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# Adolescents' Response to Parental Efforts to Influence Eating Habits: When Parental Warmth Matters

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**Abstract** Previous findings have shown both beneficial and adverse effects of parents' attempts to influence adolescents' eating habits. The current study examined the differential effect of parents' persuasion (e.g., encouragement, giving information) and pressure tactics (e.g., guilt induction, ridicule) and the moderating influence of parental warmth on older adolescents' emotional and behavioral responses. An ethnically diverse sample of 336 older adolescents ( $M$  age = 18.6;  $SD$  = 1.1; 58.0% female) were surveyed. Adolescents who reported higher levels of pressure tactics by parents reported more negative affect and behavioral resistance. Perceived parental warmth moderated the influence of persuasion tactics, but not pressure tactics. For adolescents with low parental warmth, high levels of persuasion were associated with more negative emotional and behavioral responses; persuasion had the opposite associations for adolescents with high parental warmth. These results suggest that parental warmth plays an important role in how older adolescents respond to parents' persuasion tactics. However, when parents use more forceful pressure tactics to influence eating habits, adolescents react negatively regardless of the overall quality of the parent–adolescent relationship.

**Keywords** Adolescence · Parental warmth · Social control · Eating habits · Reactance

## Introduction

The incidence of obesity among adolescents in many industrial and developing nations has increased dramatically since the 1970s and has been described as a global health concern (World Health Organization 2006). In the United States, the rate of adolescents who are overweight, defined by the Center for Disease Control as above the 95th percentile for weight-by-height, has risen from 6.1% between 1971 and 1974 to 16.1% between 1999 and 2002 (Center for Disease Control 2005). Members of minority ethnic groups and children of immigrant parents are at increased risk of overweight and obesity (Chen and Kennedy 2001). In turn, adolescent obesity strongly predicts adult obesity (Raitakari et al. 2005) and is related to several adult-onset chronic health conditions, including Type 2 diabetes, cancer, and heart disease (Dietz 1998). Thus, this upward trajectory in rate of adolescent obesity has led to widespread short-term and long-term deleterious health consequences.

A significant influence on these increases in obesity and body mass index (BMI) are recent changes in adolescents' diet. Adolescents ingest more simple sugars, on average, than they did 40 years ago and eat fewer complex carbohydrates. Adolescent consumption of non-diet sodas increased 150% between 1965 and 1996, while their consumption of high-fat potato products (e.g., potato chips, French fries) increased 70% (Cavadini et al. 2000). Adolescents also eat more meals outside the home than 40 years ago, and these meals are of poorer nutritional quality than those eaten in the home (Neilson et al. 2002). In a longitudinal study conducted by Berkey et al. (2000), both baseline caloric intake and changes in caloric intake over time were associated with BMI among adolescents. Further, Rosenbaum and Leibel (1998) found that genetic

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predispositions related to weight, dietary preferences, and physical activity interact with rapid increases in the availability of energy-dense foods to predict increases in adolescent BMI. Overall, changes in adolescents diet over time have substantively impacted adolescents' weight and health.

Parents play a major role in influencing adolescents' eating habits and dietary intake, for better and worse, both through the models they provide and their direct influence attempts. Parental modeling of positive health behaviors predicts better adolescent health behaviors, whereas parents' modeling of negative health behaviors (e.g., smoking) predicts worse adolescent health behaviors (Jessor et al. 1998). However, parents also often explicitly try to control the dietary intake of their adolescent children (Brown and Ogden 2004), and the relationship between these explicit control attempts and adolescents' eating habits is unclear. Parental restriction of adolescent diet (e.g., limiting portions, deciding adolescent's diet) has been associated with anorexia, bulimia, and unhealthy dieting habits (Haworth-Hoepfner 2004) and poor diet (Brown and Ogden 2004). Parental pressure to diet has been associated with the onset of bulimia during adolescence (Kanakakis and Thelen 1995). Excessive parental concerns about weight (Field et al. 2001) and parental commenting about adolescents' weight (Keel et al. 1997) also have been associated with body dissatisfaction, low self-esteem, and depressive symptoms. Parental teasing about adolescents' weight has been associated with negative body image among girls (Schwartz et al. 1999). In contrast, Lau et al. (1989), in a study of older adolescents about to enter college, found that parental attempts to encourage good eating habits and regular physical activity were associated with older adolescents' positive health beliefs. These beliefs, in turn, persisted over time among college students who no longer lived with their parents. Overall, the amount of influence that parents exert on their adolescent children does not appear to be a consistent predictor of adolescent outcomes. Rather, the specific types of influence they use appear to play a larger role in adolescents' physical health and psychological functioning.

Previous research that has examined the influence of health-related social control provides a framework for understanding this pattern of findings. Health-related social control operates when a member of an individual's social network actively attempts to persuade or coerce the individual to engage in health-enhancing behaviors (e.g., exercising, eating healthy foods) or not to engage in health-compromising behaviors (e.g., eating unhealthy foods, smoking; Rook 1990). Individuals use many different control tactics to regulate the behaviors of others in close relationships. Indeed, one review documented 131 different social influence tactics used in close relationships (Lewis

et al. 2004). Lewis and Butterfield (2005) argued that a major reason why many measures of health-related social control are not consistently related to health outcomes is that the effectiveness of influence attempts may depend on the particular tactics they use.

