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THE EFFECT OF ADOLESCENT PHYSICAL AND SEXUAL DATING VIOLENCE ON THE NUTRITIONAL AND PSYCHOLOGICAL HEALTH OF ADOLESCENT GIRLS

by

JERRIS LAVERNE RAIFORD

Under the Direction of Sarah L. Cook

ABSTRACT

The purpose of this study was to explore the stress-eating relation established in the literature by examining a naturally occurring stressor, adolescent dating violence, and its effect on eating in adolescent girls. Specifically, analyses focused on assessing the mediating role of depression in the adolescent dating violence-fruit and vegetable intake relation and the moderating role of sports team involvement in the adolescent dating violence-depression relation. A nationally representative sample of 5,892 black, Hispanic, and white adolescent girls were surveyed using measures assessing physical and sexual dating violence experiences, depressed affect, suicidal thoughts, plans, and/or attempts, fruit and vegetable intake and involvement in team sports. This study supported the hypothesis that depression mediates the relation between adolescent dating violence and dietary intake, but only in black adolescent girls. These findings suggest that black girls victimized by dating violence experience depression, which may affect

their desire or motivation to eat properly. This study also supported the hypothesis that sports team involvement, a source of social support and physical activity, moderated the relation between adolescent dating violence and depression and suicidality, but only for white adolescent girls. For this group, participating on a sports team served to protect those girls reporting dating violence from experiencing depression at the high rate reported by those dating violence victims not involved on a sports team. The findings presented in this study provide evidence that depression explains how experiences of dating violence affect eating behavior for a high-risk group, black adolescent girls. Recognizing depression's contribution to this group's high rate of obesity and overweight is an important step in preventing obesity and obesity-related outcomes in this population. Also, this study highlights an important source of social support, sports team involvement, and its potential to protect dating violence victims from experiencing depression and suicidal ideation, plans, and attempts.

INDEX WORDS: Adolescent dating violence, Physical, Sexual, Depression, Suicide, Fruits, Vegetables, Dietary intake, Sports team, Obesity

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by

JERRIS LAVERNE RAIFORD

A Dissertation Submitted in Partial Fulfillment of the Requirements for the Degree of

Doctor of Philosophy

in the College of Arts and Sciences

Georgia State University

2005

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Jerris Laverne Raiford
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JERRIS LAVERNE RAIFORD

Major Professor:	Sarah L. Cook
Committee:	John L. Peterson
	Julia Perilla
	Jana Kicklighter

Electronic Version Approved:

Office of Graduate Studies

College of Arts and Sciences

Georgia State University

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INTRODUCTION

Adolescence is a phase in life typically associated with risky and health-compromising behaviors including tobacco use, unhealthy dietary behaviors, inadequate physical activity, alcohol and other drug use, risky sexual behavior and violence. This study proposes to investigate the interrelationships of three of these behaviors: dietary intake, adolescent dating violence, and depression. Many studies have investigated these behaviors separately or in combination with other behaviors, however, none have explored the potential path from dating violence to dietary intake.

Depression Mediating Effect

Previous research has associated fatty food and fruit and vegetable intake with several constructs including stress (Cartwright et al., 2003; Dallman et al., 2003), race (Alleyne & LaPoint, 2004; Sobal & Stunkard, 1989), socioeconomic status (Baltrus, Raghunathan, & Kaplan, 2002; Sobal & Stunkard, 1989), negative mood states and emotional reactivity (Blazer, Moody-Ayers, Craft-Morgan, & Burchett, 2002; Golden et al., 2004), and traumatic events (Dong, Dube, Felitti, Giles, & Anda, 2004). This study proposes to examine additional constructs not previously associated with dietary intake in adolescents, namely, adolescent dating violence (ADV), depression, and suicidality.

Research on stress-induced eating and its consequences provide a rationale for considering dating violence, depression, and suicidality in tandem with dietary intake. The relationship between stress and eating behaviors is commonly accepted in the literature and findings indicate that psychological stress is linked to both increases in unhealthy eating (e.g., fatty foods) and decreases in healthy eating (e.g., fruits and

vegetables, Cartwright et al., 2003; Dallman et al., 2003; Willenbring, Levine, & Morley, 1986). Rather than focus on detecting increases or decreases in overall food consumption, this study theorized that stress leads individuals away from healthy food choices such as fruits and vegetables (Cartwright et al., 2003; Dallman et al., 2003; Grunberg & Straub, 1992; Willenbring et al., 1986). Thus, this study examined a specific stressor, adolescent dating violence, and its effect on fruit and vegetable intake.

Many studies have investigated physical and/or sexual violence victimization and its association with eating disorders such as anorexia and bulimia nervosa (Ackard & Neumark-Sztainer, 2002; Silverman, Raj, Mucci, & Hathaway, 2001). However, to date, there is no scientific research assessing unhealthy dietary intake (i.e., less than five servings of fruits and vegetables a day) as a health consequence of physical and sexual dating violence. In this study, adolescent physical and sexual dating violence, a rising and pervasive social problem, is viewed as a stressor that may be associated with a shift towards unhealthy dietary intake in adolescent female victims.

