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Change in Parental Influence on Children's Physical Activity Over Time

Brandon L. Alderman, Tami B. Benham-Deal, and Jayne M. Jenkins

Background: Parents are believed to play a pivotal role in their children's health-related behaviors, including physical activity (PA). It is currently unclear, however, at what developmental period parental socialization has the strongest influence on child and/or adolescent PA levels. The purpose of this study was to take a developmental approach to examine parental influence on children's PA levels over time. ***Methods:*** Parents (N = 70; 68 mothers) completed a questionnaire assessing PA habits, amount of time they engage in PA with their child, and reasons for their child's PA participation at baseline (during child's preschool years) and at follow-up, which occurred from 1 to 9 years later. ***Results:*** The results indicate that the relationship between parents' and children's physical activity patterns and parents' reasons for their children's participation in organized physical activity change over time. Parents also reported spending approximately 60 min per week engaged in physical activity together with their children at baseline compared with 40 min at follow-up. ***Conclusions:*** These findings help to extend previous research examining parental influences on children's physical activity participation.

Keywords: parental socialization, beliefs, role-modeling

Identifying the determinants of children's physical activity behaviors[1] continues to remain widely popular due to the positive health benefits associated with physical activity participation as well as the growing need to implement effective physical activity intervention programs. The role of the family, especially parents, in understanding and promoting children's physical activity has received research attention for over 2 decades.[2–4] Broad social ecological approaches have also been used to investigate the impact parents' behaviors[5] and beliefs[6] toward physical activity have in influencing children's decisions to become, and remain, physically active. Studying this relationship makes intuitive sense given that parents have a major influence on children's overall psychosocial development as well as serve as the "gatekeeper" for providing resources and access for children to engage in physical activity.[7]

Because of the potential benefits for public health, promoting parental involvement in children's physical activity has been highlighted as one of the key recommendations in the Centers for Disease Control and Prevention's[8] guidelines for school and community physical activity programs. A recent meta-analytic review[4] revealed that the odds of being an active child or adolescent are almost 2 times greater with supportive versus unsupportive parents. Parental encouragement, instrumental (eg, transportation and providing access to equipment), and modeling behaviors all demonstrated significant positive relations with children's and adolescents' physical activity levels. Based on the number of included studies, role modeling, a central concept of social cognitive theory,[9] has been the primary approach used in the literature to explain parental influence on children's physical activity. Based on this parental role modeling hypothesis, parents who are highly active would have highly active children, while more sedentary parents would bestow this behavior to their children. Studies correlating activity levels of parents and children have both supported[10,11] and refuted[12–14] this position. Inherent challenges associated with assessing physical activity[7] and a lack of examination of other psychosocial influences[6] may have contributed to these inconsistent findings. It is also possible that the conflicting findings are due to the developmental nature of this role modeling influence.[4,15] For instance, the relationship between parental modeling and child and adolescent

The authors are with the Division of Kinesiology and Health, University of Wyoming, Laramie, WY.

physical activity was recently found to be moderated by age, with the relationship between parental modeling and early (9.75 to 12.75 years) adolescents' physical activity being significantly lower than with children or older (greater than 12.75 years) adolescents.[4] Parents may have a greater role modeling influence on younger children who spend more time at home and rely more on parents for opportunities to be physically active than early adolescents who have a broader social base (eg, peers, teachers, and coaches) that potentially influences their physical activity decisions. This parental role modeling influence may decline over time as children reach school age and are influenced to a greater degree by teachers, coaches, and peers. It is unclear why the effect size of parental modeling for older adolescents was greater than for early adolescents, but highlights the possibility that early adolescence represents a salient period in which to promote greater parental involvement in youth physical activity. Examining how the association between parents' and children's physical activity changes over time may provide greater insight toward understanding parental influence on youth physical activity.

In addition to role modeling, other socialization processes have been shown to influence children's behavior, including parental attitudes, values, and beliefs about their children's physical activity.[5–7] Parental encouragement,[12,16] instrumental behaviors, and direct involvement in physical activity[6] have been purported to be important sources of influence toward children's physical activity. Brustad[12] examined parental influence on children's physical activity in an attempt to elucidate what type of physical activity environment and encouragement they provide for their children. Parents' self-reported enjoyment of physical activity, perceived fitness levels, beliefs about the importance of physical activity, and levels of encouragement they offered their children to be physically active were studied in relation to children's attraction to, and competence in, physical activity. The extent to which parents encouraged their children to participate in physical activity was significantly related to the children's level of perceived physical competence, which was predictive of their attraction to physical activity. These findings underscore the importance of the type and amount of encouragement and opportunities parents offer their children to be physically active.