According to Lewis and Butterfield (2005), the plethora of social control tactics that have been identified can be understood as specific manifestations of two types of influence tactics that have quite different influences on adolescent behavior. Negative social control, or *pressure tactics*, are intended to produce behavior change in the target by communicating negative emotions such as disapproval or inducing negative feelings such as guilt or failure. Examples of negative social control tactics include demanding, embarrassing the target, and criticizing. Positive social control, or *persuasion tactics*, in contrast, are intended to produce change in the target's behavior through acts such as rewarding, encouraging, facilitating, and participating with the target in his or her efforts to change. Importantly, pressure and persuasion tactics represents distinct dimensions of social control, rather than the opposite ends of a single dimension. In one study, pressure and persuasion tactics were highly correlated,  $r = .55$ , yet had distinctive effects (Lewis and Butterfield 2005). Lewis and Rook (1999) found that being the target of negative tactics was associated with greater psychological distress, and Cohen and Lichtenstein (1990) found that negative types of influence from a partner or spouse were inversely associated with improvement in health behaviors. They also found evidence that the use of more negative tactics influenced how social control targets responded to positive influence tactics used by the same social network member. In contrast, several studies have found that supportive types of influence are associated with improvements in health behavior (Lewis and Rook 1999; Okun et al. 2007).

Social control attempts in close relationships lead to emotional reactions, both positive and negative (Lewis and Butterfield 2005). Social control can lead to negative emotions (e.g., anger, hostility) if the target feels that his or her freedom is being constrained (Dillard and Shen 2005; Rook 1990) or that the would-be influencer is not truly concerned about the target person's health. In contrast, social control can lead to positive emotions (e.g., happiness) if the target person feels that the individual attempting to influence them is genuinely concerned about his or her health or if the social control is embedded in a high-quality relationship (Lewis and Butterfield 2005). Tucker and Anders (2001) proposed that negative emotions in response to social control lead to reactance, or the motivation to reject or actively resist social control, and behavioral resistance (Brehm and Brehm 1981; Dillard and Shen 2005). Much of this research has examined influence attempts from spouses and romantic partners, rather than

from the parents of adolescents transitioning into adulthood. However, these findings are consistent with the possibility that the emotional tone of the parent–adolescent relationship may play a crucial role in modulating how adolescents respond to parental attempts to influence their dietary habits.

As noted earlier, previous researchers often have not distinguished between persuasion and pressure tactics—a factor that no doubt has contributed to inconsistencies in findings. Another factor that may have led to inconsistent findings is researchers' neglect of the overall quality of the parent–adolescent relationship in shaping responses to parental influence attempts. When the parent–adolescent relationship is conflictual, adolescents respond to social control attempts with anger, hostility, and externalizing behaviors (Pettit et al. 2001). During adolescence, youth seek increasing autonomy (Silverberg and Steinberg 1987), and social control attempts by parents that are perceived as threats to their emotional or behavioral freedom are not likely to produce positive results (Barber and Harmon 2002). Darling and Steinberg (1993) argued that the emotional climate of the parent–adolescent relationship may influence the effectiveness of parental socialization practices, proposing that the latter are more effective in higher-quality parent–adolescent relationships that are characterized, among other things, by warmth and understanding (see also Hoffman 1983). Thus, the effectiveness of parents' attempts to influence their adolescent children's diet may be contingent on parents' ability to convey warmth and acceptance.

The moderating effect of parental warmth on reactions to parental diet-related social control has not been examined to date. However, in a study of the influence of romantic partners' social control on changes in health-related behaviors, Okun et al. (2007) found that high levels of positive social control resulted in the target person's hiding his or her unhealthy behaviors from a romantic partner when they were in a low-quality relationship, but not when they were in a high-quality relationship. They also found that partners in high-quality romantic relationships were less likely to hide their unhealthy behaviors when they experienced low levels of negative social control than were partners in low-quality romantic relationships. However, they found no difference between the two groups when they experienced high levels of negative social control, and that there was a strong overall main effect of negative social control on hiding unhealthy behaviors. Thus, partners in relationships characterized by high levels of warmth and understanding improved their health habits in response to more positive types of social control—but not when their partners used more coercive tactics.

These findings suggest that the emotional context of the parent–adolescent relationship may influence reactions to

diet-related social control. The overall relationship quality may provide cues for the individual that shape how they interpret domain-specific influence attempts, particularly when the parent uses more positive tactics. In the context of diet-related social control (i.e., parental social control aimed at improving an adolescent's eating habits or dietary intake quality), parent–adolescent relationships that are high in parental warmth and acceptance may decrease the likelihood that adolescents will perceive parental social control attempts as constraints on their freedom, and thus may increase the likelihood that they will result in internalization of diet-related values by the adolescent.