Previous research has linked adolescent dating violence to various negative health outcomes such as disordered eating and unhealthy weight control techniques, substance use, depression, and suicide risk (Brener, McMahon, Warren, & Douglas, 1999; Howard & Wang, 2003; Silverman et al., 2001). A central focus of the present study is how ADV affects female victims' emotional and psychological well-being as indicated by depression and suicidality. Dating violence is associated with poorer quality of life, overall life dissatisfaction, and suicidal ideation and attempts in females (Ackard & Neumark-Sztainer, 2002; Callahan, Tolman, & Saunders, 2003; Hanson, 2002; Harned,

2001). Given ADV's serious effect on mental well-being, it is important to consider dating violence a stressor that increases symptoms of depression and suicidality, which may signal additional health consequences such as insufficient fruit and vegetable intake.

Sports Team Involvement's Moderating Effect

Although depression and suicidality are associated consequences of ADV, not all female adolescent victims of physical and/or sexual dating violence become depressed or suicidal. One possible reason for why some female victims may be more or less vulnerable to depression in the face of dating violence experiences is the presence or absence of social support, which has been documented to affect, or prevent, depressive symptomatology (Bal, Crombez, Van Oost, & Debourdeaudhuij, 2003; Barrera, 2000; Feiring, Taska, & Lewis, 1998; Osborne & Rhodes, 2001; Zimmerman, Ramirez-Valles, Zapert, & Maton, 2000). One potential source of social support for adolescent girls is their engagement with peers in team sports (Vilhjalmsson & Thorlindsson, 1992).

The present study focuses on the dual role that sports team involvement, a means of peer social support *and* physical activity, may play in protecting adolescents from deleterious psychological (i.e., depression) and physical (i.e., unhealthy diet) outcomes. Adolescents involved on sports teams may be protected from these deleterious outcomes because of the ecological effects of being part of a sports team. Physical activity during adolescence, including sports team involvement, has a negative relationship with stress, depression, and anxiety, and is positively associated with self-esteem, self-concept, and self-efficacy (Mutrie & Parfitt, 1998; Sallis & Owen, 1999). Thus, at the individual level, sports team involvement can increase youth's sense of competence, self-esteem,

self-worth, and/or self-concept, and on a group level it may serve as a source of social support to cope with relationship concerns. Both the individual and group level effects of sports team involvement may help to counter, and/or prevent, depression and suicide (Brandi-Bredenbeck & Brettschneider, 1997; Daley, 2002; Duda, 1996; Erkut & Tracy, 2002; Grove, 1996; Kirkcaldy, Shephard, & Siefen, 2002; Vilhjalmsson & Thorlindsson, 1992). Hence, the present study theorized that being involved on a sports team may protect adolescent female victims of dating violence from experiencing depression, suicidal ideation, plans and/or attempts.

To provide a more in-depth context for this study, a literature review follows. This review includes previous research establishing the relationship between: (1) stress and eating, (2) adolescent dating violence and depression/suicidality, (3) depression/suicidality and eating, and (4) sports team involvement and depression/suicidality.

LITERATURE REVIEW

Adolescence is an exciting, but tumultuous period of life marked by demanding and competing cognitions, attitudes, and behaviors. Many risky and health-compromising, but preventable, problems occur during adolescence including tobacco use, unhealthy dietary behaviors, inadequate physical activity, alcohol and other drug use, risky sexual behavior, depression, and violence. This study proposes to investigate the interrelationships of three of these behaviors: dietary intake, adolescent dating violence, and depression. Many studies have investigated these behaviors separately or in combination with other behaviors, however, none have explored the potential path from dating violence to dietary intake. Hence, the overarching research question for the present study asks, "What is the relationship between adolescent physical and sexual dating violence and dietary intake and how can understanding this relationship assist in the development of prevention research priorities and intervention strategies?" This proposal begins with a brief description of previous research findings and unanswered questions concerning these problems in adolescence, and then discusses how this study will advance the understanding of how to prevent deleterious health consequences during adolescence and young adulthood.

The Role of Stress in Dietary Intake

Dietary intake among adolescents has received much attention in the last decade as researchers acknowledge its implications for future morbidity and mortality (Donovan, Jessor, & Costa, 1993). Unhealthy dietary intake and inadequate physical activity contribute to the risk of becoming overweight in adolescence and obese in adulthood

(e.g., Blackwell, Hayward, & Crimmins, 2001; DiPietro, Mossberg, & Stunkard, 1994; Ferraro, Thorpe, & Wilkinson, 2003) . The prevalence of obesity and overweight has a substantial impact on public health and, thus, has recently become a major public health concern and research priority, especially since the percentage of overweight children and adolescents has more than doubled to 15% since 1970 (CDC, 2004b).

Adolescence is viewed as a critical phase in life in which to study correlates of obesity because this stage of life is characterized by increased autonomy in decision-making, including decisions regarding diet and physical activity (World Health Organization, 1998). During this developmental phase many factors may interfere with adolescents' decisions to eat healthily, including increased time spent away from home where food consumption is supervised, as well as increased access and peer pressure to eat fast food. Adolescence is also marked by a period of identity development and the initiation of intimate romantic relationships (Erikson, 1963; Myers, 2003). These crucial developmental tasks expose adolescents to more experiences which increase or decrease their self-esteem, sense of self-worth, and/or self-competence. Experiencing a stressful event like dating violence potentially threatens the development of these tasks because it may interrupt or impair well-being, which may lead to depression and a subsequent lack of motivation to eat healthily, specifically sufficient fruits and vegetables.

