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Sources and Types of Social Support in Youth Physical Activity

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Abstract

This study examines the influence of sources and types of social support on youth physical activity. The sample comprised 372 youth (Mean age = 12.05 years, SD = 1.63). Youth were predominantly White (76%) and 50.3% female. The annual household income for the sample was: 20% under $30,000, 30% $30,000-$49,999, 25% $50,000-$69,999, 13% $70,000-$89,999, and 12% $90,000 and above. Results revealed that support from friends and watching youth engage in activities were significantly and positively related to youth physical activity. Significant correlations existed among the type factors. Future research should examine the sources and nature of support, and the mechanisms through which social support influences youth physical activity.

Keywords: Youth, Physical Activity, Social Support, Structural Equation Modeling

Sources and Types of Social Support in Youth Physical Activity

Introduction

While increased physical activity among school children has been recommended as a preventive health measure for many years (Perry et al., 1987), nearly half of American youth ages 12-21 are still not active on a regular basis (USDHSS, 1996), and trends over the past 10 years indicate a continual decrease in certain types of physical activity. For example, results from the Youth Risk Behavior Surveillance System (YRBSS) demonstrate the percentage of students who attend physical education classes daily has decreased from 41.6% in 1991 to 32.2% in 2002 (Centers for Disease Control, 2002). The alarming decline in physical activity during pre-adolescence and adolescence presents a special challenge to researchers and professionals in health and physical activity (Pender, Sallis, Long, & Calfas, 1994).

There are two major health-related rationales for focusing attention on youth and adolescent physical activity (Sallis & Patrick, 1994): (1) to promote physical health and well-being during adolescence, and (2) to promote physical activity to enhance future health by increasing the probability of remaining active throughout the life-span. The 1996 Surgeon General's report on physical activity and health recommended that adolescents engage in moderate amounts of physical activity every day, in the form of longer sessions of moderately intense activities or in shorter sessions of more intense activities (USDHSS, 1996). In addition, youth are encouraged to engage in three or more 20-minute sessions of moderate to vigorous exercise each week (Sallis & Patrick, 1994). Such patterns of activity are likely to result in aerobic fitness benefits during adolescence, and reduce health problems such as hypertension, osteoporosis, and the incidence of chronic diseases such as coronary heart disease and Type 2 diabetes, in later life (Heath, Pate,

& Pratt, 1993; Sallis & Patrick, 1994; USDHHS, 1996). In addition, vigorous aerobic or anaerobic activities of a weight-bearing nature, as well as resistance training during adolescence, appear to be effective in promoting good skeletal health (Sallis & Patrick, 1994). Physical activity is also believed to enhance mental health and to improve self-esteem and self-identity among adolescents (Savage & Holcomb, 1998).

Despite the importance of youth physical activity for physical, mental, and social health, few consistent correlates of children's physical activity have been identified (Sallis, Prochaska, Taylor, Hill, & Geraci, 1999). Social support has been cited as an important correlate of physical activity (King, 1994; Pender et al., 1994), but the impact of social support on adolescent physical activity has not been widely assessed. Social support has been defined in numerous ways, generally referring to any behavior that assists an individual in achieving desired goals or outcomes (Caplan, Robinson, French, Caldwell, & Shinn, 1976; Taylor, Baranowski, & Sallis, 1994). Pender et al. (1994) suggest that a number of possible sources of support for physical activity should be examined, such as parents, older children or siblings, and friends. A few studies have examined the impact of family and friend support on youth physical activity and have found initial support for this influence (e.g., Sallis et al., 1992; Zakarian, Hovell, Hofstetter, Sallis, & Keating, 1994).