### The Current Study

The current study was designed to investigate the effects of parents' perceived persuasion and pressure tactics on older adolescents' emotional and behavioral reactions and to determine whether parental warmth and acceptance play a role in moderating these relationships. We examined a population of older adolescents just prior to entering college for several reasons. Most of these adolescents (85.7%) were currently living with their parents, and still might be influenced by parental attempts to improve their eating habits. However, they are about to begin an important transition, so that if participants had negative emotional and behavioral responses to parents' current influence attempts, they might carry forward negative health-related attitudes (self-efficacy, enjoyment of healthy eating) and lower-quality dietary habits after they leave the home. Further, as the majority of these adolescents were planning to live away from home, parents may be aware that they have relatively few opportunities to influence the behaviors of their adolescent children.

Previous studies that have examined the influence of social control have used omnibus measures of emotional and behavioral reactions that assess reactions to social control attempts in general. However, we expected that older adolescents would have quite different reactions to two types of social control: parental use of persuasion and pressure tactics. In order to examine these patterns of reactions, we separately assessed emotional and behavioral reactions to persuasion and pressure tactics. This also allowed us to examine whether parents' use of one type of social control would influence adolescents' reactions to the other type of social control.

We had three main hypotheses about the associations between parents' diet-related influence tactics, parental warmth, and older adolescents' emotional and behavioral reactions. First, based on previous research (Lewis and Butterfield 2005; Okun et al. 2007), we expected that higher levels of parents' persuasion tactics would be

associated with less negative affect and behavioral resistance to both persuasion tactics (Hypothesis 1a) and pressure tactics (Hypothesis 1b). Second, we expected that high levels of parents' pressure tactics would be associated with more negative affect and behavioral resistance to parents' use of both persuasion (Hypothesis 2a) and pressure tactics (Hypothesis 2b; Lewis and Rook 1999; Cohen and Lichtenstein 1990). Third, we expected that persuasion tactics would be associated with less negative affect and behavioral resistance in the context of high parental warmth and acceptance, but not in the context of low warmth and acceptance (Hypothesis 3). In the context of a high-quality relationship, influence tactics such as encouragement and showing concern may be viewed as supportive and helpful (Okun et al. 2007). In the context of a lower-quality relationship, individuals may view the same tactics as more coercive or manipulative. In contrast, however, the influence of pressure tactics was not expected to be moderated by parental warmth and acceptance. When a network member uses high levels of pressure tactics, such as guilt induction and ridiculing the target, the influence of warmth and acceptance in the relationship may be muted (Okun et al. 2007).

Although not the central focus of the current study, previous studies have found evidence that gender differences (Schwartz et al. 1999), cultural values (Fuligni 1998), and age of the adolescent (VanderValk et al. 2008) all influence how individuals respond to control tactics from social network members. In order to control for these influences, and to more fully understand the potential influences on older adolescents responses' to diet-related control tactics, the associations of gender, age, and ethnicity with reactions to persuasion and pressure tactics will also be examined.

## Method

### Participants

Participants were 336 incoming college freshmen at a large, public university in southern California. The sample included 195 females (58.0%) and 141 males whose age ranged from 17–25 ( $M = 18.5$ ;  $SD = 1.1$ ), with 97% of the sample between the ages of 17 and 20. The sample was ethnically diverse: 112 participants (33.3%) described themselves as East or Southeast Asian, 77 (22.9%) as Latino, 62 (18.5%) as Caucasian), and the remainder as either South Asian ( $n = 26$ ; 7.7%), African/African American ( $n = 10$ , 3.0%), Middle Eastern ( $n = 10$ ; 3.0%), or mixed ethnicity ( $n = 39$ ; 11.6%). The parents of participants were relatively well-educated; 53.9% of fathers and 43.5% of mothers were graduates of 4 years colleges.

In contrast, only 4.8% of fathers and 7.4% of mothers did not graduate from high school. The majority (78.7%) of participants had parents who were currently married and living together, whereas 17.4% of participants had parents who were divorced or separated. Most (85.7%) participants currently lived with a parent.

### Procedure

Participants were recruited through an email that was sent to incoming freshman inviting them to complete a survey about influences on their health behaviors. A link to the survey was included in the email. All potential participants completed an online consent form, and the parents of all potential participants under the age of 18 were mailed an informed consent to read and sign to authorize the participation of their child. Participants then completed the web-based survey from home during the 30 days prior to the start of the school year. Participants were entered into a raffle for an iPod music player in acknowledgement of their participation. All procedures were approved by the authors' Institutional Review Board. The sample had similar demographic characteristics as the population of incoming freshman at the same university, with a similar gender (58.0% vs. 55.6% among incoming freshmen), age ( $M = 18.5$  vs. 18.6 among incoming freshmen), and ethnic composition, although participants in the sample were somewhat less likely to be of East/Southeast Asian ancestry (33.3% vs. 39.0%), and somewhat more likely to be of European ancestry (18.5% vs. 10.1%).

### Measures

#### *Demographic Information*

Participants provided demographic information that included their gender, age, ethnicity, parents' level of education, marital status, and current living situation.

