

## **Adolescent nutrition and exercise behavior: A preliminary investigation into the role of parental communication quality**

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**Abstract**

This paper addresses an issue that has received little attention within the literature: the role that parents play in shaping children's nutrition and exercise beliefs and behaviors. Of particular interest was the influence of parental style and the quality of parent-child communication upon children's nutrition and exercise beliefs and behaviors. Twenty family units with a child in middle school were studied during home visits. Data were collected with a survey instrument, including measures related to parent-adolescent communication quality, warm and restrictive parenting styles, adolescent nutrition concern, adolescent weight loss behaviors, and adolescent exercise commitment and satisfaction. Results suggest that adolescents' nutrition concerns were positively related to good communication quality and restrictive parenting behaviors, and they support the significance of parental communication on adolescents' nutrition and exercise attitudes and behaviors. Implications for education and intervention are identified.

**Keywords:** adolescent, parents, exercise, nutrition

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As a population, American adolescents have poor eating and exercise habits. They routinely skip meals, binge, eat unhealthy snacks (Gardyn 2003), and consume less than the recommended amounts of fruits and vegetables (Kahn et al. 1993, Krebs-Smith et al. 1996). Further complicating the issue is teens' tendency to view nutritional health as an issue that will be of relevance to them only when they are older (Neumark-Sztainer et al. 1999, Story and Resnick 1986). Unfortunately, children's participation in physical activity also begins to decline as they enter adolescence (Aaron et al. 2002, U.S. Department of Health and Human Services 1996). Almost half of Americans aged 12-21 do not engage in vigorous physical activity on a regular basis (Frenn et al. 2005), and the average teen spends 28 hours each week engaging in activities that require no physical exertion, such as talking on the phone, playing video games, or surfing the internet (Gardyn 2003). These lifestyle patterns have contributed in part to one of the most alarming health trends among today's child and teen population – the increase in overweight and obesity; in the past two decades, the prevalence of overweight U.S. children and adolescents has doubled (Styne 2001).

Indeed, these are critical findings given that nutrition and exercise behaviors in childhood and adolescence create a foundation for patterns in later life, and thus, have implications for adult health (McGuire et al. 2002, Neumark-Sztainer et al. 1996). Dietary habits have been linked to varied health issues, including cancer, obesity, cardiovascular disease, diabetes, and eating disorders (Doll and Peto 1981, Fagot-Campagna 2000, Patton 1999, Styne 2001). Exercise similarly impacts adult health. Increased levels of exercise are associated with improved fitness (Marrow and Freedson 1994), blood pressure control (Alpert and Wilmore 1994), better mood (King et al. 1989), weight control (Pronk and Wing 1994), and positive psychological outcomes (Calfas and Taylor 1994). Adolescents who exercise are more likely to carry this activity into adulthood, thereby protecting themselves against the development of health risks associated with inactivity — such as cardiovascular disease, hypertension, obesity, diabetes, osteoporosis, and certain cancers — in later life (American Diabetes Association 2000, Bronner 1996, Freedman et al. 1999, Riddoch and Boreham 2000).

Given the impact of adolescents' nutrition and exercise behaviors on their current and future health, it is critical to examine the ways in which such behaviors can be positively developed. One promising avenue is to study the impact of family variables upon children's nutrition and exercise beliefs and behaviors. As primary agents of socialization, parents model diet and exercise habits for their children (Crockett 1987, DiLorenzo et al. 1998, Nicklas et al. 2001, Tibbs et al. 2001). Further, the ways in which parents and children interact in general, as well as

about the topics of nutrition and exercise, also may be critical to the development of adolescents' health-related habits. Several researchers have found support for a positive relationship between family connectedness (i.e., adolescents' perceptions of family and parental care, understanding, and attention) and adolescents' adequate intake of fruits and vegetables (Neumark-Sztainer et al. 1996) and healthy nutrition and exercise behaviors (Fonseca, Ireland, and Resnick 2002). Further, parental encouragement to exercise has been shown to be positively correlated to the amount of time that adolescents participate in physical activity (McGuire et al. 2002).

With the present preliminary investigation, we build further understanding about the relationship between family communication and adolescents' health-related attitudes and behaviors. Specifically, we examine the impact of two aspects of communication on adolescents' nutrition and exercise attitudes and behaviors: the quality of communication between parents and adolescents and socialization dimensions of parental style. Nutrition and exercise were examined together as they are crucially interrelated in effects on health. We collected data from families to capture perspectives of both parents and adolescents within family units.