The family is an important source of social support for children and adolescents. Support may take a variety of forms: informational and emotional (e.g., viewing the child's practice, discussing physical activity with the child), and instrumental (e.g., offering to take part in the activity with the child, and assisting with fees, equipment, and transportation) (Taylor et al., 1994; Sallis et al., 1992). Most research in this area has examined parent modeling of physical

activity, which tends to be related to the frequency of adolescent exercise (Anderssen & Wold, 1992) and may involve indirect or direct modeling (i.e., participating in physical activity with the child). In general, more active parents tend to have more active pre-adolescents and adolescents (Moore et al., 1991; Sallis, Patterson, Buono, Atkins, & Nader, 1988). However, social factors other than parent modeling have not been widely studied (Sallis, Taylor, Dowda, Freedson, & Pate, 2002). Physical activity patterns of siblings also may be correlated and sibling social support may be influential (Sallis et al., 1988), although the research is limited.

As children age, they spend increasing amounts of time with friends compared to family, thus enhancing the potential for peer influences in a number of domains (Montemayor, 1983). Results from studies in the developmental psychology and health risk behavior literature support this observation (Duncan, Duncan, & Hops, 1994; Sallis et al., 1992). In particular, peers are likely to be a potentially important source of social support for adolescent physical activity and for efficacy beliefs regarding physical activity (Pender et al., 1994). The support of peers may serve a number of different functions: social integration or companionship (when participating in physical activities together); emotional support, such as encouragement; informational support; and instrumental support, such as sharing equipment or transportation. Peers also may provide esteem support or reassurance of worth, which might bolster self-efficacy to perform the desired behavior and to overcome perceived barriers. Research in the physical activity domain has demonstrated the importance of peer or friend support in physical activity (e.g., Duncan, Duncan, & McAuley, 1993; Zakarian et al., 1994). Duncan (1993) found that companionship and esteem support provided by friends in physical education classes influenced the level of positive affect related to physical activity and choices to participate in physical activity among seventh-

and eighth-grade children. Despite the apparent importance of peers in influencing adolescent physical activity, however, few studies have included peers as part of the physical activity support network for youth (Sallis et al., 1999).

When studying youth physical activity behavior, the influence of demographic factors (e.g., gender, age, and socio economic status) must be considered. Prior research demonstrates that younger children and males tend to be more active than older children and females (Centers for Disease Control, 2002; Heath, Pratt, Warren, & Kann 1994; USDHSS, 1996). Research has documented a considerable decline in physical activity during adolescence. Boys are about 10% more active than girls at all ages (Kemper, 1994) and adolescent girls are at particularly high risk for inactive lifestyles (Sallis & Patrick, 1994). Children in higher income families tend to be more active than other children (Sallis et al., 1992).

Although research suggests family and peer support influence youth physical activity, few studies have investigated the importance of social support in physical activity behavior. Thus, the effects on physical activity of different sources and types of support are not well understood, nor are the mechanisms through which social support might influence such behavior. It is not clear whether sources and/or types of support even matter to children's physical activity. Increased knowledge regarding which people are most influential in youth physical activity, and which types of support are most highly related to physical activity, will likely aid intervention efforts aimed at enhancing youth physical activity.

The purpose of the current study was to examine the influence of social support for physical activity among youth ages 10 to 14 years. Specifically, the study was designed to explore the relative influence of different sources (parents, siblings, friends) and types of support (emotional

support such as encouragement, watching the child participate in physical activity and talking about the child's physical activity, and instrumental support such as taking part in physical activity with the child and providing transportation) on physical activity. Sources of support and types of support were examined using structural equation modeling. It was hypothesized that the most influential sources of support would be parents and friends, and emotional types of support would be more highly related to physical activity than instrumental types of support. Demographic variables of age, gender, and income were included as covariates in the model, and it was hypothesized that males and youth from higher income families would have higher levels of physical activity.

Method

Participants and Procedures

Data for this study were collected from youth residing in a metropolitan area in the Pacific Northwest. As part of the longitudinal cohort-sequential study design, families having a 10-,12-, or 14-year-old child were randomly recruited from 58 different neighborhoods. These neighborhoods were from the same county and were selected to include the greatest diversity in family socioeconomic status and racial composition. Primary recruitment was via telephone using a computer-aided telephone interviewing (CATI) system. Eligibility criteria were ability to speak English; being 10, 12, or 14 years of age; and residing within the 58 neighborhoods under study. The sample was stratified by age, gender, and neighborhood such that a 10-year-old boy and girl, a 12-year-old boy and girl, and a 14-year-old boy and girl were recruited from each of 58 neighborhoods. Otherwise-eligible youth were disqualified if the neighborhood quota for their age and sex was already filled. Of eligible families, approximately 68% agreed to participate.