*Parental Diet-Related Social Control Tactics* Participants were asked to indicate how often during the last six months their parents used each of 9 strategies (4 persuasion, 5 pressure) to get them to improve their diet, or maintain a healthy diet. These items were adapted from previous scales of health-related social control (Lewis and Rook 1999; Lewis and Butterfield 2005) in order to specifically assess *parental diet-related* social control. Item responses ranged on a 6-point scale from 1 = *never* to 6 = *every day*. Four items (see Appendix A) assessed parental use of *positive social control* ( $\alpha = .83$ ; sample item, "My parents encouraged me to eat healthy foods") and 5 items assessed parental use of *negative social control* ( $\alpha = .86$ ; sample

item, “My parents tried to make me feel guilty about my eating habits”).

*Parental Warmth and Acceptance* was assessed with an 8-item scale (Greenberger et al. 1998). The scale ( $\alpha = .86$ ) assesses the overall emotional quality of the parent–child relationship. It consists of items such as “My parents really understand me” and “I know that they will ‘be there’ for me if I need them.” Responses ranged on a 6-point scale from 1 = *strongly disagree* to 6 = *strongly agree*.

#### *Negative Reactions to Parental Social Control*

Negative reactions to perceived parental social control were assessed in terms of adolescents’ negative affective reactions and behavioral resistance to parents’ persuasion and pressure tactics. Unlike previous research that employed omnibus measures of overall reactions, the distinction in this study between *affective* and *behavioral* reactions, in combination with the two types of social control (*persuasion* and *pressure*), allowed us to create four specific measures.

Based on Lewis and Butterfield (2005), we used six items each (see Appendix B) to assess *negative affect in response to persuasion* ( $\alpha = .86$ ) and *negative affect in response to pressure* ( $\alpha = .88$ ). In these measures, participants were asked what emotions they felt when their parents used specific persuasion tactics, and pressure tactics, respectively. Item responses ranged on a 6-point scale from 1 = *strongly disagree* to 6 = *strongly agree*, and sample items are “I felt resentful” and “I felt angry”.

Based on Lewis and Rook (1999), we used three items each (see Appendix C) to assess *behavioral resistance to persuasion* ( $\alpha = .71$ ) and *behavioral resistance to pressure* ( $\alpha = .72$ ). In these measures, participants were asked what actions they engaged in when their parents used specific persuasion tactics, and pressure tactics, respectively. Item responses ranged on a 6-point scale from 1 = *strongly disagree* to 6 = *strongly agree*, and a sample item is “I did the opposite of what they wanted me to do”.

#### Data Analytic Plan

First, the means, standard deviations, and intercorrelations among the main study variables were examined. Next, in order to examine the hypotheses of the current study, a series of multiple regression models was run. In the first two regression models, negative affect and behavioral resistance in response to *persuasion tactics*, respectively, were regressed on parents’ use of persuasion and pressure tactics (Hypotheses 1a and 2a), controlling for demographic variables (i.e., gender, age, ethnicity). In the next two regression models, negative affect and behavioral resistance in response to *pressure tactics*, respectively,

were regressed on parents’ persuasion and pressure tactics (Hypotheses 1b and 2b), controlling for the same demographic and personality variables.

In order to test Hypothesis 3, that parental warmth would moderate the influence of persuasion tactics on emotional and behavioral responses, an interaction term created by multiplying the centered values for parental warmth and persuasion tactics was added to the two multiple regression models predicting negative affect and behavioral resistance in response to persuasion tactics, respectively. In order to assess whether parental warmth would moderate the influence of pressure tactics on emotional and behavioral responses, an interaction term created by multiplying the centered values for parental warmth and pressure tactics was added to the two multiple regression models predicting negative affect and behavioral resistance in response to pressure tactics, respectively.

## Results

### Descriptive Analysis

Means, standard deviations, and intercorrelations among the main study variables are presented in Table 1. Parental use of persuasion and pressure tactics were positively correlated,  $r = .45$ ,  $p < .001$ . However, the level of persuasion tactics were significantly higher than the level of pressure tactics,  $t = 16.19$ ,  $p < .001$ . Nonetheless, most participants (73.2%) reported experiencing some pressure tactics by parents. Importantly, although parental warmth was negatively correlated with pressure tactics,  $r = -.23$ ,  $p < .001$ , this association was relatively modest. Participants also reported significantly more negative affect and behavioral resistance in response to parental pressure tactics than to their persuasion efforts,  $t = 11.32$ ,  $p < .001$ , and  $t = 8.99$ ,  $p < .001$ , respectively.

