that target father-son activity in parks and festivals. An increase in father-son time is likely to come at the expense of time from other activities. It would therefore be necessary to provide strategies to fathers for budgeting their time in order to ensure sufficient father-son involvement.

Although the present findings are informative, caution needs to be exercised in their interpretation. The small sample size reduced the power to detect significant effects and it may have masked other relationships among the girls/boys and mother/father activity and social supportive behaviors. The homogeneous sample (primarily White non-Hispanic from two-parent families) limits the generalizability of the findings. Also, we did not assess the amount of time spent in other types of activities (e.g., indoor play) in order to control for this influence in the analysis. We recognize that numerous other types of parental social support may have been taking place, but were not assessed. The questions used in the current study were selected through earlier pilot work, along with the need to lower the response burden for the parents. Future studies should include additional support items, because it is likely that other unique maternal and paternal supportive behaviors exist, and these may vary depending on the timeframe assessed. Finally, restraints precluded us from collecting

demographic information on the parents. This limits the conclusions about the occupational responsibilities of both parents, socioeconomic status, or cultural values associated with activity. However, the community from which the sample was derived is fairly homogeneous (US Census Bureau, 2000), which provides some assurance of the homogeneity of the parents.

Yet despite these cautionary notes, the present study has several methodological strengths: the use of an objective measure of activity (i.e., pedometer), separate paternal and maternal report of support behavior, and the division of the weekdays versus the weekend for these. Furthermore, we attempted to control for the potential influence of sports participation by including the average number of minutes of sport involvement for both the weekday and weekend analyses. Only a few studies have separated the contribution of maternal and paternal supportive behaviors and reported distinct contributions from each provider (Davison et al., 2003; Greendorfer & Lewko, 1978). Based on the current results it appears to be necessary for practitioners to assess the unique contribution of parental support to children's activity, including the different means by which mothers and fathers influence activity behaviors. To our knowledge this is the first study to examine weekday versus weekend support with an objective measure of physical activity. Our findings underscore the importance of accounting for variations in parental behaviors across timeframes when parents are able to provide support to their child.

The contribution of mothers to daughters; and fathers to sons' activity indicates, within the current sample at least, that parental supportive behaviors are related to the amount of activity children exhibit, yet are fundamentally different based on *what* was provided, to *who* provided it, to *whom* it was provide, and *when* the provision occurred. Interventions that attempt to involve parents in increasing children's activity levels may experience greater success when practitioners delineate, not only the differences in support between mothers and fathers, but also account for when the parent has time to spend with the child.

Acknowledgement We would like to extend our appreciation to the children and parents who made this study possible. Further, we would like to recognize the school administrators who graciously allowed us into their school. We could not have accomplished our work without all of their assistance.

References

- Baranowski, T., Thompson, W. O., DuRaunt, R. H., Baranowski, J., & Puhl, J. (1993). Observations on physical activity in physical locations: Age, gender, ethnicity, and month effects. *Research Quarterly for Exercise and Sport*, 64(2), 127–133.
- Baxter-Jones, A. D. G., & Maffulli, N. (2003). Parental influences on sport participation in elite young athletes. *Journal of Sports Medicine and Physical Fitness*, 43, 250–255.
- Beets, M. W., Patton, M. M., & Edwards, S. (2005). The accuracy of pedometer steps and time during walking in children. *Medicine and Science in Sports and Exercise*, 37(3), 513–520.
- Beets, M. W., Vogel, R., Forlaw, L., Pitetti, K. H., & Cardinal, B. J. (2006). Social support and youth physical activity: The role of provider and type. *American Journal of Health Behavior*, 30(3), 278–289.
- Brustad, R. J. (1993). Who will go out and play? Parental and psychological influences on children's attraction to physical activity. *Pediatric Exercise Science*, 5, 210–223.
- Brustad, R. J. (1996). Attraction to physical activity in urban schoolchildren: Parental socialization and gender influences. *Research Quarterly for Exercise and Sport*, 67(3), 316–323.
- Burdette, H. L., & Whitaker, R. C. (2005). Resurrecting free play in young children: Looking beyond fitness and fatness to attention, affiliation, and affect. *Archives of Pediatrics and Adolescent Medicine*, 159, 46–50.
- Christiansen, S. L., & Palkovitz, R. (2001). Why the "Good Provider" role still matters: Providing as a form of paternal involvement. *Journal of Family Issues*, 22(1), 84–106.
- Davison, K. K., Cutting, T. M., & Birch, L. L. (2003). Parents' activity-related parenting practices predict girls' physical activity. *Medicine and Science in Sports and Exercise*, 35(9), 1589–1595.
- Duncan, S. C., Duncan, T. E., & Strycker, L. A. (2005). Sources and type of social support in youth physical activity. *Health Psychology*, 24(1), 3–10.
- Eccles, J. S., & Harrold, R. D. (1991). Gender differences in sport involvement: Applying the Eccle's expectancy value model. *Journal of Applied Sport Psychology*, 3, 7–35.
- Epstein, L. H. (1998). Integrating theoretical approaches to promote physical activity. *American Journal of Preventive Medicine*, 15(4), 257–265.
- Fagot, B. L. (1994). Peer relations and the development of competence in boys and girls. In C. Leaper (Ed.), *Childhood segregation: Causes and consequences* (pp. 53–66). San Francisco, CA: Jossey-Bass.
- Fredricks, J. A., & Eccles, J. S. (2005). Family socialization, gender, and sport motivation and involvement. *Journal of Sport and Exercise Psychology*, 27, 3–31.
- Greendorfer, S. L., & Lewko, J. H. (1978). Role of family members in sport socialization of children. *Research Quarterly*, 49(2), 146–152.
- Hewlett, B. S. (2003). Fathers in forager, farmer, and pastoral cultures. In M. E. Lamb (Ed.), *The role of fathers in child development* (pp. 182–195). Hoboken, NJ: Wiley.
- Hochschild, A., & Machung, A. (1989). *The second shift: Working parents and the revolution at home*. New York: Viking.
- Isley, S. L., O'Neil, R., Clafelter, D., & Parke, R. D. (1999). Parent and child expressed affect and children's social competence: Modeling direct and indirect pathways. *Developmental Psychology*, 35(2), 547–560.
- Kahn, E. B., Ramsey, L. T., Brownson, R. C., Heath, G. W., Howze, E. H., Powell, K. E., et al. (2002). The effectiveness of interventions to increase physical activity. A systematic review. *American Journal of Preventive Medicine*, 22(4), 73–107 (Suppl).
- Klesges, R. C., Eck, L. H., Hanson, C. L., Haddock, C. L., & Klesges, L. M. (1990). Effects of obesity, social interactions, and physical environment on physical activity in preschoolers. *Health Psychology*, 9(4), 435–449.
- Le Masurier, G. C., Beighle, A., Corbin, C. B., Darst, P. W., Morgan, C., Pangrazi, R. P., et al. (2005). Pedometer-determined physical