For more detailed information on sample recruitment see Duncan, Strycker, Duncan, and Chaumeton (2002).

The target child and a parent completed surveys in their home. All children aged 11 years or younger were administered the survey as an interview. Survey visits lasted about 90 minutes (± 30 minutes). Participants completed individual surveys in private, away from other family members, to enhance confidentiality. For 1 week (7 days) prior to the survey assessment, target children completed a daily record of physical activities and wore a pedometer to record the number of steps taken each day. Compliance in filling out the 7-day physical activity record was generally very good, with 99% of participants recording the daily pedometer total and 90% recording one or more activities for at least 4 of the 7 days. Our protocol was designed to maximize use of the pedometer and completion of the daily physical activity record. Target youth were fitted with a pedometer and given a form at the first visit along with two project-logo magnets, and instructed to put the form on the refrigerator or in some other prominent place. Parents were encouraged to help remind children, and reminder phone calls were made to the family 2 days after the first visit. Both the pedometer and activity form were retrieved at the second visit unless the child had data for fewer than 4 days, in which case participants kept the pedometer and form so that they could record more data. Children were paid $25 for completing the assessments with a bonus of $5 if all aspects of the assessment were completed. Parents were paid $15.

Data for this study comprised 372 youth. The sample were 50.3% female and 49.7% male, 76% White, 12% African American, 4% Hispanic, 2% Asian, 2% American Indian, and 4% other or mixed races. Mean age was 12.05 years (SD = 1.63). The annual household income for

the sample was: 20% under $30,000, 30% $30,000-$49,999, 25% $50,000-$69,999, 13% $70,000-$89,999, and 12% $90,000 and above.

Measures

Target Physical Activity

Physical activity is a complex behavior that involves different types of activities (e.g., competitive sports, recreational activities, and instrumental walking), which occur in different social contexts, at different times of day, for varied lengths of time, and at varied levels of physiological intensity. No single field measure of physical activity is ideal for all purposes, and all measures have recognized advantages and disadvantages (Welk, Corbin, & Dale, 2000). The suitability of each methodology depends upon the type of research, the type of physical activity of interest, the age and number of research participants, and pragmatic considerations such as the resources available to the researcher (Sallis & Owen, 1999). Because of the multidimensional nature of physical activity, researchers emphasize the importance of collecting data from multiple sources (Ainsworth, Montoye, & Leon, 1994; Freedson, 1991; Wood, 2000). The measures of youth physical activity used in this study included survey items and data from electronic motion sensors (pedometers).

The survey items were based on previously used measures (e.g., Sallis, Buono, Roby, Micale, & Nelson, 1993; Heath et al., 1993). Youth were asked, "On how many of the past 7 days did you exercise or take part in hard physical activities that made you sweat and breathe hard for at least 20 minutes without stopping (such as basketball, jogging, swimming laps, fast bicycling, or similar aerobic activities)?" And, "In a typical week, how many days do you take part in any regular physical activity long enough to work up a sweat (heart beats rapidly)?" For

both items, responses ranged from 0 to 7 days. The third physical activity measurement was gathered from a pedometer. Pedometers have been shown to be valid and reliable tools for measuring children's physical activity (Eston, Rowlands, & Ingledew, 1998; Kilanowski, Consalvi, & Epstein, 1999; Vincent & Pangrazi, 2002). The Yamax Digiwalker was chosen for this study because it performed best in a research study when compared to other pedometers (Bassett et al., 1996). From the pedometer data, an average daily steps variable was computed by summing the number of steps for the week and dividing by the number of days. The average daily number of steps was then divided by 10 to reduce problems related to variance discrepancies across measures in the structural equation model (Gustafsson, Rosén, & Stahl, 2002). These three items were used as indicators of the latent factor of Target Physical Activity (F9).