### Regression Analyses

A series of hierarchical regression analyses were conducted to assess emotional and behavioral reactions to persuasion and pressure tactics. The first set of regression models assessed reactions to persuasion tactics. In the first regression model, negative affect in response to persuasion tactics was regressed on demographic variables (age, gender, and ethnicity) at step 1. At step 2, centered values for persuasion tactics, pressure tactics, and parental warmth, were added to the model. At step 3, an interaction term created by multiplying the centered values for parental warmth and positive social control was added to the model (see Table 2 for final models). In the second

**Table 1** Means, standard deviations, and intercorrelations among variables

Variables	1	2	3	4	5	6	7
1. Persuasion tactics	–						
2. Pressure tactics	.45***	–					
3. Parental warmth	.26***	–.23***	–				
4. Negative affect to persuasion tactics	.12*	.48***	–.33***	–			
5. Behavioral resistance to persuasion tactics	.06	.36***	–.28***	.59***	–		
6. Negative affect to pressure tactics	.10	.20***	–.05	.48***	.32***	–	
7. Behavioral resistance to persuasion tactics	.01	.16**	–.08	.32***	.47***	.67***	–
<i>M</i>	3.12	1.99	4.73	2.59	2.35	2.37	2.91
<i>SD</i>	1.27	1.13	0.89	1.10	1.04	1.33	1.07

\*  $p < .05$ , \*\*  $p < .01$ , \*\*\*  $p < .001$

regression model, behavioral resistance to positive social control was regressed on the same set of variables.

Contrary to Hypothesis 1a, parents' use of persuasion tactics was not significantly associated with affective reactions. As hypothesized, parental use of pressure tactics (Hypothesis 2a) was associated with greater negative affect in response to parents' efforts at positive social control. In contrast, parental warmth was associated with less negative affect in response to persuasion. Also as expected (Hypothesis 3), parental warmth moderated the relation between parents' use of persuasion and participants'

negative affect. As can be seen in Fig. 1, in the context of high parental warmth, adolescents who perceived their parents as using high levels of persuasion reported low levels of negative affect. However, in the context of low parental warmth, persuasion tactics used by parents were associated with high levels of negative affect. When parents are perceived to use low levels of persuasion, parental warmth did not influence older adolescents' level of negative affect.

Contrary to Hypothesis 1a, parental persuasion was not significantly associated with behavioral resistance. Parental

**Table 2** Hierarchical regressions of reactions to parents' persuasion tactics on demographics and key study variables

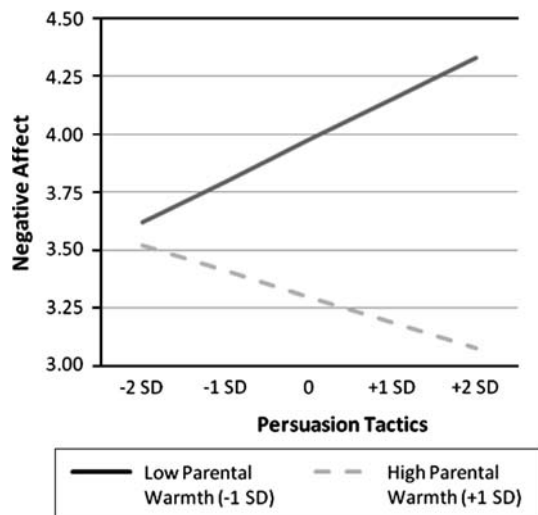
Variables	Reactions to parents' persuasion tactics					
	Negative affect			Behavioral resistance		
	<i>B</i>	<i>SE B</i>	$\beta$	<i>B</i>	<i>SE B</i>	$\beta$
Age	–.05	.03	–.07	–.03	.03	–.05
Gender <sup>a</sup>	–.16	.10	–.08	.06	.10	.03
Ethnicity <sup>b</sup>						
Asian	.10	.15	.04	–.04	.15	–.02
Latino	.11	.16	.04	–.02	.16	–.01
Other/mixed	.17	.17	.06	.07	.17	.03
<i>R</i> <sup>2</sup>	.03**			.02		
Persuasion tactics	.03	.05	.04	.02	.05	.03
Pressure tactics	.35***	.06	.36	.24***	.06	.26
Parental warmth	–.34***	.07	–.28	–.29***	.07	–.25
$\Delta R^2$	.25***			.16***		
Persuasion tactics $\times$ Parental warmth	–.14**	.05	–.15	–.16**	.05	–.16
$\Delta R^2$	.02**			.02**		
Adj. <i>R</i> <sup>2</sup>	.29			.18		
<i>F</i> (9, 322)	16.21***			8.78***		

Note: Unstandardized and standardized regression weights are from the final model (with all variables in the model)

<sup>a</sup> Male = 1

<sup>b</sup> Reference group = Caucasian

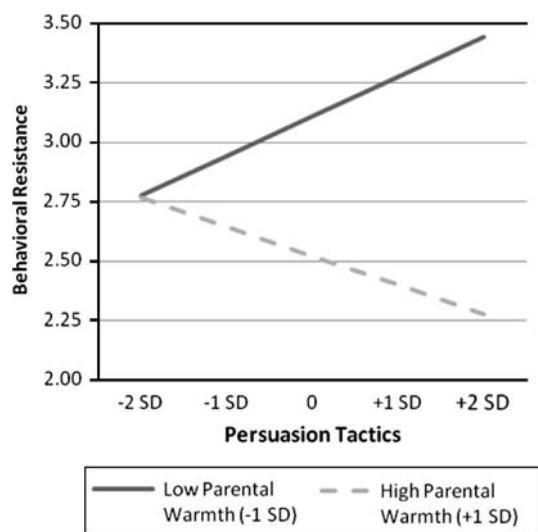
\*  $p < .05$ , \*\*  $p < .01$ , \*\*\*  $p < .001$



**Fig. 1** The parental warmth by persuasion tactics interaction effect on negative affect in response to persuasion tactics

pressure was also associated with greater behavioral resistance to parents’ use of more supportive persuasion tactics (Hypothesis 2a), whereas parental warmth was inversely associated with resistance. Also as hypothesized (Hypothesis 3), parental warmth moderated the relation between positive social control and behavioral resistance to positive social control, and the overall form of this interaction was very similar to the interaction described above (see Fig. 2).