- activity levels of youth. *Journal of Physical Activity and Health*, 2(2), 159–168.
- MacDonald, K., & Parke, R. D. (1986). Parent–child physical play: The effects of sex and age of children and parents. *Sex Roles*, 15(7/8), 367–378.
- O’Loughlin, J., Paradis, G., Kishchuk, N., Barnett, T., & Renaud, L. (1999). Prevalence and correlates of physical activity behaviors among elementary schoolchildren in multiethnic, low income, inner-city neighborhoods in Montreal, Canada. *Annals of Epidemiology*, 9(7), 397–407.
- Paquette, D. (2004). Theorizing the father–child relationship: Mechanisms and developmental outcomes. *Human Development*, 47, 193–219.
- Perry, C. L., Crockett, S. J., & Pirie, P. (1987). Influencing parental health behavior: Implications of community assessments. *Health Education*, 18(5), 68–77.
- Prochaska, J. J., Rodgers, M. W., & Sallis, J. F. (2002). Association of parent and peer support with adolescent physical activity. *Research Quarterly for Exercise and Sport*, 73, 206–210.
- Raudsepp, L., & Viira, R. (2000). Influence of parents’ and siblings’ physical activity on activity levels of adolescents. *European Journal of Physical Education*, 5(2), 169–178.
- Roberts, C. (2005). *Cooking with kids—Safely!—Cooking-tips*: URL <http://www.free-health-information.com/cooking-tips/40491.shtml>.
- Royston, P. (2004). Multiple imputations of missing values. *Stata Journal*, 4(3), 227–241.
- Sallis, J. F., Alcaraz, J. E., McKenzie, T. L., & Hovell, M. F. (1999). Predictors of change in children’s physical activity over 20 months. *American Journal of Preventive Medicine*, 16, 222–229.
- Sallis, J. F., Alcaraz, J. E., McKenzie, T. L., Hovell, 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., McKenzie, T. L., Elder, J. P., Broyles, S. L., & Nader, P. R. (1997). Factors parents use in selecting play spaces for young children. *Archives of Pediatrics and Adolescent Medicine*, 151, 414–417.
- Sallis, J., Prochaska, J. J., & Taylor, W. C. (2000). A review of correlates of physical activity of children and adolescents. *Medicine and Science in Sports and Exercise*, 32(5), 963–975.
- Thompson, A. M., Humbert, M. L., & Mirwald, R. L. (2003). A longitudinal study of the impact of childhood and adolescent physical activity experiences on adult physical activity perceptions and behaviors. *Qualitative Health Research*, 13(2), 358–377.
- 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(4), 277–282.
- US Census Bureau (2000). *American factfinder*. Retrieved 10-18-04.
- Yeung, W. J., Sandberg, J., Davis-Kean, R. E., & Hofferth, S. L. (2001). Children’s time with fathers in intact families. *Journal of Marriage and the Family*, 63(1), 136–154.