Social Support

Similar to items used in other studies (e.g., Sallis et al., 2002), youth were asked the extent to which different people (parents/caregivers, siblings, friends) provided different types of support. Five types of support were included for each reference person: "Encourage you to do physical activities," "Do a physical activity with you," "Watch you take part in physical activities," "Talk with you about your physical activity," and "Provide transportation so you can go to a place where you can do physical activities." Given the age of the youth, the "provide transportation" item for friends asked whether friends or parents of friends provided transportation. Questions asked how often during a typical week each person did these things and responses were on a five-point scale ranging from (1) Never to (5) Very often. Due to the high correlation ($r > .70$)

between responses for mother and father items, the maximum score for mother and father was used as the score for parents.

Demographic Variables

Age, gender, and income were included in the model to control for their possible effects on social support and youth physical activity. Age of youth ranged from 10 to 14 years. Gender was coded 0 for males and 1 for females. Parents reported on annual household income, which was divided into 11 categories, the lowest being "under $5000 " and the highest "more than $90,000."

Results

Analyses were conducted using EQS structural equation modeling software, version 6.0 (SEM; Bentler, 2001). This version of EQS allows for the inclusion of incomplete data, making it possible to include the total study sample in the analyses. Means and variances for each of the variables in the model are shown in Table 1.

Insert Table 1 about here

The model specification for the present study is illustrated in Figure 1. In line with structural modeling conventions, squares denote observed variables and circles denote latent variables.

Insert Figure 1 about here

The analysis included variables representing five types of support from three sources. These 15 variables were hypothesized to form eight latent factors, three source factors (parents, siblings, friends), and five type factors (encourage, do with, watch, talk, transport). Three variables were used to form a physical activity latent factor. The analysis permitted a simultaneous examination of the relationship between sources and types of support, and youth physical activity. Demographic variables of age, gender, and income also were included in the model to control for their effects on sources and types of social support, and physical activity.

The resulting model fit was χ^2 (126, N = 372) = 202.90, $p < .05$, Non-Normed Fit Index (NNFI) = .96, Comparative Fit Index (CFI) = .98, Goodness-of-Fit Index (GFI) = .96, and Root Mean Square Error of Approximation (RMSEA) = .04. As shown in Table 2, the majority of variables loaded significantly on their respective factors. The only exceptions involved the transportation items. Parent and friend transportation items did not load significantly on their respective source factors. While most of the variance in these items was explained by the type factor, a substantial amount of unexplained variance still exists. This is also true for the sibling item which did not load significantly on the transport type factor. In this case approximately 95% of the variation in that variable was unexplained by the source and type factors. This result may be due to the fact that many participants in the study did not have siblings who were old enough to drive.

Insert Table 2 about here

Friend support and sibling support factors were significantly correlated, $r = .20$, $p < .05$. Other correlations between source factors were not significant: Parent and sibling support $r = .05$; parent and friends support $r = -.06$. Alternatively, the five support type factors were all significantly correlated at $p <. 05$ or greater: Encourage and do with $r = .68$; encourage and watch $r = .66$; encourage and talk $r = .81$; encourage and transport $r = .64$; do with and watch $r = .84$; do with and talk $r = .73$; do with and transport $r = .77$; watch and talk $r = .78$; watch and transport $r = .83$; and talk and transport $r = .66$.

To determine which source and type factors were significantly related to youth physical activity, and to achieve the most parsimonious model, backwards elimination of nonsignificant paths was conducted. This involved removing, one at a time, the least significant source or type path and re-estimating the model. The effects of age, gender, and income on physical activity were left in the model to control for their effects. Results of the final model with backwards elimination were χ^2 (132, N = 372) = 214.71, $p > .05$, NNFI = .96, CFI = .97, GFI = .95, and RMSEA = .04. Standardized regression coefficients and *t*-values of structural paths for the final model with backwards elimination are shown in Table 3.