Kimiecik and Horn[6] assessed a number of components underlying parental beliefs toward older children's (ie, 11 to 15 years) moderate-to-vigorous (MVPA) physical activity participation, including parents' reasons for encouraging their children to engage in MVPA. These reasons included having fun, promoting physical and mental health, preparing for sport participation, developing life skills, and weight control. A better understanding of the reasons why parents encourage their children to engage in physical activity is limited, and research examining how those reasons change as a function of their children's age is sparse. If parents' reasons for their children's involvement in physical activity underlie their belief systems (eg, encouragement, reinforcement, attitudes), then determining what these reasons are could help to further characterize parental influence on children's initiation and maintenance of a physically active lifestyle.

Recently, a developmental approach to the study of sport and exercise participation has been advocated,[17] and has been recognized as an appropriate strategy for examining parental influence on their children's physical activity participation.[18] The purpose of this study was to take a developmental approach to examine parental influence on children's PA levels over time (ie, as the parents and children get older). Specifically, we assessed (a) parental reports of their own and their child's physical activity habits, (b) the amount of time parents report engaging in physical activity together with their child and (c) parents' reasons for their children's organized physical activity participation and how these responses potentially changed over time. A mixed quantitative/qualitative approach[19] was used in an attempt to more fully elucidate parental influence on children's physical activity.

Method

Participants and Design

Participants included 99 parents whose child attended an 8-week university-based developmental preschool movement program between 1991 and 2000 (see Benham-Deal[20] for a detailed description of the program). When parents enrolled their preschoolers in the program they completed a questionnaire that addressed physical activity levels for both child and parent, the amount of time parents engage in physical activity together with their child, and their reasons for the child's organized physical activity participation. Parents were contacted by telephone to explain the purpose of the follow-up study and to request their participation. Of the 99 parents who completed the original questionnaire, 68 mothers and 2 fathers, ranging in age from 30 to 51 years (M = 42.1, SD = 4.6), agreed to participate in this follow-up study which occurred between 1 to 9 years later depending on when the child was initially enrolled in the preschool movement program. The original respondent (ie, mother or father) was asked to participate to compare their responses over time. A convenient time was arranged to deliver the questionnaire and informed consent forms to their homes. In addition, questionnaires were mailed to parents who had since moved or lived too far away for in-home delivery. Only participants with a complete data set on all variables at both time points were included in the study. One father was excluded from the analysis due to incomplete or insufficient responses. The parents were mainly White and they represented a diverse socioeconomic background reflective of the general demographic characteristics of the community (middle to upper-middle class). At baseline the children (26 female, 43 male) ranged in age from 4 to 6 years (M = 5.3 years, SD = .21) and at follow-up between 5 and 15 (M = 9.3, SD = 2.6) years of age. This study was approved by the University

Institutional Review Board and written informed consent was obtained by all the participants both at baseline and follow-up before questionnaire administration.

Measures

Physical Activity Assessment. At baseline and follow-up, parents completed a questionnaire that addressed their own and their child's habitual physical activity. In this study, physical activity was operationally defined as voluntary habitual movements of skeletal muscles performed that causes one to sweat or breathe hard. This definition is in accordance with one of the most accepted definitions of physical activity in the field of epidemiology[21]: "any bodily movement produced by skeletal muscles that results in energy expenditure."[22] Using this definition, physical activity was assessed as the number of days per week and minutes per day spent in activities that cause one to sweat or breathe hard. Parents completed questions specific to the frequency and duration of their own and their child's physical activity. Specifically, parents were asked "How many days per week do you (your child) engage in physical activity that makes you (him/her) sweat or breathe hard?" followed by "How many minutes per day do you (your child) engage in physical activity that makes you (him/her) sweat or breathe hard?" To assess the amount of time parents engaged in physical activity with their child, they were asked "How many days per week do you (and/or spouse/significant other) engage in physical activity together with your child?" and "How many minutes per day do you (and/or spouse/significant other) engage in physical activity together with your child?" Parental reported minutes of physical activity were multiplied by the reported frequency (ie, days/week) and then summed to derive total weekly minutes of physical activity.