Previous research has associated fatty food and fruit and vegetable intake with stress (Cartwright et al., 2003; Dallman et al., 2003; Greeno & Wing, 1994), which may also interfere with the development of important tasks in adolescence. The relationship between stress and eating behaviors is commonly accepted in the literature, although

contradictory findings exist. Psychological stress has been linked to both increased food consumption (Leon & Chamberlain, 1973; McKenna, 1972; Slochower & Kaplan, 1980; Slochower, Kaplan, & Mann, 1981) and decreased food consumption (E. E. Abramson & Wunderlich, 1972; Resznick & Balch, 1977; Schachter, Goldman, & Gordon, 1968) under conditions of stress.

A review of the literature on stress-induced eating by Greeno and Wing (1994) highlights these opposing camps' findings on the effects of stress on eating. Previous research documenting stress' association with increased eating have mostly compared normal weight and overweight individuals in varying conditions of stress and/or anxiety (Leon & Chamberlain, 1973; McKenna, 1972; Slochower & Kaplan, 1980; Slochower et al., 1981). McKenna (1972) found that overweight individuals assigned to a high anxiety condition consumed more food than those overweight individuals in a low anxiety condition. In this study, researchers argue that increased eating in times of stress is a learned coping response by which certain individuals use food to manage anxiety. Similarly, Macht, Haupt, & Ellgring (2005) compared college students assigned to an exam group (stress condition) with controls. Results showed that students awaiting an examination reported higher emotional stress and an increased tendency to consume more food as a means of distraction from stress than those students not awaiting an examination (control group). These studies demonstrated stress' effect on increased eating in adults.

Other researchers have used empirical findings to support the theory that stress leads to a decrease in eating (E. E. Abramson & Wunderlich, 1972; Resznick & Balch,

1977; Schachter et al., 1968). These studies failed to demonstrate a significant increase in eating among participants assigned to a high anxiety or stress conditions. For instance, Resznick & Balch (1977) found no evidence of increased eating due to laboratory-induced stress for normal or obese participants. Further, obese participants assigned to the low anxiety condition ate more than obese individuals in the high anxiety condition.

This literature lacks guidance in understanding the directional effect stress has on eating and suggests that other ways of thinking about the stress – eating relation are needed. Rather than focus on detecting increases or decreases in overall food consumption, this study theorizes that stress leads individuals toward more unhealthy food choices such as fatty foods and away from healthy food choices such as fruits and vegetables (Cartwright et al., 2003; Dallman et al., 2003; Grunberg & Straub, 1992; Willenbring et al., 1986). This theory may explain the disagreement in the literature on whether food consumption increases or decreases in times of stress. In their study, Cartwright and colleagues (2003) found a significant association between stress and the dietary practices of children in South London. Results indicated a positive association between stress and fatty food intake and snacking, and a negative association between stress and fruit and vegetable intake. In other words, the more stress children reported, the more likely they were to report increased consumption of fatty foods and snacks and a decrease in fruits and vegetables. In their laboratory study assessing the effects of stress on eating at a predominantly white university, Grunberg and Straub (1992) found that women ate twice as much sweet food under stress (i.e., viewing a film about industrial

accidents) than those women assigned to their control condition (i.e., viewing a film about a pleasant travelogue).

Previous studies on the effects of stress on dietary intake have typically operationalized stress as either a non-specific or general stressor assessed by perceived stress questionnaires that ask, "How often have you felt that you couldn't control the important things in your life?" (Cartwright et al., 2003; Willenbring et al., 1986), or stress is induced via a laboratory setting such as viewing unpleasant videos (Grunberg & Straub, 1992). Although these studies demonstrate the general effect of stress on food choices, it is important to examine different types of stressors to detect whether this stress-eating relationship is consistent across naturally occurring stressors (Neumark-Sztainer, Wall, Perry, & Story, 2003). Important stressors to observe include poverty, community violence, and adolescent dating violence.

When examining the stress-eating relationship, the literature has predominantly focused on unhealthy food choices (i.e., fatty foods) as opposed to healthy food consumption (e.g., fruits and vegetables). Moreover, it fails to focus on specific stressors, and little research explores food consumption in adolescence. Rather, these studies have either assessed children (Baranowski et al., 1993; Cartwright et al., 2003) or adults (Brug, Debie, Van Assema, & Weijts, 1995). Therefore, the present study seeks to understand (a) the association between a specific life stressor defined as physical and sexual dating violence and fruit and vegetable intake in adolescence. Also this study seeks to understand whether depression is one mechanism by which this association may occur during adolescence.

Conceptualizing Adolescent Dating Violence as a Stressor

Adolescent dating violence (ADV) is defined as "a pattern of repeated actual or threatened acts that physically, sexually, or verbally abuse a member of an unmarried heterosexual or homosexual couple in which one or both partners is between thirteen and twenty years old" (Levy, 1998, p. 4). Many studies have investigated physical and/or sexual violence victimization and its association with extreme eating disorders such as anorexia and bulimia nervosa (Ackard & Neumark-Sztainer, 2002; Silverman et al., 2001; Thompson, Wonderlich, Crosby, & Mitchell, 2001). However, to date, there is no research assessing less extreme eating behaviors such as unhealthy dietary intake (i.e., less than five servings of fruits and vegetables a day) as a health consequence of dating violence victimization. The present study contends that physical and sexual forms of dating violence, when conceptualized as a stressful life event, may be associated with a shift towards unhealthy dietary intake in adolescent female victims.