Insert Table 3 about here

As can be seen from Table 3, the final model resulted in only two significant findings relating sources and types of support with youth physical activity. Perceptions of increased support from friends, and youth who perceived their parents, siblings, and friends watched their

physical activity more, had higher levels of physical activity. In addition, males reported higher levels of physical activity than females.

Demographic covariates were significantly related to parent and sibling support such that older children perceived less support than younger children. Older children perceived higher levels of encouragement and talking about physical activity than younger children, and females reported more help with transportation than boys. Youth from higher income families reported more support from siblings, greater transportation support, and higher levels of doing physical activity with friends and family and being watched, compared to youth from lower income families.

The amount of variance in target physical activity explained by variables in the model was 36%.

Discussion

Based on prior research documenting the importance of social support for youth physical activity, the current study aimed to specifically examine the relationship between sources and types of support and physical activity among youth ages 10 to 14 years. Sources of support included parents, siblings, and friends. Support types included emotional (e.g., encouragement, watching the child participate in physical activity and talking about the child's physical activity) and instrumental (e.g., doing physical activity with the child and providing transportation). Relationships among sources of support, types of support, and youth physical activity were examined using structural equation modeling. To control for demographic variables, age, gender, and income were included as covariates in the model.

In general, the findings support previous research indicating that social support is positively related to youth physical activity. In this study, the source of support most highly related to physical activity was friends. That is, youth who perceived greater support for physical activity from friends had higher levels of physical activity. Other studies have found that perceived direct support for physical activity from significant others, such as parents and friends, is related to higher levels of physical activity among young adolescents (Anderssen & Wold, 1992). Sallis et al. (2002) found peer support influenced youth vigorous physical activity and was significant in the youngest groups of boys and girls, suggesting that peer support in physical activity is important for younger children as well as adolescents.

The only significant finding for types of support was that children who reported that their parents, siblings, and friends more frequently watched them engage in physical activity, had higher levels of physical activity. Because this study uses cross-sectional data, it is not possible to determine the direction of influence. However, these results indicate a significant relationship between family and friends watching youth take part and their level of physical activity, and may suggest that watching is a particularly important type of support for youth of this age. Watching children take part in physical activity is considered an emotional rather than instrumental form of support, providing evidence for the hypothesis that emotional types of support are more highly related to physical activity than instrumental types of support.

No other significant relations between sources or types of support with physical activity were evident. It is possible that specific sources or types of support may be more influential for older rather than younger children, or for different subgroups. For example, there is some evidence to suggest that sources of support and types of support may differ as children get older

(Lee, 1998). For example, transport items were not particularly influential with this sample, which may be a function of the age of the participants. Types of support not addressed in the current study (e.g., educational and other types of instrumental support such as monetary support) also may be important for youth physical activity. Future research should continue to investigate the relative importance of different sources and types of support on physical activity behavior, given the obvious implications for interventions to enhance youth physical activity.

Although other sources and types of support were not significantly related to youth physical activity in this model, this does not mean that they are not important for many youth. As noted earlier, all five support type factors were significantly correlated. Thus, youth who perceived more of one type of support also tended to perceive greater support of all types. Given the changing nature of children's family and social contexts, researchers should continue to examine the role of significant others in providing support to youth of different ages.

Some significant effects were found for the demographic variables. As hypothesized, and in keeping with previous research, females had significantly lower levels of physical activity than boys. That is, males reported higher levels of physical activity than females regardless of source and type of social support. Females reported more help with transportation than boys. These findings, along with prior research, suggest that gender differences in physical activity are evident from early childhood, becoming more pronounced as children get older and especially through adolescence (Armstrong & Welsman, 1997). Age appeared to play a role in perceptions of support. In this study, older children perceived less support than younger children from parents and siblings, but more encouragement and talking about physical activity than younger children. Again, it is possible that forms of support change as children get older, such that certain

types of support (e.g., watching) may become less influential and others (e.g., talking and encouragement), may become more important as children age. Youth from higher income families perceived more support from siblings and reported greater transportation support and higher levels of doing physical activity with significant others and being watched, compared to youth from lower income families. Although lower income youth did not have lower levels of physical activity than higher income youth as was hypothesized, they did perceive less support in the form of being watched, which was the only type of support significantly related to physical activity level.