The second set of regression analyses was designed to assess negative affect and behavioral resistance to pressure tactics (see Table 3 for final models). Variables entered on steps 1 and 2 of these models were identical to those in the models discussed above. At step 3, an interaction term



**Fig. 2** The parental warmth by persuasion tactics interaction effect on behavioral resistance to persuasion tactics

created by multiplying the centered values for parental warmth and pressure tactics was added to the model.

As expected (Hypothesis 2b), parental pressure was associated with greater negative affect on the part of adolescents in response to those pressure tactics. Neither parental warmth nor persuasion tactic use was significantly associated with self-reported negative affect when parents used pressure tactics, and the interaction between parental warmth and pressure tactic use was also not significant.

As expected (Hypothesis 2b), parental pressure tactics were positively associated with adolescents’ behavioral resistance. Neither parental warmth nor the level of parents’ positive social control was significantly associated with negative affect in response to pressure, and parental warmth did not significantly moderate the relation between parents’ use of pressure tactics and adolescents’ behavioral resistance to such tactics.

Age and gender were both significant predictors of negative affect in response to pressure tactics: Younger participants and females reported greater negative affect in response to pressure. Gender was also significantly associated with behavioral resistance to pressure tactics, with females reporting more behavioral resistance than males. Ethnicity was not a significant predictor of emotional or behavioral responses to either persuasion or pressure.<sup>1</sup>

<sup>1</sup> Although ethnicity had no main effects on emotional or behavioral reactions to persuasion or pressure tactics, it was possible that the associations among the main variables of interest varied between specific ethnic groups. In order to assess this possibility, we ran a series of multi-group analyses in order to examine the fit of the multiple regression models across the three largest ethnic groups in our sample (East Asian, Latino, Caucasian). For the regression model predicting negative affect in response to persuasion tactics, the model constraining the three ethnic groups to have identical covariances and regression weights was an adequate fit to the data,  $\chi^2(43) = 66.2, p < .05, RMSEA = .05 [.02-.07], CFI = .91$ . Similarly, for the regression model predicting behavioral resistance in response to persuasion tactics, the model was an adequate fit to the data,  $\chi^2(43) = 50.6, ns, RMSEA = .03 [.00-.05], CFI = .97$ . For the regression models predicting reactions to pressure tactics, the models were not an adequate fit to the data. Specifically, in the regression of negative affect in response to pressure tactics, the model was a poor fit to the data,  $\chi^2(41) = 80.7, p < .001, RMSEA = .06 [.04-.08], CFI = .81$ , as was the case in the regression of behavioral resistance to pressure tactics,  $\chi^2(43) = 82.5, p < .001, RMSEA = .06 [.04-.08], CFI = .79$ . In both models, unconstraining the covariance between pressure tactics and the pressure tactics  $\times$  parental warmth interaction term resulted in models that were an adequate fit to the data,  $\chi^2(41) = 58.7, p < .05, RMSEA = .04 [.01-.06], CFI = .91$ , and  $\chi^2(41) = 60.4, p < .05, RMSEA = .04 [.02-.06], CFI = .90$ , respectively. Overall, these results suggest that the regression results adequately describe the relationship between the variables of interest in all three of these ethnic groups.



**Table 3** Hierarchical regressions of reactions to parents' pressure tactics on demographics and key study variables

Variables	Reactions to parents' pressure tactics					
	Negative affect			Behavioral resistance		
	<i>B</i>	<i>SE B</i>	$\beta$	<i>B</i>	<i>SE B</i>	$\beta$
Age	-.08*	.04	-.12	-.04	.03	-.06
Gender <sup>a</sup>	-.55***	.14	-.21	-.36**	.13	-.15
Ethnicity <sup>b</sup>						
Asian	-.27	.21	-.10	-.32	.18	-.13
Latino	.11	.22	.04	-.16	.20	-.06
Other/mixed	.01	.23	.00	-.03	.20	-.01
<i>R</i> <sup>2</sup>	.06***			.04*		
Persuasion tactics	.01	.07	.01	-.06	.06	-.06
Pressure tactics	.21**	.08	.18	.16*	.07	.15
Parental warmth	-.02	.09	-.01	-.04	.08	-.03
$\Delta R^2$	.04**			.03*		
Pressure tactics $\times$ Parental warmth	-.10	.07	-.08	-.11	.06	-.10
$\Delta R^2$	.01			.01		
Adj. <i>R</i> <sup>2</sup>	.09			.05		
<i>F</i> (9, 322)	4.83***			3.11***		

Note: Unstandardized and standardized regression weights are from the final model (with all variables in the model)

<sup>a</sup> Male = 1

<sup>b</sup> Reference group = Caucasian

\*  $p < .05$ , \*\*  $p < .01$ , \*\*\*  $p < .001$

## Discussion

In the current study, we examined older adolescents' emotional and behavioral reactions to parents' perceived attempts to influence their dietary habits through the use of persuasion and pressure tactics. Further, we examined the moderating influence of parental warmth and acceptance on how adolescents respond to these tactics. We found that pressure tactics were associated with more negative emotional and behavioral responses to both pressure and persuasion. We also found that parental warmth moderated the influence of persuasion, but not pressure, tactics on emotional and behavioral responses.