In the literature, the term "stress" has been defined in many ways including "the process by which we perceive and respond to certain events, called *stressors*, that we appraise as threatening or challenging" (Myers, 2003, p. 532). In this study, adolescent dating violence, a rising and pervasive social problem, is considered a stressor with resulting health consequences. Theoretically, experiencing ADV disrupts the victim's efforts to develop and maintain close intimate relationships which subsequently may negatively affect their self-esteem, sense of self-worth and/or self-competence. A victim's self-competence to maintain an abusive dating relationship is affected by the abusive behaviors of their partner. Victims are often humiliated in front of other peers,

scared and afraid of their partner's threats of physical harm, and are often times not allowed to contribute their own ideas and opinions concerning relational decisions (American Bar Association, 2001). Self-competence in maintaining relationships is affected by these experiences of fear and lack of control. In light of such detrimental effects, it is not difficult to conceptualize dating violence as a stressor, which may ultimately have health consequences.

Adolescence is characterized as a stage in which many autonomous decisions are being made for the first time including when, how, and with whom to initiate intimate dating relationships. When seeking intimate romantic relationships, adolescents attempt to develop skills such as managing conflict and negotiating gender role expectations. However, previous studies show that factors commonly associated with adolescents' involvement in dating violence include ineffective conflict resolution skills, having attitudes that support gender role stereotypes and expectations, having attitudes that justify and/or support the use of violence, and witnessing intimate partner violence at home (Gray & Foshee, 1997; Malik, Sorenson, & Aneshensel, 1997; Raiford, 2004; Smith & Donnelly, 2001; Sousa, 1999). In the United States, adolescent dating relationships can be viewed as "practice ground for permanent, enduring, committed, and in many cases, marriage-bound relationships" (Quatman, Sampson, Robinson, & Watson, 2001, p. 211). Hence, one of the most crucial tasks of adolescence is the ability to practice how to manage and negotiate emotions and power within dating relationships (Erikson, 1963; Quatman et al., 2001). However, as a stressor, ADV creates demands that may exceed a victim's resources and ability to negotiate power in dating

relationships, making developmental tasks more difficult to master. It is often difficult for teens to escape violent dating relationships because the abuse often damages the victim's self-esteem (American Bar Association, 2001). Also, lack of dating experience often contributes to the victim's belief that violence is an acceptable and normal part of intimate relationships (American Bar Association, 2001). Developmentally, adolescents are actively seeking independence from parents and other adults and therefore do not always seek proper help to effectively deal with abuse (Wekerle & Wolfe, 1999; D. A. Wolfe & Feiring, 2000). Subsequently, many victims of adolescent physical and sexual dating violence experience depression due to these attendant relationship concerns (e.g., Callahan et al., 2003; Hanson, 2002).

Of particular importance to the present study is how ADV affects female victims' emotional and psychological well-being as indicated by depression. Dating violence is associated with poorer quality of life, overall life dissatisfaction, and suicidal ideation and attempts in females (Ackard & Neumark-Sztainer, 2002; Callahan et al., 2003; Hanson, 2002; Harned, 2001). Given ADV's serious effect on mental well-being, it is important to consider dating violence a stressor that increases symptoms of depression and may signal additional health consequences such as poor dietary intake.

Depression's Mediating Effect

Around the world, depression is acknowledged as one of the most serious health problems, ranking fourth among leading diseases following respiratory infections, diarrheal diseases, and perinatal complications (Saez-Santiago & Bernal, 2003). Furthermore, depression is expected to be the second most serious health problem

affecting the world population, after heart disease, by the year 2020 (Saez-Santiago & Bernal, 2003). Consequently, it is important to understand how depression affects adolescents who experience stressful life events.

According to a national study of youth risk behaviors, 28.6% of students across the nation reported feeling so sad or hopeless almost everyday for two or more weeks in a row that they stopped doing some usual activities (CDC, 2004c). Overall, depressed affect was reported more frequently among female adolescents (35%) than male adolescents (21.9%). In the same sample, 16.9% of students across the nation had seriously considered attempting suicide in the past year (from time of survey). Again, this prevalence for attempted suicide was higher for girls (21.3%) than for boys (12.8%). Paralleling the increase in depression and anxiety observed in young adults between 1960-1990, suicide rates for 15- to 25-year olds in America, Australia, Great Britain, Canada, and New Zealand also increased twofold (Eckersley & Dear, 2002).

Several theories have been proposed to explain the occurrence of depression including Aaron Beck's cognitive model of depression (1967), socio-environmental theories on depression (e.g., Friedrich, Reams, & Jacobs, 1982; Kaplan, 1977) , the cognitive diathesis-stress model (L. Y. Abramson, Alloy, & Metalsky, 1988), and the ecological perspective (Kelly, Ryan, Altman, & Stelzner, 2000). In his theory, Beck explained depression as stemming from negative self-beliefs, which may occur in response to many life events including experiencing intimate violence. Beck presented his cognitive triad model to further explain these negative thoughts. In essence, he argued that depressed individuals view (1) themselves as worthless, incapable of being

loved, and lacking in some area, (2) their environment as overwhelming, rife with obstacles and pending failure, and (3) their future as bleak and hopeless, believing that any efforts to change their lives is futile.