### **Family influence on adolescents' nutrition behaviors**

Friedman (1989) suggests that a major influence upon adolescent health is the quality of communication between parents and adolescents. However, only a handful of studies has examined the impact of communication-related family variables on children's and adolescents' nutrition behaviors. DeBourdeaudhuij and Van Oost (1998) found that healthy adolescents (with respect to a range of health behaviors including smoking, alcohol use, food choice, sleeping, BMI, and physical activity) were most likely to have experienced high levels of family cohesion, high levels of emotional bonding among family members, and stability and regularity in family roles, rules, and power structure. Family connectedness, which involves positive communication between parents and children, also has been shown to impact adolescents' eating behaviors. Low levels of connectedness have been shown to be positively related to increased frequency of dieting (French et al. 1995), whereas high levels of connectedness have been positively associated with breakfast eating among overweight adolescent girls and engagement in both positive and negative health-related behaviors (e.g., eating breakfast, consuming fruits and vegetables, and engaging in extreme dieting behaviors) among overweight adolescent boys (Mellin et al. 2002). High levels of connectedness and family communication have been shown to protect against extreme dieting for adolescent girls, but not for boys (Fonesca et al. 2002).

Given that family communication variables have been shown to be related to adolescents' nutritional behaviors, it stands to reason that family communication also would be related to adolescents' concern about nutrition. We therefore propose the following:

H1: Communication between parents and adolescents marked by a high degree of openness and few problems increases adolescents' nutrition concerns; less openness and more problems decrease adolescents' nutrition concerns.

Parenting style – “a constellation of attitudes toward the child that are communicated to the child and that, taken together, create an emotional climate in which the parent's behaviors are expressed” (Darling and Steinberg 1993) – also may be significant in the development of adolescents' nutrition behaviors. For example, Mellin et al. (2002) reported that high levels of parental expectations and moderate levels of parental monitoring were positively associated with the lowest frequency of extreme dieting behaviors among overweight adolescent girls. Nicklas et al. (2001) examined food-related parenting styles on preschool children and found that children of permissive parents (i.e., parents who let their children eat whatever they want) were more likely to drink less milk, to have lower intake of all nutrients except fat, and to have diets in the lowest 10 percent with respect to nutritional quality. Overall, permissive mothers had less control over their children's food choices. However, when parents exerted more control (i.e., restrictive parents) they were able to influence their children's food choices, although not always positively (e.g., food used as punishment, coercing children to eat when not hungry). Even though this study focused upon preschool children, the results suggest the potential importance of parenting behaviors, particularly restrictive behaviors, on adolescents' dietary behaviors. We thus hypothesize that

H2: Restrictive parenting increases adolescents' nutrition concerns, whereas permissive parenting decreases adolescents' nutrition concerns.

H3: Restrictive parenting decreases adolescents' involvement in weight loss behaviors, whereas permissive parenting increases adolescent involvement in weight loss behaviors.

### **Family influence on exercise behaviors**

Several researchers have found strong relationships between parent and child exercise patterns (Hofstetter, Hovell, and Sallis 1990; Gottlieb and Chen 1985; Rossow and Rise 1994) and exercise beliefs and attitudes (Carron, Hausenblas, and Mack 1996). Seemingly, the effects of parental influence upon children's exercise behaviors are enduring; Gottlieb and Baker (1986) found that fathers' exercise involvement was positively related to the physical activity levels of their college-aged sons and daughters.

The family interaction environment also influences exercise patterns. Fathers' and mothers' social support – as manifested in verbal encouragement, praise, and co-participation – can be important predictors of physical activity level for early adolescents and children (DiLorenzo et al. 1998, Johnson et al. 2000, McGuire et al. 2002). We therefore propose that

H4: Warm or nurturing parenting increases adolescents' exercise commitment and satisfaction, whereas non-nurturing parenting decreases adolescents' exercise commitment and satisfaction.

H5: Restrictive parenting decreases adolescents' exercise commitment and satisfaction, whereas permissive parenting increases adolescent exercise commitment and satisfaction.

## METHOD

### Sample

Twenty family units, each consisting of a mother, father, and adolescent, were recruited via snowball sampling. The sample, obtained from a small midwest college town, was primarily white (70 percent), with a median income range of \$50,000-\$74,999. The majority of parents (92 percent) reported at least some college education. The adolescents, including an equal number of males and females, ranged in age from 12 to 14 years. The sample was limited to 20 families because the data collection process was primarily focused on in-depth interviews with each family. In addition to participating in these interviews, each family member was asked to complete a survey questionnaire. Findings reported here are based upon the analysis of this survey data and are necessarily preliminary, given the small and unrepresentative sample used.

### Procedure and measures

The study was approved by the Human Subjects Institutional Review Board at the sponsoring institution. Data collectors met with each family in their home. As noted, each family member was asked to complete a questionnaire, which took approximately 20-30 minutes. The presence of the researcher ensured that questionnaires were completed privately and without influence from other family members.

Measures tapped nutrition and exercise attitudes and family interaction and communication patterns, as described in more detail below. Inclusion of items for all the measures was determined with factor analysis. Items in each measure were summed to create variable scores. Reliabilities and other descriptive statistics for each measure are summarized in Table 1.