The older adolescents in the current study reported that their parents used substantially higher levels of persuasion than pressure tactics to influence their dietary habits. However, the substantial, positive correlation found between parents' use of positive and negative social control, which is consistent with prior research (Lewis and Butterfield 2005), suggests that parents often may try to influence diet-related behaviors by any (and all) means. There was also only a modest inverse association between parental warmth and pressure tactics. Although parental warmth appears to be one factor that influences what types of tactics parents use, parents' concerns for their children's

health and well-being may play a larger role, causing parents to use influence tactics that they ordinarily would not.

However, we found that use of pressure tactics by parents was strongly related to older adolescents' negative affect and behavioral resistance when parents used *either* persuasion or pressure to influence their eating behavior. Thus, the efforts of parents who engage in a combination of pressure and persuasion may be largely counterproductive, resulting in anger and resentment, as well as behavioral reactance, on the part of the older adolescents whose behavior they wish to influence. In the current study, influence attempts that were associated with adolescents' greater negative affect also were associated with greater behavioral resistance, suggesting that, consistent with prior research (Tucker and Anders 2001), adolescents' negative emotional responses to influence attempts on the part of their parents may act as a barrier to these efforts' having their intended consequences. The current results are also consistent with research on programs designed to alter parenting behaviors to make them more effective. For instance, programs that teach parents to use positive reinforcement, including attention and praise, in place of their previous coercive discipline, have been found to be efficacious, at least in well-controlled settings (Kazdin 1997).

The current results provide further evidence that coercive discipline by parents, even in the context of an otherwise warm relationship, are likely to result in adverse outcomes among adolescents.

The quality of the parent–adolescent relationship played a complex role in responses to parental efforts to influence older adolescents' eating behavior. Specifically, our findings suggest that, in the context of high perceived parental warmth, adolescents may perceive persuasion tactics such as giving information, expressing concern, and encouraging behavior change, as relatively benign, helpful, and supportive of their own efforts to improve their diet-related behaviors. However, in the context of low perceived parental warmth, adolescents may view these same tactics in a less favorable light: i.e., as intrusive, unwarranted, and manipulative. These findings are consistent with Darling and Steinberg's (1993) argument that the overall quality of the parent–child relationship may influence how adolescents respond in domain-specific interactions—in this instance, when parents attempt to influence adolescent's diet. The current results are consistent with the findings of Okun et al. (2007), who found that positive social control from a romantic partner was only associated with positive behavior change in the context of a high-quality dating relationship, among college undergraduates. These findings suggest that adolescents do not determine the intent of each influence tactic in a vacuum. Thus, whether adolescents interpret their parents' influence attempts as supportive or autonomy-threatening may depend on the overall emotional tone of the parent–adolescent relationship.

It is worth underscoring the finding that parental warmth had no significant direct or interactive effect on youths' emotional and behavioral reactions to pressure tactics. The relatively harsh nature of these pressure tactics (e.g., ridiculing youths, making them feel guilty, getting others to pressure them about their diet) may override the potentially positive effects of a generally positive parent–child relationship. It may be difficult or impossible for youths to view these more negative parental tactics as well-meant or helpful even when they generally view their parents as warm and accepting. These findings are consistent with prior research that parental restriction of diet (Haworth-Hoepfner 2004; Brown and Ogden 2004) and commenting (Keel et al. 1997) or teasing about adolescents' weight (Schwartz et al. 1999), have been associated with a variety of negative mental and physical health outcomes, including body dissatisfaction, increased risk of eating disorders, and

decreased ability to regulate caloric intake (Vincent and McCabe 1999). Thus, our findings suggest that older adolescents' perceptions of the overall quality of their relationship with their parents matter, but only when parents use more positive types of influence.

The present research has several limitations. This study is cross-sectional in design, and thus we cannot advance causal interpretations of the associations between variables. For example, we cannot conclude that parents' use of pressure tactics causes adolescents to behaviorally resist parental attempts to control their eating behavior. Longitudinal research that begins in the years prior to adolescence would help inform our understanding of how the quality of the parent–child relationship, youth's diet-related behaviors, and specific parental attempts to influence those behaviors change and interact over time. The study also relies on data from a single source. Future research on adolescents' reactions to parental attempts to modify their diet-related behavior should include data obtained from parents as well as adolescents. Finally, it is important to note that the sample for this study consisted of mostly healthy, normal weight participants, and so the results should not be generalized to obese youth or clinical populations.