Other researchers debate Beck's cognitive model of depression, arguing that rather than resulting from negatively distorted thoughts and perceptions from early childhood experiences, depression is a consequence of negative cognitions generated and sustained by current socioenvironmental factors (Simmons & Miller, 1987). Examples of such factors include interpersonal challenges among friends and acquaintances as well as violence victimization. Martin Seligman (1991; 1995) discusses how common depression is among Westernized youth due to individualism and a rejection of a historical commitment to religion and family. He argues that hopelessness results when individuals face failure or rejection coupled with a lack of social support. In contrast, in non-Westernized societies, depression is less prevalent due to the close relationships and cooperation experienced as a part of societal norms. Thus, the socioenvironmental, or ecological, perspective provides some insight into the onset of depression among adolescent female victims, particularly when these youth are least likely to seek formal help in dating violence situations (Dubow, Lovko, & Kausch, 1990; Offer, Howard, Schonert, & Ostrov, 1991; Raiford, 2004). A loss of connection to religion and family, coupled with teens' tendency to not seek formal help leaves youth few resources in which to obtain social support. As previous research shows, a lack of perceived social support is associated with increased depression and psychological maladjustment (Bal, Crombez,

Van Oost, & Debourdeaudhuij, 2003; Feiring, Taska, & Lewis, 1998; Osborne & Rhodes, 2001).

The cognitive diathesis-stress model of depression combines Beck's theory with the socioenvironmental, or ecological, perspective by proposing that depression results when adverse or negative life events interact with negative cognitions. This intersection of negative life events and cognitions increases the negative affect experienced and/or reduces the individual's ability to cope with the stressful life event (Spence, Sheffield, & Donovan, 2002). In their longitudinal study on problem-solving ability and attributional style, Spence, Sheffield, and Donovan (2002) were able to predict future depression in the presence of negative life events among those adolescents employing a negative problem solving orientation. Adams and Adams (1996) were also able to predict depression among those adolescents using self-destructive or passive/avoidant problem solving strategies when experiencing negative life events.

Each of these theoretical perspectives plausibly explains how experiences of violence can lead to depression and other risk factors for suicide. Also, in all of these theories, the means by which individuals cope with stressful and negative life events, including social support resources, determines whether they will experience depressive affect and/or report suicidal ideation, plans and or attempts. Higher levels of cognitive activity are necessary for individuals to regulate and manage emotions appropriately, particularly in times of stressful and threatening life events such as sexual or physical violence. Although individuals have a repertoire of coping strategies from which to choose, previous research indicates that adolescents tend to employ self-blame,

catastrophizing, and rumination when dealing with negative life events and maladjustment (Garnefski, Kraaij, & Spinhoven, 2001). In another study comparing adults and adolescents' use of nine conceptually different coping styles in response to life stress and their relationship to anxiety and depression, Garnefski and colleagues (2002) found similar results. Specifically, both adolescents and adults employing the cognitive coping strategies self blame, rumination, and catastrophizing also reported increased symptoms of psychopathology in response to negative life events.

The key to identifying depression is assessing depressive symptoms commonly reported in physical and sexual violence victims. According to Frank and Stewart (1983), many rape victims report symptoms of depression, and in some cases, a full depressive syndrome. The Diagnostic and Statistical Manual of Mental Disorders (American Psychiatric Association, 1994) cites the features of a major depressive episode as the following:

> "Appetite is usually reduced, and many individuals feel that they have to force themselves to eat. Other individuals….may have increased appetite and may crave specific foods (e.g., sweets or other carbohydrates). Frequently there may be thoughts of death, suicidal ideation, or suicide attempts. These thoughts range from a belief that others would be better off if the person were dead, to transient but recurrent thoughts of committing suicide, to actual specific plans of how to commit suicide. Motivations for suicide may include a desire to give up in the face of perceived insurmountable obstacles or an intense wish to end an excruciatingly

> painful emotional state that is perceived by the person to be without end" (p. 321-322).

This description of depression corresponds to the various theories on depression, illuminates the effects physical and sexual violence may have on the psyche, and highlights depression's effect on dietary intake. Based on the DSM-IV's description, depression may explain the decrease in attitudes towards healthy eating and self-efficacy to eat healthy in times of stress and stress' association with decreased fruit and vegetable consumption found in previous studies (Baker, Little, & Brownell, 2003; Brug, Lechner, & De Vries, 1995; Neumark-Sztainer et al., 2003).