**Parent-adolescent communication.** Quality of communication between parents and adolescents was measured using the Parent-Adolescent Communication Scale (PACS) (Barnes and Olson 1982). The PACS measures the adolescent's perception of communication with each parent and parents' (individual) perceptions of communication with their adolescent. The 20-item instrument consists of 10 items that measure openness in communication and 10 items that measure communication problems. Openness measures the positive aspect of parent-adolescent communication, or the degree to which parents and adolescents engage in a free-flowing

exchange of information, both factual and emotional. Openness is characterized by a lack of constraint in parent-adolescent communication, with both parents and adolescents expressing understanding and satisfaction with their communication interactions. In contrast, communication problems reflect negative aspects of parent-adolescent communication such as hesitancy, selectivity, and caution in what is shared. Responses were measured on a seven-point Likert scale, from *Strongly disagree* (1) to *Strongly agree* (7). Higher scores on respective scales indicated more openness in communication or more problems in communication.

Communication openness and problems were used as two separate indicators of communication quality; parents' (mothers' responses and fathers' responses) and adolescents' responses (adolescent responses about mothers and adolescent responses about fathers) were factor analyzed separately.

**Parental style.** Parents responded to several measures related to the parenting dimensions of restrictiveness and warmth. (See Carlson and Grossbart 1988.) Restrictive parents are very demanding about manners, neatness, care of possessions, and obedience, whereas warm parents are more accepting and child-centered, use explanation and reasoning with misbehaving children, and prefer the use of praise instead of physical punishment in discipline. Two measures for restrictiveness were used: (1) *values conformity* measuring parental approval of children obeying rules outside the home (e.g., "A child must learn to conform to all school rules and regulations" vs. "A child should not have to conform to all school rules and regulations") (Baumrind 1971); and (2) *firm enforcement* measuring parental tendencies toward firmness and obedience in parent-child interactions (e.g., "With regard to my children, I would characterize my discipline as quite firm" vs. "With regard to my children I would characterize my discipline as fairly permissive") (Baumrind 1971). The reliability of the *values conformity* measure was .69, .01 less than the .70 threshold advocated by Nunnally (1978). Although previous studies have used parenting scales with low reliabilities, we advise caution when interpreting results.

Two measures were related to warmth: (1) *nurturance*, indicating parental willingness to listen to and share feelings and experiences with their children, (e.g., "I encourage my child to talk about his/her troubles") (Rickel and Biasatti 1982); and (2) *encouraging verbalization*, measuring parental disposition toward encouragement of children's verbalization of anxieties, conflicts, hostilities, and disagreements with parents (e.g., "Children should be allowed to disagree with their parents whenever they feel family rules are unreasonable") (Schaefer and Bell 1958).

**Nutrition concern.** Adolescents' concern about nutrition, or the extent to which they worry about their nutritional health, was assessed using an eight-item nutritional attitudes and beliefs scale (Sims 1978). All items were measured on a seven-point Likert scale, from *Strongly disagree* (1) to *Strongly agree* (7). Items included statements such as "I feel the foods I eat now

will affect my future health,” and “I feel that as long as I am maintaining my weight, I don’t have to worry about nutrition.” Higher scores indicated more concern about nutrition.

**Exercise commitment.** Adolescents’ exercise beliefs and attitudes were measured on a seven-point Likert scale (Anderson and Cychosz 1994), from *Strongly disagree* (1) to *Strongly agree* (7). Items such as “I would consider myself an exerciser” and “I have numerous goals related to exercise” indicated the extent to which adolescents felt positively toward exercising. Higher scores on the nine-item scale indicated a higher level of commitment to engage in exercise.

**Exercise/fitness satisfaction.** Adolescents’ exercise satisfaction was measured on a nine-point Likert scale from *Not at all* (1) to *Very* (9). The three-item scale, unique to this study, asked adolescents to indicate their degree of satisfaction with their current level of (1) exercise; (2) physical condition/level; and (3) health. Higher scores indicated a higher degree of satisfaction with exercise and fitness.

**Adolescent weight loss behaviors.** A three-item scale, scored on a five-point Likert scale, from *Almost never* (1) to *Very often* (5), measured adolescents’ likelihood to engage in potentially dangerous weight loss behaviors, such as wearing a rubber suit while exercising and using laxatives or diuretics to lose weight. The scale was developed by the authors for use in this study, with higher scores indicating a higher likelihood to engage in dangerous weight loss behaviors.

## Results

Given the small sample size, the assumption of normality was checked prior to hypothesis testing, using the Lilliefors and the Shapiro-Wilks’ tests. Results showed that data for several variables were not normally distributed in specifically two of the parental style variables (values conformity and firm enforcement) and the adolescent weight loss behaviors variable. Hypothesis tests involving any of the non-normally distributed variables were conducted with a non-parametric test of association, Kendall’s *tau b*. For all other tests, Pearson correlations were calculated. Hypothesis tests where  $p \leq .05$  were considered to be significant.