Measuring physical activity in a precise and reliable way has proven to be extremely difficult, particularly when using self-report. In the current study, the physical activity items included relatively intense activities (ie, moderate-to-vigorous activity) that would be more likely to be recalled than would lower intensity activities.[23] Previous studies have found that parental reports of their child's moderate-to-vigorous physical activity have been reliable and valid.[24,25] Further, a significant relationship between parental ratings of their young child's physical activity with moderate to vigorous intensity and heart rate recordings,[24] motion in a vertical plane,[24,26] and 1.6-km run/walk times[28] have been found. In addition, parents' classification of children as sedentary, slightly active, or active has been significantly correlated with children's cardiovascular fitness levels.[28] Self-report of physical activity in adults has been used in previous research and results have been significantly associated with VO_2max ($P = .03$) and body mass index ($P = .001$) values.[29,30]

Assessment of Parents' Reasons. To discern parents' reasons for their children's organized physical activity participation, they were asked to list the organized physical activity programs in which their child currently engaged (eg, youth sport, dance program, organized recreation) and were given a list of possible sport and extracurricular activities for an example. They were then asked to complete 2 open ended questions to (a) identify their reasons for encouraging their child to participate in the activity and (b) what they would like their child to accomplish as a result of his or her participation in the activity program(s). These 2 separate questions were used in combination to more fully elucidate the reasons parents have for their child's organized physical activity participation.

Data Analysis

The baseline and follow-up questionnaires provided both quantitative (ie, physical activity assessment) and qualitative (ie, parents' reasons for their children's organized physical activity involvement) information regarding parents' influence on children's physical activity. For the quantitative data, descriptive statistics (means and standard deviations) were calculated for parental reports of physical activity levels. Pearson correlation coefficients were computed between parental reports of their own and their children's physical activity both for baseline and follow-up assessments. Differences in mean reported activity levels were compared across time using dependent sample *t* tests. A critical alpha level of $P < .05$ was adopted for all significance tests. In addition, effect sizes (ES) were calculated for pairwise comparisons by using Hedges' *g* statistic.[31] The calculation of Hedges' *g* involves subtracting the means of 2 groups and dividing the mean difference by the pooled standard deviation.

Theme Categorization. Parents' responses to open ended questions were analyzed separately by 3 investigators to establish triangulation.[32] Specifically, parents' baseline and follow-up reasons for their children's organized physical activity participation were coded and a frequency analysis was conducted to assess which reasons were most prevalent at baseline and follow-up. Peer review was used to establish trustworthiness for the construction of categories that reflected parents' reasons for their children's physical activity participation, along with reducing bias in the interpretation process.[32] The primary investigator separately grouped parents' baseline and follow-up responses into categories. Two other participant investigators, both of whom were trained in qualitative methodology, independently formulated categories. All 3 investigators then met to discuss the classification systems. Agreement among all 3 investigators, or triangular consensus, had to be reached on all categories and placement of each response. When disagreements between investigators surfaced, the investigators restudied the original response, discussed points of contention, and established concurrence. Thus, the agreement rate was 100%.

Results

Table 1 contains the descriptive statistics of parental reported physical activity for children by gender and age. At baseline, parents reported engaging in 140 (SD = 101) min of physical activity compared with 169 (SD = 127) min at follow up. Parents reported 196 (SD = 164) min of physical activity per week for their children at baseline and 341 (SD = 259) min at follow up. The total amount of time engaged in physical activity as reported by parents significantly increased over time for both children ($t = 4.48$, $P < .001$, ES = .67) and parents ($t = 2.10$, $P < .05$, ES = .25). The magnitude of change over time in mean physical activity levels for parents and children is presented in Figure 1. While parents reported an increase in their own activity by 29 min per week, they reported a much more dramatic increase in their children's physical activity. On average, parents reported an increase of 145 min per week in their children's activity. When the data describing parental reports of children's physical activity were examined by chronological age of the child, significant differences in mean physical activity levels over time (all $t > 1.70$, all $p < .05$) were found (see Table 1). Specifically, while all of the children experienced an increase in physical activity relative to baseline, the largest increase in activity was found for the 7 to 9 and 10 to 12 year old children. Although the 13 to 15 year olds engaged in more physical activity than they did during their preschool years, this increase failed to reach significance. As expected, parents reported lower amounts of physical activity for their daughters relative to sons at baseline assessment (Mean Difference [*M.D.*] = 36 minutes/week) as well as at follow-up (*M.D.* = 158 minutes/week); however, these reported gender differences were statistically significant only during the follow-up assessment, $t = 2.5$, $P < .01$, ES = .63.