This depression – eating relationship is also evident in previous research on binge eating, or "rapid consumption of large amounts of food, often high in calories" (Melcher & Bostwick Jr., 1998, p. 197). These studies on binge eating assess negative mood states such as anxiety and depression as precipitants of binge eating episodes (e.g., Johnson & Larson, 1982; Lingswiler, Crowther, & Stephens, 1987; Loro & Orleans, 1981). In their study assessing variability in reported moods during eating for normal and overweight binge and nonbinge eaters, Lingswiler and colleagues (1987) found that binge eaters reported greater daily changes in mood (i.e., anxiety and depression) than their non-binge eating cohort. In addition, compared to non-binge eaters, those individuals who engaged in binge eating reported experiencing these fluctuations in anxiety and depression while eating. Researchers have also hypothesized that negative affect accompanied by other factors such as stress and fatigue may interact to determine whether an individual will engage in binge eating and to what degree (e.g., Hawkins & Clement, 1980; Orleans &

Barnett, 1984). Based on the literature, stress and depression can play an important role in individual food consumption.

Hypothesis 1: Depression's Mediating Effect

Given previous research findings, the present study proposes a path model to explain depression's mediating role in explaining the effect of stress on diet, specifically fruit and vegetable intake, in female victims of adolescent dating violence (see Figure 1).

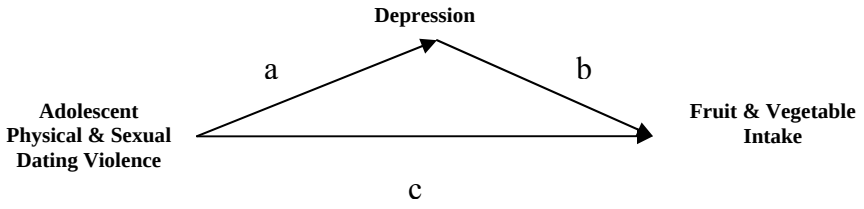

Figure 1. Mediation Path for Model 1

To summarize the literature presented here, previous studies show that individuals will eat more fatty foods and less fruits and vegetables or other healthy foods when under stress (Cartwright et al., 2003; Dallman et al., 2003; Grunberg & Straub, 1992; Willenbring et al., 1986). Therefore, experiencing dating violence may affect adolescent food choices as depicted by path C in Figure 1. It is hypothesized that increased physical and sexual dating violence will be associated with a decrease in fruit and vegetable intake.

The literature also claims that if an individual has ever been the victim of adolescent physical and/or sexual dating violence they are more likely to report depression (Ackard & Neumark-Sztainer, 2002; Callahan et al., 2003; Hanson, 2002;

Harned, 2001). It is possible that ADV leads to depression, which is illustrated by path A in Figure 1. Therefore, it is hypothesized that increased physical and sexual dating violence will be associated with an increase in depression.

Finally, the literature on depression contends that during states of depression, adolescents may experience a sense of hopelessness and lack motivation to eat properly (American Psychiatric Association, 1994; Lingswiler et al., 1987). As path B in Figure 1 shows, depression may affect adolescent female victims' fruit and vegetable intake. It is hypothesized that increased depression will be associated with a decrease in fruit and vegetable intake. Hence, this study will assess the direct and indirect effects of adolescent physical and sexual dating violence on adolescent victims' dietary intake. Although ADV is expected to affect food choices due to the stress – eating relation established in the literature, perhaps depression is the mechanism by which this effect of stress is transmitted to dietary intake.

It is important to examine multiple effects of adolescent dating violence for many reasons. Based on previous research, ADV affects between 12% and 35% of high school students who are victims and/or perpetrators of physical violence in dating relationships (Foshee, Linder, MacDougall, & Bangdiwala, 2001). Although both adolescent males and females perpetrate and/or are victimized by dating violence, the proposed study focuses on female victims of dating violence because most dating or intimate partner violence (IPV) is perpetrated against women. The rate of violence against females perpetrated by intimate partners is 3 to 6 times that of violence directed at males (Silverman et al., 2001). In addition, for both adolescents (ADV) and adult populations

(IPV), injuries resulting from relationship violence are significantly more pervasive among females than males (Silverman et al., 2001). Approximately 10% of intentional injuries to adolescent females are a result of violence perpetrated by male dating partners (Silverman et al., 2001). Therefore, examining how established correlates of ADV are structurally related is an important next step in understanding how to prevent and respond to dating violence victimization and its psychological and nutritional health consequences.

As the aforementioned studies demonstrate, much attention has been given to detecting risk factors for, and causes of, unhealthy dietary intake. However, equally important to preventing unhealthy diet is the identification and assessment of factors that may serve to moderate, and thereby protect individuals from, these effects.

Sports Team Involvement's Moderating Effect

Although depression is an associated consequence of ADV, not all female adolescent victims of physical and/or sexual dating violence become depressed. Possible reasons for why some female victims may be more or less vulnerable to depression in the face of dating violence experiences include the use of maladaptive coping strategies (Allen, 2004; Beck, 1967; Garnefski et al., 2002) and the presence or absence of social support, which has been documented to affect, or prevent, depressive symptomatology (Bal et al., 2003; Barrera, 2000; Feiring et al., 1998; Osborne & Rhodes, 2001; Zimmerman et al., 2000). Sources of social support for teens usually include peers, parents and other family members, significant others, and school personnel (Colarossi,

2001; Haluska, Jessee, & Nagy, 2002; Raiford, 2004; J. M. Richman, Rosenfeld, & Bowen, 1998).