In order to fully examine the first hypothesis, mothers’, fathers’, and adolescents’ responses on the openness and problems communication scales were individually tested for significant correlation to adolescents’ nutrition concern. A complete summary of all of the test results is provided in Table 2. As adolescents’ responses showed, communication with parents marked by a high degree of openness and few problems was significantly related to adolescents’ concern about nutrition, in support of H1. Specifically, the more open communication adolescents perceived they had with their mothers and fathers, the more concerned they were with nutrition



( $r=0.76, p=.0003$ ;  $r=0.61, p=.0076$ , respectively). Conversely, the more communication problems adolescents perceived they had with their mothers, the less they were worried about nutrition ( $r= -0.72, p=.0008$ ). It can be inferred from these results that the better that adolescents perceive the quality of their communication to be with their parents — that is, communication characterized by open dialogue and few conflicts — the more teens will concern themselves with their nutritional health. None of the parents' responses yielded any significant findings with respect to H1, however.

Hypothesis 2 examined the association between restrictive parenting (values conformity and firmness) with adolescents' nutritional concerns, and H3 examined the association between restrictive parenting and adolescents' involvement in weight loss behaviors. As the results in Table 3 reveal, although several of the tests approached the significance level of .05, none were significant at this level, so H2 and H3 were not supported.

H4 examined the relationship between parenting behaviors and adolescents' exercise commitment and satisfaction; the results are summarized in Tables 4 and 5, respectively. In H4, neither warm parental style, that is, nurturance and encouraging verbalization, was significantly correlated to adolescents' exercise commitment. However, adolescents' satisfaction with their exercise/fitness level was significantly correlated to mothers' nurturance ( $r=-.47, p=.04$ ), but negatively, which was opposite to the direction posited in H4. Similarly, satisfaction with exercise was negatively correlated to mothers' encouraging verbalization ( $r=-.45, p=.05$ ). These results suggest that the more that mothers engaged in nurturing, warm behaviors with their teens, the less satisfied teens were with their fitness and exercise level. These findings, in opposition to H4, suggest that adolescents who have open communication and warm relationships with their parents are more likely to be dissatisfied with their exercise and state of fitness. Neither values conformity nor firmness, both of which are considered restrictive parenting behaviors, was significantly associated with adolescents' commitment to and satisfaction with exercise. Therefore, Hypothesis 5 was not supported.

**Table 1. Descriptive statistics and reliability of measurement instruments**

Scale / Responses		Cronbach's alpha	Number of Items	Range	Mean	Standard deviation
Parent-adolescent communication--openness	Mothers' responses about adolescents	.88	9	21-62	46.90	9.19
	Fathers' responses about adolescents	.86	9	33-60	45.10	8.25

	<b>Adolescents' responses about mothers</b>	.69	9	13-63	43.00	11.61
	<b>Adolescents' responses about fathers</b>	.78	9	17-61	40.95	10.84
<b>Parental-adolescent communication-- problems</b>	<b>Mothers' responses about adolescents</b>	.79	4	4-28	13.55	5.83
	<b>Fathers' responses about adolescents</b>	.75	4	5-21	11.95	4.63
	<b>Adolescents' responses about mothers</b>	.90	4	5-25	13.86	5.54
	<b>Adolescents' responses about fathers</b>	.90	4	4-25	13.10	6.17
<b>Parental style-- restrictiveness</b>	<b>Values conformity - Mothers</b>	.59	3	3-5	4.00	0.34
	<b>Values conformity - Fathers</b>	.69	3	3-5	4.11	0.46
	<b>Firm enforcement - Mothers</b>	.91	2	2-4	3.56	0.81
	<b>Firm enforcement - Fathers</b>	.84	2	2-4	3.47	0.84
<b>Parental style-- warmth</b>	<b>Nurturance - Mothers</b>	.93	7	15-49	39.85	8.23
	<b>Nurturance - Fathers</b>	.83	7	30-49	41.80	4.81

	<b>Encouraging verbalization - Mothers</b>	.55	3	14-27	20.52	3.46
	<b>Encouraging verbalization - Fathers</b>	.79	3	6-26	17.84	5.06
<b>Nutrition concern</b>		.88	9	19-49	30.17	6.55
<b>Adolescent weight loss behaviors</b>		.82	3	4-20	6.62	3.63
<b>Exercise commitment</b>		.93	7	9-53	31.85	14.41
<b>Exercise/fitness satisfaction</b>		.90	3	5-27	18.19	5.72