Table 1 Descriptive Statistics of Parental Reported Physical Activity for Children by Sex and Age at Baseline and Follow-up

Variable	n	Baseline	Follow-up	*t*	*p*	ES
Males	44	209 (163)	398 (290)	3.77	.001	.74
Females	25	172 (167)	240 (151)	1.51	.14	.42
4–6 years old	9	120 (99)	233 (182)	1.63	.12	.73
7–9 years old	28	190 (151)	354 (262)	2.87	.005	.76
10 to 12 years old	25	236 (205)	398 (291)	2.28	.02	.63
13 to 15 years old	7	167 (79)	225 (152)	0.90	.39	.45

Note. Values for baseline and follow-up are mean (SD) min/week of parental reported physical activity. Effect sizes reflect the magnitude of difference in reported physical activity from baseline to follow-up.

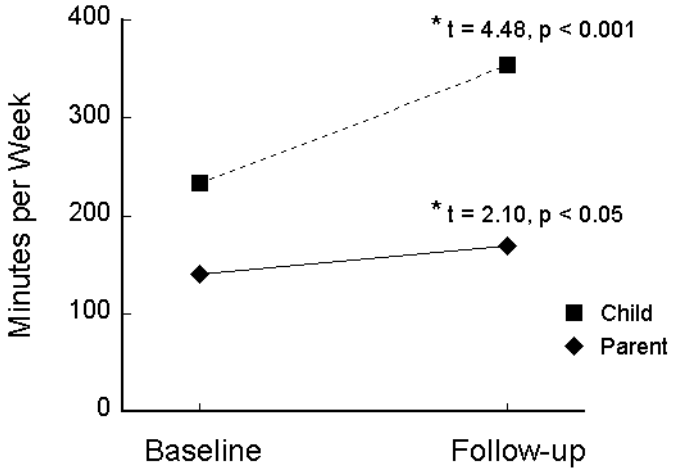

Figure 1 — A comparison of parental reports of their own and their child's physical activity levels over time.

The relationship between parents' and children's baseline physical activity levels was significant and moderately strong ($r = .44$, $P < .05$) and at follow up, the relationship was much weaker and nonsignificant ($r = .08$, $P > .05$). The data were divided into age groups and analyzed to determine if a stronger relationship existed between parents and their children at a specific developmental period however no significant differences were found.

At the baseline assessment, parents reported engaging in 63.2 (SD = 38.0) min of weekly physical activity together with their children. At follow up, this amount of weekly activity was significantly reduced to 39.6 (SD = 22.1) min per week, $t = 4.49$, $P < .001$. The amount of physical activity parents engaged in physical activity together with their children decreased from baseline to follow-up by more than 1 day ($t = 4.51$, $P < .001$). On average, parents reported 3.3 days of family activity at baseline (ie, during the preschool years), compared with 2.2 days at follow-up.

Parents' reasons for their child's participation in organized physical activity program(s) and what they would like their child to accomplish as a result of participation were grouped within the following categories: (a) *fun/enjoyment*; (b) *motor skill development*; (c) *physical activity/physical fitness*; (d) *self-confidence/self-esteem*; (e) *social skills*; (f) *child's interest/desire*; (g) *parent's request/choice*; (h) *to experience success*; (i) *keeps child active/busy*; (j) *mental health*; and (k) *other*.

Frequency of responses to each question can be found in Tables 2 and 3. *Fun/enjoyment* (31.9%) was the primary reason parents had originally for their preschool

Table 2 Frequencies of Parents' Baseline and Follow-up Reasons for their Children's Organized Physical Activity Participation

	Baseline		Follow-up	
Categories	Frequency	%	Frequency	%
Fun/enjoyment	22	31.9	15	14.6
Motor skill development	19	27.5	10	9.7
Physical activity/physical fitness	17	24.6	23	22.3
Self-confidence/self esteem	0	0.0	0	0.0
Social skills	4	5.8	16	15.5
Child's interest	1	1.4	15	14.6
Parent's choice	0	0.0	3	2.9
To experience success	0	0.0	0	0.0
Keep child active/busy	4	5.8	18	17.5
Mental health	0	0.0	0	0.0
Other	2	2.9	3	2.9
Total	69	100	103	100

Table 3 Frequencies of What Parents Wanted Their Children to Accomplish as a Result of Organized Physical Activity Participation at Baseline and Follow-up