Among these sources of support, peers have been the most commonly reported source of social support (Colarossi, 2001), particularly in instances of adolescent dating violence (Dubow et al., 1990; Offer et al., 1991; Raiford, 2004; Watson, Cascardi, Avery-Leaf, & O'Leary, 2001). Social support from peers includes friends, classmates, and sports teammates (Duncan, 1993; Nettles, Mucherah, & Jones, 2000). Of particular interest to the present study is the dual role that sports team involvement, a means of peer social support *and* physical activity, may play in protecting adolescents from deleterious psychological (i.e., depression) and physical (i.e., unhealthy diet) outcomes. Adolescents involved in sports teams may be protected from these deleterious outcomes because of the ecological effects of being part of a sports team. Physical activity during adolescence, including sports team involvement, has a negative relationship with stress, depression, and anxiety, and is positively associated with self-esteem, self-concept, and self-efficacy (Mutrie & Parfitt, 1998; Sallis & Owen, 1999). Thus, at the individual level, sports team involvement can increase youth's sense of competence, self-esteem, self-worth, and/or self-concept (Brandi-Bredenbeck & Brettschneider, 1997; Daley, 2002; Duda, 1996; Erkut & Tracy, 2002; Grove, 1996; Kirkcaldy et al., 2002; Vilhjalmsson & Thorlindsson, 1992), all of which may help to counter, and/or prevent, depression.

In their study predicting adolescent self-esteem associated with involvement in school sports, Erkut and Tracy (2002) demonstrated that, among subgroups of Latino

adolescents, participating in a school sport was significantly associated with self-esteem. Boys and girls who engaged in more sport activity also exhibited increased self-worth when compared to their less active, sedentary cohort (Trew, Scully, Kremer, & Ogle, 1999). Furthermore, Wild and colleagues (2004) reported an association between low sports/athletic self-esteem and an increased risk of suicidal ideation and attempts for adolescent females. Overall, numerous studies support the use of exercise and physical activity in preventing and/or minimizing stress, anxiety, and depression (Arent, Landers, & Etnier, 2000; Berger & Motl, 2000). These effects are attributed to physical activity's ability to increases the body's production of norepinephrine, serotonin, and the endorphins – neurotransmitters that serve to elevate mood and ease pain (Jacobs, 1994; Salmon, 2001).

Physical activity has also been shown to positively affect psychological health among those adolescents involved in team sports. Specifically, adolescents involved in *team* sports reported lower anxiety and depression when compared to adolescents reporting *individual* sports involvement (Vilhjalmsson & Thorlindsson, 1992). These researchers argue that it may be the social component of team sports that contributes to these positive psychological outcomes rather than just being involved in some form of physical activity. This argument supports the present study's contention that sports team involvement may also affect individual well-being at higher ecological levels via group social support. In her research on the role of cognitive appraisal and friendship provision in adolescents' motivation to participate in physical activity, Duncan (1993) notes a commonly cited rationale for children's participation in sports, stating that children are

motivated to engage in organized sports due to affiliation and "the notion of being part of a team and being with friends" (p. 315). This line of reasoning is supported in the literature on adults that reports a positive relationship between social support and regular physical activity (Duncan, 1993).

Social support has also been found to be important in buffering the effects of violent relationships as social support may help to reduce isolation and lead individuals to end or escape violent relationships (Coker, Watkins, Smith, & Brandt, 2003; Donato & Bowker, 1984; Goodman, Dutton, Vankos, & Weinfurt, 2005). Focusing on sports team involvement as a means of peer social support in the face of dating violence is a way of viewing social problems as universal – in part, dating violence is a result of the social arrangements of a community's environment. Therefore, preventive interventions would advocate targeting higher ecological levels of analysis beyond the individual such as peer group support. It is possible that adolescent females reporting dating violence experiences may benefit from sports team involvement as a system or avenue in which to receive social support, particularly in instances of negotiating and solving dating relationship concerns.

Both individual- and peer-level effects of sports team involvement may be beneficial in assisting adolescents in crucial developmental tasks such as developing an identity, a sense of self-worth, and self-competence (Erikson, 1963), while avoiding psychological disturbances such as depression, which can affect healthy food choices. Hence, it is reasonable to expect that sports team involvement, a means of social support

and a mechanism in which to develop self-esteem, worth, and competence, will moderate, or protect, female victims of adolescent dating violence from experiencing depression.

Not only may participating in sports teams assist in preventing youth, particularly youth experiencing stressful life events, from later depression, it is possible that sports team participation may also affect dietary intake. In their study comparing the food habits and dietary intake of athletic and nonathletic adolescents, Cavadin and colleagues (2000) found that adolescents who engaged in sports reported healthier food habits than non-athletes. Specifically, athletic adolescents consumed more dairy products, ready to eat cereals, fruit, fruit juices, and salad. This study provides evidence to support dietary benefits of sports involvement. However, an extensive review of the literature by Argyle (1996) shows that adolescent involvement in sports activity declines as teens get older. It appears that 90% of adolescents between the ages of 13 and 14 years participate in weekly sports activities. However, over the next 6 years this level of participation drops to 67% and 49%, for males and females respectively. In a more recent publication, the U.S. Surgeon General (2001) reported that among young Americans aged 12 to 21 years, only about 50% participate in vigorous physical activity on a regular basis, with one-fourth of these adolescents reporting no involvement in vigorous activity. Such findings highlight the current physical state of American adolescents and emphasize the importance of increasing youth participation in vigorous physical activity, specifically sports team involvement.