**Table 2. H1: Correlation of communication openness and problems with adolescents’ nutrition concern**

<b>Scale</b>	<b>Response</b>	<b>Correlation with nutrition concern*</b>	<b>p-value</b>
<b>Parent-adolescent communication—openness</b>	<b>Mothers’ responses about adolescents</b>	0.36	.073
	<b>Fathers’ responses about adolescents</b>	-0.01	.492
	<b>Adolescents’ responses about mothers</b>	0.76	.000
	<b>Adolescents’ responses about fathers</b>	0.61	.008
<b>Parent-adolescent communication—problems</b>	<b>Mothers’ responses about adolescents</b>	-0.04	.447
	<b>Fathers’ responses about adolescents</b>	0.17	.254
	<b>Adolescents’ responses about mothers</b>	-0.72	.000
	<b>Adolescents’ responses about fathers</b>	-0.36	.073

\*Pearson correlations

**Table 3. H2 and H3: Association of restrictive parenting behaviors with adolescents' nutrition concern and involvement in weight loss behaviors**

Scale	Response	Nutrition concern*	p-value	Involvement in weight loss behaviors*	p-value
Values conformity	Mothers' responses	0.06	.399	0.01	.493
	Fathers' responses	0.12	.293	0.00	.494
Firmness	Mothers' responses	0.34	.070	0.34	.108
	Fathers' responses	0.31	.080	0.16	.273

\*Kendall's tau-b

**Table 4. H4: Association of warm parenting behaviors with adolescents' exercise commitment and exercise satisfaction**

Scale	Responses	Exercise commitment*	p-value	Exercise satisfaction*	p-value
Nurturance	Mothers' responses	-0.04	.874	-0.47	.041
	Fathers' responses	0.01	.486	-0.17	.470
Encouraging verbalization	Mothers' responses	-0.08	.734	-0.45	.050
	Fathers' responses	0.06	.808	0.13	.607

\*Pearson correlations

**Table 5. H5: Association of restrictive parenting behaviors with adolescents' exercise commitment and exercise satisfaction**

Scale	Responses	Exercise commitment*	p-value	Exercise satisfaction*	p-value
Values conformity	Mothers' responses	-0.08	.355	0.09	.337
	Fathers' responses	-0.10	.317	0.18	.185
Firmness	Mothers' responses	0.14	.259	-0.19	.183
	Fathers' responses	-0.15	.217	-0.07	.365

\*Kendall's tau-b.

## Discussion and conclusions

Findings from this preliminary study provide some clear indications that interaction between parents and adolescents in the small sample does significantly affect adolescent nutrition and exercise beliefs and behaviors. The quality of communication between teens and parents was significantly linked to how concerned adolescents were with nutrition; when dialogue between parents and teens was open and problem-free, teens were more likely to be concerned about nutrition. Given that problem-free communication may be indicative of cohesive families and family connectedness, this finding is consistent with Debourdeaudhuij and Van Oost (1998) and Neumark-Sztainer et al. (1996). The findings suggest that an open communication pattern between parents and adolescents may prove to be an important conduit to overcoming adolescents' nonchalance about the urgency of eating healthy foods.

Parenting behaviors also played a significant role in adolescents' commitment to and satisfaction with exercise. Warm and nurturing relationships between mothers and teens were significantly linked to adolescents' fitness and exercise dissatisfaction; displaying warmth seemed to make adolescents feel less satisfied with their exercise activities. Nonetheless, this finding was contrary to what was hypothesized. Based on the fact that previous researchers discovered a positive relationship between supportive parental behaviors and adolescent involvement in exercise, it was predicted that warm, supportive parenting behaviors would be positively related to adolescents' commitment to and satisfaction with exercise. Our findings seemingly suggest a discrepancy with previous findings, perhaps because we measured attitudes toward exercise, not exercise behaviors. In that light, our findings indicate that teens might be more willing to acknowledge dissatisfaction with their fitness when they feel nurtured by their mothers. Although not specifically measured in this study, dissatisfaction may be what leads to teens'

increased involvement in exercise behaviors, which would be consistent with previous research (e.g., McGuire et al. 2002) suggesting that parental support and encouragement (such as what nurturing parents would provide) is positively related to exercise behaviors. It is possible that our results are confounded by early adolescents' general dissatisfaction with their appearance and fitness. Without a doubt, developmental issues loom large for early adolescence. Nonetheless, our results may mean that when adolescents are able to talk openly with their mothers about their fitness and feel nurtured in the process, they are better able to recognize and deal with their dissatisfaction by increasing their exercise activity.