This study has several limitations and strengths. Limitations include the cross-sectional nature of the data, which restricts the ability to make inferences regarding the direction of effects. The study also incorporated a somewhat limited number of variables, most of which were self-report. The research was conducted in only one metropolitan area and in a predominantly White sample, restricting the ability to make comparisons by race. Where sample sizes allow, future research should investigate these relationships across different races. It should also be noted that the analytic approach taken in the current study is only one of several alternatives. However, the use of structural equation modeling was a strength, as it allowed the simultaneous analysis of sources and types of social support, enabling examination of their relative contribution to explaining variance in physical activity. Other strengths of the study include the randomly recruited sample from numerous neighborhoods within the metropolitan area, the acquisition of data relating to different types of support as well as providers of the support, and the use of different data methods (survey items and pedometer data) to document physical activity. The measurement of physical activity is difficult. There are more than 30

different methods for measuring physical activity and no one method is ideal. All measures have advantages and disadvantages. Survey methods of measuring physical activity have been used more frequently than other methods (Sallis, 1991) because they are relatively inexpensive to administer and may be used to collect data from large samples. Indeed, there are situations in which self-report measures in the form of surveys, diaries, logs, or interviews are the only feasible method of assessing habitual physical activity (Montoye, 2000). Although convenient, the validity of self-report measures of physical activity has been questioned (e.g., Baranowski, 1988; Baranowski & Simons-Morton, 1991). Studies generally have reported only moderate correlations between children's self-reported physical activity and objective measures of physical activity (Sallis, 1991). Electronic motion sensors provide a more objective assessment of physical activity (Freedson & Miller, 2000). However, pedometers and accelerometers are limited in their ability to measure some common physical activities (e.g., swimming, cycling, and activities that emphasize the upper body). Additional limitations of motion sensors include pragmatic challenges for use with larger samples and lack of information about the social context in which activity takes place. Generally, it is recommended that choice of physical activity assessment depend on the type of information required by the researcher and the resources available (Sallis & Owen, 1999). In the current study, methods used were based on recommendations of prior research for youth and adolescents in a large-scale epidemiological investigation.

Variables in the model explained more than a third of the variance in youth physical activity, which is substantial. Support of peers and being watched by significant others (parents, siblings, and peers) were significantly related to youth physical activity. This study underscores

the importance of watching children when they participate in physical activity, and indicates that peers play an influential role in determining youth's level of physical activity (Armstrong & Welsman, 1997).

Future research should examine the relative influence of different sources and types of support for physical activity by gender and age group, preferably using longitudinal data from childhood through adolescence. The use of longitudinal data would permit an analysis of how perceptions of support, including sources and types, and their relation to physical activity change over time - and how change differs across subgroups. More etiological and developmental examinations of children's physical activity perceptions and behavior are needed to better understand this behavior and to inform successful interventions for enhancing physical activity across the life span (Biddle, 1992).

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Table 1

Means and Variances of the Variables in the Model

	Mean	SD
Age	12.05	1.63
Gender	1.50	.50
Income	6.72	2.53
Daily Steps (divided by 10)	1038.40	417.32
Days Hard Physical Activity	3.51	1.94
Typical Days of Physical Activity	4.00	1.88
Parent Encourage	3.81	1.07
Parent Do With	2.89	1.09
Parent Watch	3.50	1.22
Parent Talk	3.34	1.21
Parent Transport	3.70	1.25
Siblings Encourage	2.28	1.22
Siblings Do With	2.62	1.22
Siblings Watch	2.58	1.18
Siblings Talk	2.02	1.08
Siblings Transport	1.51	.92

table continues

	Mean	SD
Friends Encourage	2.95	1.22
Friends Do With	3.45	1.19
Friends Watch	2.81	1.24
Friends Talk	2.60	1.28
Friends Transport	2.44	1.13