Despite these limitations, the current research contributes to the literature on late adolescent health in several ways. Most importantly, this research suggests that the perceived warmth and acceptance of their parents plays an important role in how late adolescents respond to parents' use of persuasion and pressure tactics to influence their behavior. This research suggests that inconsistencies in prior research findings regarding the effectiveness of parents' health-related influence attempts might be resolved by differentiating between parents' persuasion and pressure tactics for promoting better health practices. Our findings suggest that parents who cultivate a warm emotional climate and avoid the use of pressure tactics will be more successful in their attempts to influence their late adolescents' eating behavior. It seems plausible that conflicts between adolescents' autonomy-striving and parent's desires to positively influence their children's behavior may not be unique to the domain of diet. The pattern of high warmth and acceptance, combined with parents' avoidance of pressure tactics, may result in better functioning among older adolescents across a number of other domains, including their academic performance, peer relationships, and overall psychological well-being.

## Appendix A

### Parental Diet-Related Social Control Tactics Scale

Think about how your parents have tried to get you to improve or help you maintain your healthy eating habits.

How did your parents try to influence you? Please indicate below how often your parents tried to influence you in the following ways.

	1 Never	2 Almost Never	3 Occasionally	4 Somewhat Often	5 Often	6 Very often
<u>My Parents:</u>						
Tried to make me feel <i>guilty</i> about my eating habits.....	1	2	3	4	5	6
Offered to <i>help</i> me with my diet.....	1	2	3	4	5	6
<i>Pressured</i> me about my diet.....	1	2	3	4	5	6
<i>Ridiculed</i> me about my eating habits.....	1	2	3	4	5	6
Tried to be <i>understanding</i> about my eating habits.....	1	2	3	4	5	6
<i>Compared</i> me <i>negatively</i> to others with better eating habits...	1	2	3	4	5	6
Gave me <i>information</i> about how I could change or maintain my diet.....	1	2	3	4	5	6
Tried to <i>get others</i> (e.g. your friends or relatives) to <i>pressure</i> me about my diet.....	1	2	3	4	5	6
<i>Encouraged</i> me to eat healthy foods.....	1	2	3	4	5	6

## Appendix B

### Negative Affect in Response to Persuasion Scale

How did you respond when your parents tried to improve or help you maintain your healthy eating habits or level of physical activity by *encouraging you, offering to help, being understanding, or giving you information?* [If your parents have not used these tactics, please answer according to how you think you would have responded if they had used them]

	1 Strongly Disagree	2 Disagree	3 Slightly Disagree	4 Slightly Agree	5 Agree	6 Strongly Agree
<u>Less</u>						
felt guilty.....	1	2	3	4	5	6
felt resentful.....	1	2	3	4	5	6
felt irritated.....	1	2	3	4	5	6
felt ashamed.....	1	2	3	4	5	6
felt bitter.....	1	2	3	4	5	6
felt angry.....	1	2	3	4	5	6

### Negative Affect in Response to Pressure Scale

How did you respond when your parents tried to improve or help you maintain your healthy eating habits or level of physical activity by *trying to make you feel guilty, ridiculing you, pressuring you, comparing you to others, or enlisting others to pressure you?* [If your parents have not used these tactics, please answer according to how you think you would have responded if your parents had used them]

	1 Strongly Disagree	2 Disagree	3 Slightly Disagree	4 Slightly Agree	5 Agree	6 Strongly Agree
<u>Less</u>						
felt guilty.....	1	2	3	4	5	6
felt resentful.....	1	2	3	4	5	6
felt irritated.....	1	2	3	4	5	6
felt ashamed.....	1	2	3	4	5	6
felt bitter.....	1	2	3	4	5	6
felt angry.....	1	2	3	4	5	6

## Appendix C

### Behavioral Resistance to Persuasion Scale

How did you respond when your parents tried to improve or help you maintain your healthy eating habits or level of physical activity by *encouraging you, offering to help, being understanding, or giving you information?* [If your parents have not used these tactics, please answer according to how you think you would have responded if they had used them]

	1 Strongly Disagree	2 Disagree	3 Slightly Disagree	4 Slightly Agree	5 Agree	6 Strongly Agree
<u>Less</u>						
ignored their requests....	1	2	3	4	5	6
did the opposite of what they wanted me to do....	1	2	3	4	5	6
hid or disguised my behavior.....	1	2	3	4	5	6

### Behavioral Resistance to Pressure Scale

How did you respond when your parents tried to improve or help you maintain your healthy eating habits or level of physical activity by *trying to make you feel guilty, ridiculing you, pressuring you, comparing you to others, or enlisting others to pressure you?* [If your parents have not used these tactics, please answer according to how you think you would have responded if your parents had used them]

	1 Strongly Disagree	2 Disagree	3 Slightly Disagree	4 Slightly Agree	5 Agree	6 Strongly Agree
<u>Less</u>						
ignored their requests....	1	2	3	4	5	6
did the opposite of what they wanted me to do....	1	2	3	4	5	6
hid or disguised my behavior.....	1	2	3	4	5	6

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