Overall, our results suggest that among this sample of parents, mothers and fathers who enjoy healthy communication with their adolescents but who are also somewhat restrictive as parents may have the greatest positive impact on adolescents' nutrition and exercise beliefs and behaviors. Whereas results from prior work (Crockett 1987, DiLorenzo et al. 1998, Nicklas et al. 2001, Tibbs et al. 2001) suggest that parents shape children's nutrition and exercise behaviors by the types of foods that are purchased and available in the household and by being good role models, the present study provides evidence that *how* parents communicate and interact with their children also may significantly affect children's nutrition and exercise behaviors. This is consistent with findings from focus group interviews with adolescents (Neumark-Sztainer et al. 1999) – that adolescents' food choices are partly motivated by how parents and children relate to one another. Moreover, the extent to which parents positively communicate and nurture their adolescents is likely to positively intersect with teens' motivations to engage in exercise activities.

When interpreting these findings it is important to remember that the sample was small, limiting not only the ability to generalize the findings, but also the statistical power of the hypothesis tests — a larger sample size might well have produced additional significant findings, particularly in the H2 and H3 test results. At best, therefore, the present findings must necessarily be interpreted as preliminary but suggestive of directions for continued work in this area. It would be valuable to explore whether the relationships discovered in the present study differ for male and female adolescents; prior work (e.g., Smetana 1988, Spitzack 1990, Striegel-Moore and Kearney-Cook 1994) has suggested that parental socialization about body-related health issues may vary by the gender of both the parent (as was discovered in this study) and the child; the small number of male and female adolescents in this study limited the feasibility of examining this issue. There is evidence from past research that obesity in adolescents is higher among Hispanics/Latinos and African-Americans than among white youth (Mellin et al. 2002) and that physical activity among racial and ethnic minority groups is lower than for whites (He and Baker 2005, Frenn and Malin 2003). Given the demographics of this sample (70 percent white), future research should investigate the presence or absence of ethnicity and racial effects on the variables examined in this study. Additionally, the use of a larger sample would afford clearer comparisons of the nutrition and exercise attitudes and behaviors of adolescents experiencing varied levels of the

parental communication traits identified within the present study (e.g., openness, warmth, control). Extending future studies to include adolescents' exercise behaviors would also be beneficial to further understanding the results related to H4 and H5 in this study.

The results also suggest implications for education and intervention. In particular, one possible avenue of prevention is to educate parents about the importance of developing open and healthy communication with their children, setting rules, and being nurturing — all facets of parenting considered to be most effective in socializing children to be responsible, mature, and successful adults (Darling and Steinberg 1993). Families, Youth, and Communities Extension, with its emphasis upon family well-being, is well-poised to play a key role in “whole family” educational campaigns aimed at improving parent-child communication pathways, adolescent nutrition, and exercise behaviors. For instance, multi-state Extension leader teams could use the present findings to supplement positive youth development initiatives. Families Extension educators could include these findings in Partnering with Parents, a national parent curriculum initiative to address issues of adolescent health (e.g., nutrition and exercise needs) as well as parent-child communication strategies that can set an effective context for nurturing healthful attitudes and behaviors among adolescents. Finally, local community trainers could encourage parents in their programs to practice open nurturing communication by role playing the healthy behavior conversations they could have with their adolescents.

Any programs, including WIC and Head Start, that work with parents and children or adolescents might increase effectiveness in combating youth obesity, diabetes, and eating disorders by incorporating educational programs related to parental style. In conclusion, the preliminary findings from this study highlight the importance of including family communication patterns in programs designed to improve nutrition and exercise attitudes and, ultimately, healthy behaviors among children and adolescents.

## References

Aaron, Deborah J., Kristi L. Storti, Robert J. Robertson, Andrea M. Kriska, and Ronald E. LaPorte. 2002. Longitudinal study of the number and choice of leisure time physical activities from mid to late adolescence: Implications for school curricula and community recreation programs. *Archives of Pediatrics & Adolescent Medicine* 156:1075-1084.

Alpert, Bruce S., and Jack H. Wilmore. 1994. Physical activity and blood pressure in adolescents. *Pediatric Exercise Science* 6:361-380.

American Diabetes Association. 2000. Type 2 diabetes in children and adolescents. *Pediatrics* 105:671-680.