Table 2

Standardized Regression Coefficients and t-values for Factor Loadings

	Effect	*t*-value
Factor Loadings		
Physical Activity		
Days Hard Activity	.78	
Daily Steps	.35	5.56
Typical Days of Physical Activity	.68	9.21
Sources		
Parent - Encourage	.35	
Parent - Do With	.59	3.43
Parent - Watch	.23	2.81
Parent - Talk	.40	4.72
Parent - Transport	.04	.40
Siblings - Encourage	.68	11.90
Siblings - Do With	.72	
Siblings - Watch	.60	10.92
Siblings - Talk	.66	11.54
Siblings - Transport	.21	3.26

table continues

		Effect	*t*-value
	Friends - Encourage	.68	
	Friends - Do With	.64	11.52
	Friends - Watch	.68	11.26
	Friends - Talk	.59	10.77
	Friends - Transport	.11	1.89
Types			
	Encourage - Parent	.70	7.34
	Encourage - Siblings	.48	
	Encourage - Friends	.48	6.76
	Do With - Parent	.35	3.59
	Do With - Siblings	.33	5.09
	Do With - Friends	.54	
	Watch - Parents	.83	
	Watch - Siblings	.50	8.47
	Watch - Friends	.41	6.83
	Talk - Parents	.80	
	Talk - Siblings	.45	7.25

table continues

	Effect	*t*-value
Talk - Friends	.48	7.46
Transport - Parents	.77	
Transport - Siblings	.09	1.43
Transport - Friends	.47	6.74

Note. All *t*-values greater than 1.96 are significant at $p < .05$ or greater. Variables with a factor loading of 1 do not have an associated *t*-value.

Table 3

Standardized Regression Coefficients and t-values for the Final Model

	Effect	*t*-value
Structural Paths		
Target Physical Activity - Friends Support	.36	5.36
Target Physical Activity - Watch	.38	4.98
Covariates		
Target Physical Activity - Age	.00	.05
Target Physical Activity - Gender	-.31	-5.47
Target Physical Activity - Income	-.00	-.02
Parent Support- Age	-.57	-3.82
Parent Support - Gender	-.11	-1.15
Parent Support - Income	-.04	-.44
Sibling Support - Age	-.18	-2.16
Sibling Support - Gender	-.05	-.77
Sibling Support - Income	-.15	-2.06
Friends Support - Age	-.11	-1.16
Friends Support - Gender	-.06	-.73
Friends Support - Income	-.08	-.97