	Baseline		Follow-up	
Categories	Frequency	%	Frequency	%
Fun/enjoyment	20	20.0	23	16.2
Motor skill development	35	35.0	28	19.7
Physical activity/physical fitness	18	18.0	33	23.2
Self-confidence/self esteem	17	17.0	12	8.5
Social skills	9	9.0	27	19.0
Child's interest	0	0.0	1	0.7
Parent's choice	0	0.0	0	0.0
To experience success	1	1.0	5	3.5
Keep child active/busy	0	0.0	9	6.3
Mental health	0	0.0	3	2.1
Other	0	0.0	1	0.7
Total	100	100	142	100

child's organized physical activity involvement and one of the highest reasons parents have for child's follow-up organized physical activity participation (14.6%). The next most common reason for preschoolers' participation was *motor skill development* (27.5%). As children aged (ie, at follow-up), parents endorsed *motor skill development* (9.7%) to a lesser extent. Specific responses related to *motor skill development* reasons included: "To develop his/her coordination skills" and "To improve his/her motor skills in the pool and gymnastic setting." Interestingly, at follow-up, parents reported *physical activity/physical fitness* (22.3%) and to *keep my child active/busy* as more frequently cited reasons for their children's participation in organized physical activity than for fun/enjoyment. Several reasons not originally reported became salient in follow-up responses. Specifically, *social skills* (5.8%) and *child's interest/desire* (0%) were negligible at baseline, but gained importance for parents as their children became older (15.5% and 14.6%, respectively). An example of the *social skills* response was, "To learn the concept of teamwork and good sportsmanship" and for *child's interest/desire* the most commonly given response was, "Because he (she) wanted to."

Parents were also asked what they wanted their children to accomplish as a result of participation in organized physical activity. The most frequently given responses at baseline were *motor skill development* (35.0%), *fun/enjoyment* (20.0%), *physical activity/physical fitness* (18.0%), and *self-confidence/self-esteem* (13.6%). Parents continued to endorse these reasons for their children's involvement in organized physical activity at follow-up; however, *motor skill development* (19.7%) and *self-confidence/self-esteem* (8.5%) were reported less frequently. The development of *social skills* and physical activity/physical fitness were also reported more frequently at follow-up (19.0 and 23.2%, respectively) than when they were younger (ie, at baseline; 9.0 and 18.0%, respectively). In addition, a few more categories were mentioned at follow-up that were not mentioned at baseline, including *to experience success* (3.5%), *keep my child active/busy* (6.3%), and *enhanced mental health* (2.1%).

Discussion

The primary purpose of this study was to examine the developmental nature of parental influences on children's physical activity. This was accomplished by assessing the association of parental reports of their own and their children's physical activity patterns, the amount of time parents engage in physical activity with their children, and parents' reasons for their children's organized physical activity involvement over time. The developmental nature of parental influence has received scant attention in the literature but needs to be better understood so that we can further characterize the influence parents have on children's physical activity.[4]

At baseline, parental reports of their and their children's physical activity were significantly related and there was a shift in the association over time between parents' reports of their own and their children's physical activity. The relationship between parents and their preschool children was stronger than that of older children (at follow-up). A similar shift in strength of association has been found in previous research. Significant relationships have been reported in physical activity between parents and their young children,[33] and between mothers and their 5th and 6th grade children.[3] In contrast, Kimiecik and Horn[6] failed to find an association between parents' and their adolescent children's physical activity patterns. Further, recent meta-analytic findings suggest a stronger association for parents with young children's relative to young adolescents' physical activity.[4] Collectively, these findings suggest a moderate to strong relationship between parents' and young children's physical activity patterns. As parents and children age, however, the association between their physical activity behaviors wanes.

While previous research has examined direct parental involvement in children's physical activity at various developmental periods, relatively few studies to date have examined developmental changes in the amount of time parents and children spend together engaged in physical activity. Our findings show a significant decrease over time in the amount of time parents report engaging in physical activity together with their child. Specifically, parents engaged in physical activity with their preschool children approximately 60 min per week. As they aged, parents reported spending less time (approximately 40 min per week) participating in physical activity together with their children. There may be several explanations for this: (a) as children enter school they spend less time with their parents and become more involved in other social influences (eg, friends, extracurricular activities); and/or (b) as parents and children age they spend less time engaged in physical activity together due to an incompatibility in interests or physical activity levels. The decreased association between parents' and older children's physical activity patterns reported above may also be a function of the decreased time families engage in physical activity together. It is reasonable to expect that as children get older and spend more of their time outside of direct parental contact, role modeling influences from parents weaken while influences from peers, coaches, and teachers strengthen. Future intervention studies should address this developmental issue and aim to promote physical activity programs for the entire family.