- Anderson, Dean. F., and Charles M. Cychoz. 1994. Development of an exercise identity scale. *Perceptual and Motor Skills* 78:747-751.
- Barnes, Howard L., and David H. Olson. 1982. Parent-adolescent communication scale. In *Family Inventories: Inventories used in a national survey of families across the family life cycle*, D.H. Olson et al, eds. St. Paul, Minnesota: Family Social Science, University of Minnesota.
- Baumrind, Diana. 1971. Current patterns of parental authority. *Developmental Psychology Monograph* 4(January):1-103.
- Bronner, Yvonne. L. 1996. Nutritional status outcomes for children: Ethnic, cultural and environmental contexts. *Journal of the American Dietetic Association* 96:891-903.
- Calfas, Karen J., and Wendell C. Taylor. 1994. Effects of physical activity on psychological variables in adolescents. *Pediatric Exercise Science* 6:406-423.
- Carlson, Les, and Sanford Grossbart. 1988. Parental style and consumer socialization of children. *Journal of Consumer Research* 15(June):77-94.
- Carron, Albert V., Heather A. Hausenblas, and Diane Mack. 1996. Social influence and exercise: A meta-analysis. *Journal of Sport & Exercise Psychology* 18:1-16.
- Crockett, Susan J. 1987. The family team approach to fitness: A proposal. *Public Health Reports* 102(5):546-551.
- Darling, Nancy, and Laurence Steinberg. 1993. Parenting style as context: An integrative model. *Psychological Bulletin* 113(3):487-496.
- DeBourdeaudhuij, Ilse, and Paulette Van Oost. 1998. Family characteristics and health behaviours of adolescents and families. *Psychology and Health* 13(5):785-803.
- DiLorenzo, Thomas M., Renee C. Stucky-Ropp, Jillon S. VanderWal, and Heather J. Gotham. 1998. Determinants of exercise among children II: a longitudinal analysis. *Preventive Medicine* 27(3):470-477.
- Doll, Richard, and Richard Peto. 1981. The causes of cancer: Quantitative estimates of avoidable risks of cancer in the United States today. *Journal of the National Cancer Institute* 66:1193-1308.



Douthitt, Vicki L. 1994. Psychological determinants of adolescent exercise adherence. *Adolescence* 29(115):711-722.

Fagot-Campagna, Anne. 2000. Emergence of type 2 diabetes mellitus in children: Epidemiologic evidence. *Journal of Pediatric Endocrinology and Metabolism* 13(6):1395-1405.

Fonseca, Helena, Marjorie Ireland, and Michael D. Resnick. 2002. Familial correlates of extreme weight control behaviors among adolescents. *International Journal of Eating Disorders* 32:441-448.

Freedman, David S., William H. Dietz, Sathanur R. Srinivasan, and Gerald S. Berenson. 1999. The relation of overweight to cardiovascular risk factors among children and adolescents: The Bogalusa Heart Study. *Pediatrics* 103:1175-1182.

French, Simone A., Mary Story, Blake Downes, Michael D. Resnick, and Robert W. Blum. 1995. Frequent dieting among adolescents: Psychosocial and health behavior correlates. *American Journal of Public Health* 85:695-701.

Frenn, Marilyn, and Shelly Malin. 2003. Diet and exercise in low income, culturally diverse middle school students. *Public Health Nursing* 20:361-368.

Frenn, Marilyn, Shelly Malin, Antonia M. Villarruel, Kimberly Slaikeu, Stephanie McCarthy, Joan Freeman, and Erinn Nee. 2005. Determinants of physical activity and low-fat diet among low income African American and Hispanic middle school students. *Public Health Nursing* 22(2):89-97.

Friedman, Herbert L. 1989. The health of adolescents: Beliefs and behavior. *Social Science Medicine* 29(3):309-315.

Gardyn, Rebecca. 2003, March. Teen food fetishes. *American Demographics*:12-13.

Gottlieb, Nell H., and Judith A. Baker. 1986. The relative influence of health beliefs, parental and peer behaviors and exercise program participation on smoking, alcohol use, and physical activity. *Social Science & Medicine* 22 (9):915-927.

Gottlieb, Nell H., and M. S. Chen. 1985. Sociocultural correlates of childhood sporting activities: Their implications for heart health. *Social Science Medicine* 21(5):533-539.

- He, Xiaoxing Z., and David W. Baker. 2005. Differences in leisure-time, household, and work-related physical activity by race, ethnicity, and education. *Journal of General Internal Medicine* 20(3):259-266.
- Hofstetter, C. Richard, Melbourne F. Hovell, and James F. Sallis. 1990. Social learning correlates of exercise self-efficacy: Early experiences with physical activity. *Social Science Medicine* 31(10):1109-1176.
- Johnson, Carolyn C., Donglin Li, Jacqueline Epping, Leslie A. Lytle, Peter W. Cribb, B.J. Williston, and Minhua Yang. 2000. A transactional model of social support, self-efficacy, and physical activity of children in the child and adolescent trial for cardiovascular health. *Journal of Health Education* 31(1):2-9.
- Kahn, Laura, Charles W. Warren, William Harris, Janet L. Collins, Kathy A. Douglas, Mary E. Collins, Barbara I. Williams, James J. Ross, and Lloyd J. Kolbe. 1993. Youth risk behavior surveillance—United States. *Journal of School Health* 65:163-171.
- King, Abby C., C. Barr Taylor, William L. Haskell, and Robert F. DeBusk. 1989. Influence of regular aerobic exercise on psychological health. *Health Psychology* 8:305-324.
- Krebs-Smith, Susan M., D. Anetta Cook, Amy F. Subar, Linda Cleveland, James Friday, and Lisa L. Kahle. 1996. Fruit and vegetable intakes of children and adolescents in the United States. *Archives of Pediatric and Adolescent Medicine* 150:81-86.
- Marrow, J., and P. Freedson. 1994. Relationship between habitual physical activity and aerobic fitness in adolescents. *Pediatric Exercise Science* 6:315-329.
- Martz, Denise M., Ellie T. Sturgis, and Sigrid B. Gustafson. 1996. Development and preliminary validation of the cognitive behavioral dieting scale (CBDS). *International Journal of Eating Disorders* 19(3):297-309.
- McGuire, Maureen T., Peter J. Hannan, Dianne Neumark-Sztainer, Nicole H. Falkner Cossrow, and Mary Story. 2002. Parental correlates of physical activity in a racially/ethnically diverse adolescent sample. *Journal of Adolescent Health* 30:253-261.
- Mellin, Alison E., Dianne Neumark-Sztainer, Mary Story, Marjorie Ireland, and Michael D. Resnick. 2002. Unhealthy behaviors and psychosocial difficulties among overweight adolescents: The potential impact of familial factors. *Journal of Adolescent Health* 31:145-153.