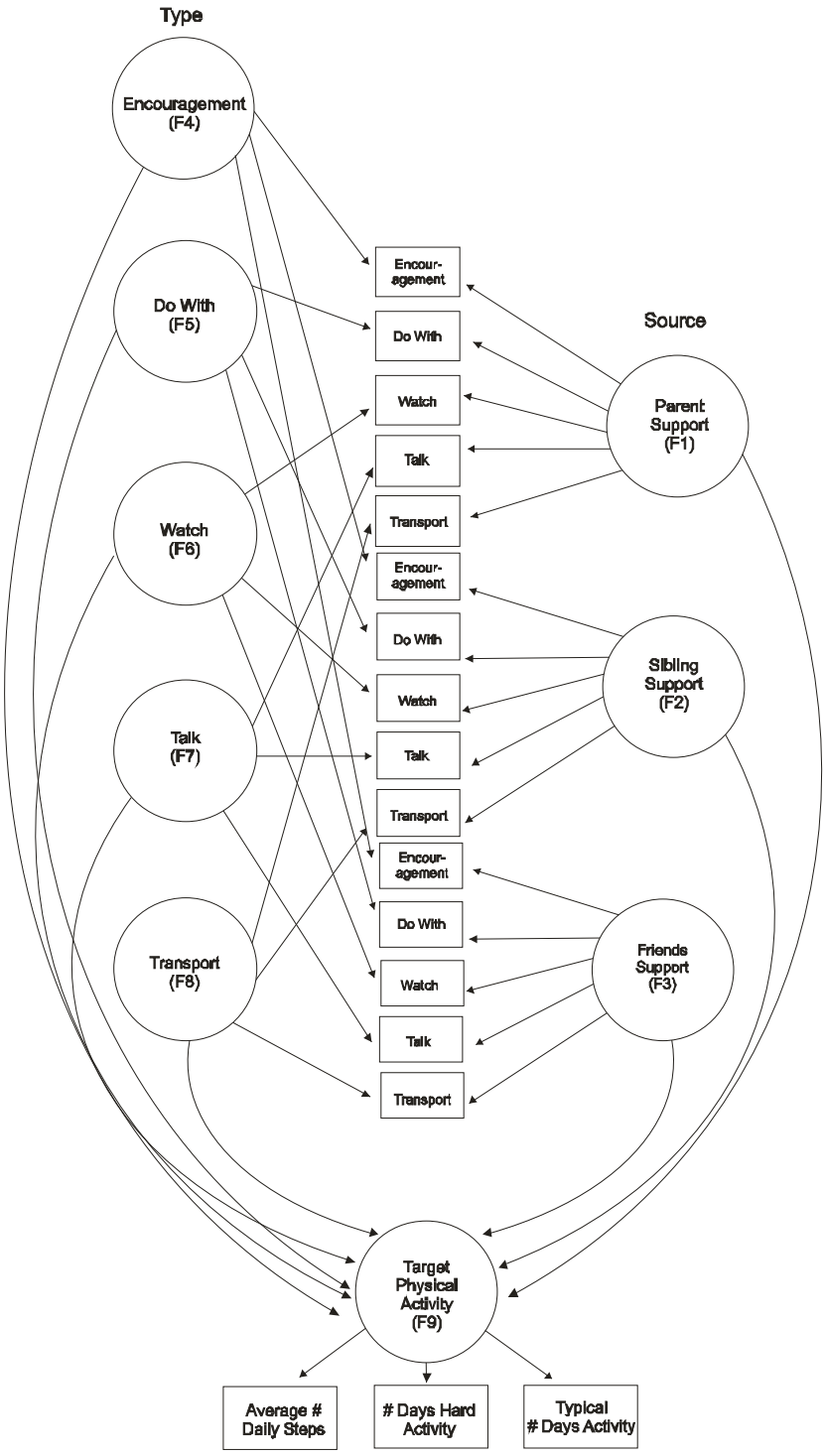
table continues

	Effect	*t*-value
Encourage - Age	.40	3.30
Encourage - Gender	.11	1.20
Encourage - Income	.16	1.65
Do With - Age	.14	1.05
Do With - Gender	.10	.88
Do With - Income	.27	2.38
Watch - Age	.20	1.90
Watch - Gender	.09	1.14
Watch - Income	.17	2.07
Talk - Age	.49	4.31
Talk - Gender	.09	1.01
Talk - Income	.11	1.23
Transport - Age	-.12	-1.34
Transport - Gender	.18	2.72
Transport - Income	.20	3.01

Note. All *t*-values greater than 1.96 are significant at $p < .05$ or greater.

Figure Captions

Figure 1. Representation of the structural model. Demographic variables (age, gender and income) were controlled for in the model, but are not shown. Correlations among factors F1 to F3 and F4 to F8 were estimated but are not shown.


Type
Encouragement (F4)
Do With (F5)
Watch (F6)
Talk (F7)
Transport (F8)
Encour-agement
Do With
Watch
Talk
Transport
Encour-agement
Do With
Watch
Talk
Transport
Encour-agement
Do With
Watch
Talk
Transport
Source
Parent Support (F1)
Sibling Support (F2)
Friends Support (F3)
Target Physical Activity (F9)
Average # Daily Steps
Days Hard Activity
Typical # Days Activity