Investigators have begun to examine parents' belief systems to further explain parental influence on children's physical activity and sport participation.[5,13,16] Consistent with previous findings,[6] parents reported *fun/enjoyment* as reasons for their preschool and older children's involvement in organized physical activity programs. Parents also endorsed *physical activity/physical fitness* and *social skills* development for their young children's participation, but placed greater importance on these reasons as

their children aged. Unique in the current findings were parents' endorsement of *motor skill development* and *self-confidence/self-esteem* for their preschool children's activity participation. As their children got older, these reasons became less predominant. Unlike results found in the Kimiecik and Horn[6] study, parents in the current study failed to report weight control or preparation for sport as reasons for their children's participation in physical activity. Discrepancy between the 2 sets of findings could be due to the choice of methodology and properly defined reasons. The qualitative aspect of this study allowed parents freedom in their responses, which may be more indicative of their true reasons. On the other hand, Kimiecik and Horn used a quantitative instrument that may have provided insight into various reasons that parents normally would not have considered. Regardless of methodology used, there were some consistencies in the findings that suggest parents do influence their children's organized physical activity and sport participation. Further research that utilizes a mixed model of qualitative and quantitative methodology incorporating a developmental approach would help advance our understanding of how parents influence their children's physical activity.

Limitations

Several factors limit the scope of the current study. First, participants were relatively homogeneous (white, middle to upper middle class mothers and 1 father) who may have been predisposed to physical activity, or at least embrace strong values regarding physical activity since at baseline they were enrolling their child in an organized activity program. Therefore, generalizability to other populations may not be appropriate. In addition, the findings are based on parents' perceptions of their own, and their children's, physical activity. While previous research has shown that parents are accurate reporters of their children's physical activity behaviors when compared with more direct measures of physical activity[24] and agreement between various physical activity correlates between parents and children ranged from $r = .34$ to $.64$,[34] additional research is needed to confirm the accuracy of their predictions. However, assessing parents' perceptions across time lends credibility to the findings assuming that they remain consistent in their perceptions (ie, they either overestimate, underestimate, or remain accurate in their physical activity perceptions across time). Parents in this study were asked to identify their reasons for their child's organized physical activity participation through 2 separate questions (ie, reasons and what they would like their child to accomplish as a result of participation). These reasons may be limited to organized physical activity programs and not generalizable to parents' overall reasons for their children's leisure-time, nonorganized physical activity play or involvement. The parents in the current study may have also had the financial resources available to afford for their child's organized physical activity involvement. Future research should aim to examine how parents' reasons for their children's organized and leisure-time physical activity involvement differs based on financial resources and sociodemographic factors. Finally, the sample size in the current study is small, especially when grouped by distinct age groups. Thus, the findings should be viewed with caution and future studies should attempt more longitudinal designs to delineate any potential changes in parental influence on children's and adolescents' physical activity behaviors using larger sample sizes.

Conclusion

The results of this study are consistent with previous research on parental influence on children's physical activity participation. Although parents clearly have a major impact on the development of active lifestyles in their children, the influence is much stronger during the early childhood years (ie, preschool). Physical activity patterns have been found to track over the lifespan, thus efforts to promote activity at a young age can possibly result in major public health benefits.[35] These results provide evidence that advocates the importance of promoting developmentally-appropriate physical activity for families, not just individuals, as a means of promoting positive physical activity behaviors. Perhaps this is one strategy to help more individuals accumulate physical activity and reach age-appropriate physical activity guidelines. Future research incorporating physical activity interventions for families should be conducted to assess the utility of such interventions for the promotion of physical activity.

The current study also has several strengths in advancing theory and application in the research literature of parental influence. These findings support the notion of greater parental influence when children are younger and a diminishing of this influence as children reach adolescence. In addition, amount of time parents spent in physical activity together with their children decreased over time. It is possible that a role modeling effect might be found in studies that examine the relationship between parent and child physical activity patterns when the children are younger (eg, 4 to 9 years). In contrast, studies examining the link between parents and children's physical activity when the children are of older age (eg, 10 to 15 years) may fail to find support for a role modeling influence. Future research should continue to examine and document the developmental nature and extent of parental influence on children's physical activity behaviors.

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