- Neumark-Sztainer, Dianne, Mary Story, Cheryl Perry, and Mary Anne Casey. 1999. Factors influencing food choices of adolescents: Findings from focus-group discussions with adolescents. *Journal of the American Dietetic Association* 99(8):929-937.
- Neumark-Sztainer, Dianne, Mary Story, Michael D. Resnick, and Robert W. Blum. 1996. Correlates of inadequate fruit and vegetable consumption among adolescents. *Preventive Medicine* 25:497-505.
- Nicklas, Theresa A., Tom Baranowski, Janice C. Baranowski, Karen Cullen, LaTroy Rittenberry, and Norma Olverra. 2001. Family and child-care provider influences on preschool children's fruit, juice, and vegetable consumption. *Nutrition Reviews* 59(7):224-235.
- Nigg, Claudio R. 2001. Explaining adolescent exercise behavior change: A longitudinal application of the transtheoretical model. *Annals of Behavioral Medicine* 23(1):11-20.
- Nunnally, Jum C. 1978. *Psychometric Theory* (Second Edition). New York: McGraw Hill.
- Patton, G.C. 1999. Onset of adolescent eating disorders: Population based cohort study over three years. *British Medical Journal* 318:765-768.
- Pronk, Nicolas P., and Rena R. Wing. 1994. Physical activity and long-term maintenance of weight loss. *Obesity Research* 2:587-599.
- Rickel, Annette U., and Lawrence L. Biasatti. 1982. Modification of the Block child rearing practices report. *Journal of Clinical Psychology* 38(January):129-134.
- Riddoch, Chris, and Colin Boreham. 2000. Physical activity, physical fitness, and children's health: Current concepts. *Pediatric Exercise Science and Medicine*, N. Armstrong and W. van Mechelen, eds. Oxford: Oxford University Press.
- Rossow, Ingeborg, and Jostein Rise. 1994. Concordance of parental and adolescent health behaviors. *Social Science Medicine* 38(9):1299-1305.
- Schaefer, Earl S., and Richard Q. Bell. 1958. Development of a parental attitude research instrument. *Child Development* 29(3):339-361.
- Sims, Laura S. 1978. Food-related value orientations, attitudes, and beliefs of vegetarians and non-vegetarians. *Ecology of Food and Nutrition* 7:23-35.

Smetana, Judith G. 1988. Concepts of self and social convention. Adolescents' and parents' reasoning about hypothetical and actual family conflicts. *Development during the transition to adolescence*, M.R. Gunnar and W. A. Collins, eds. Hillsdale, New Jersey: Lawrence Erlbaum.

Spitzack, Carole. 1990. *Confessing excess: Women and the politics of body reduction*. Albany, New York: State University of New York Press.

Story, Mary, and Michael Resnick. 1986. Adolescents' views on food and nutrition. *Journal of Nutrition Education* 18:188-192.

Striegel-Moore, Ruth H., and Ann Kearney-Cooke. 1994. Exploring parents' attitudes and behaviors about their children's physical appearance. *International Journal of Eating Disorders* 15(4):377-385.

Styne, Dennis M. 2001. Childhood and adolescent obesity: Prevalence and significance. *Pediatric Clinics of North America* 48(4):823-854.

Tibbs, Tiffany, Debra Haire-Joshu, Kenneth B. Schechtman, Ross C. Brownson, Marilyn S. Nanney, Cheryl Houston, and Wendy Auslander. 2001. The relationship between parental modeling, eating patterns, and dietary intake among African-American parents. *Journal of the American Dietetic Association* 101(5):535-541.

U.S. Department of Health and Human Services. 1996. Physical activity and health: A report of the Surgeon General (US-DHHS Pub. No. S/N 017-023-00196-5). Atlanta, Georgia: Centers for Disease Control and Prevention.

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