Hypothesis 2: Sports Team Involvement's Moderating Effect

Based on the positive effects of sports team involvement on psychological outcomes reported in the literature, another aim of this study is to investigate the impact of sports team involvement on the ADV – depression relation. Specifically, this study asks, "Does involvement in a sports team, a means of peer social support and physical activity, help to protect, or moderate, the effect of dating violence on depression?" To answer this question, this study hypothesizes that an increase in physical and sexual dating violence will be associated with an *increase* in depression, with adolescent females involved with a sports team reporting *less* depression than those females who do not participate on a sports team (see Figure 2).

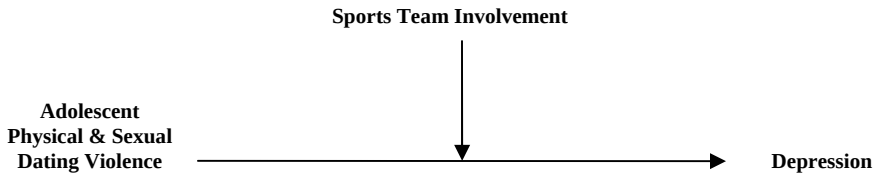

Figure 2. Moderation Path for Model 2

If involvement in a sports team serves to protect female victims of ADV from depression *and* depression is the mechanism by which healthy eating is disrupted (see Figure 3 for these combined mediated and moderated hypotheses), then encouraging and promoting sports team involvement may serve to prevent both *decreases* in healthy eating and *increases* in obesity. Sports team involvement may play a dual role in the prevention

of overweight adolescents and obesity in later adulthood if it serves as a source of social support and protection from depression *and* is a form of physical activity. Knowing the mechanism by which ADV impacts adolescent female victims' eating behavior will enable practitioners to intervene to decrease risk of obesity or poor diet. Also, demonstrating ADV's detrimental effects on healthy eating ultimately highlights the importance and need for ADV prevention, education, and awareness.

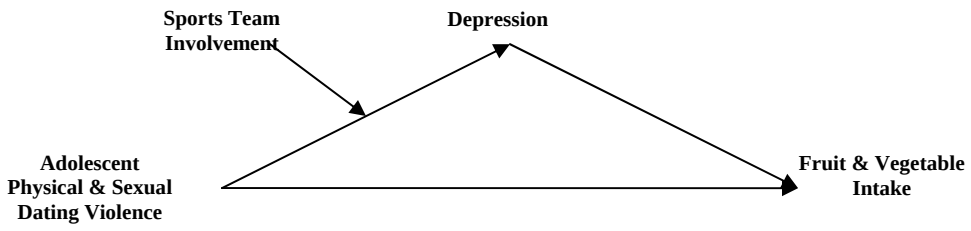

Figure 3. Combined Paths Diagram

Structural Factors

While this study proposes several variables hypothesized to affect fruit and vegetable intake and depression, this study acknowledges additional structural factors reported in the literature expected to affect these outcomes. These correlates include socioeconomic status (Cartwright et al., 2003; Neumark-Sztainer et al., 2003), race (Cartwright et al., 2003; Perry, Rosenblatt, & Wang, 2004), and metropolitan status (Steptoe et al., 2003). In their study assessing stress and dietary practices in adolescents,

Cartwright and colleagues (2003) reported associations between ethnic identity and eating behaviors. Specifically, when compared to their white counterparts, black and other ethnic minority schoolchildren reported more unhealthy dietary practices, *OR* = 1.64, *p* = .001; however, Asian adolescents reported more healthy dietary practices, *OR* = 1.64, *p* = .001.

In regard to socioeconomic status (SES), Cartwright and colleagues (2003) reported that those adolescents classified as most "deprived" had nearly twice the odds of reporting unhealthy food consumption compared to those classified as least "deprived" (p. 365). It is possible, however, that SES is confounded by race and/or metropolitan status. In other words, the racial effects detected in previous studies may be due to the high rate of racial and ethnic minorities residing in urban areas classified as poor and economically disadvantaged. In a previous study on adults residing in a "deprived inner-city area," researchers assessed psychological factors associated with fruit and vegetable consumption including barriers to consumption due to economic plight (Steptoe et al., 2003, p. 149). Among many factors, lack of knowledge of recommended fruit and vegetable consumption was found to be a consistent barrier to fruit and vegetable intake. These authors argue that, "obstacles to eating more fruit and vegetables, such as the inaccessibility of supplies, cost, and storage problems, may be more prominent in the lives of people in this sector of the population (i.e., deprived inner-city area) than among individuals living in more prosperous circumstances" (p. 149).

Other research has also documented disproportionate levels of depression in racial and ethnic minorities including African Americans (e.g., Jones-Webb & Snowden, 1993;

Rodriguez, Allen, Frongillo, & Chandra, 1999), Hispanic Americans (e.g., Alderete, Vega, Kolody, & Aguilar-Gaxiola, 1999; Potter, Rogler, & Moscicki, 1995), Asian Americans (e.g., Flaskerud & Hu, 1994; Hinton et al., 1998), and Native Americans (e.g., Parker et al., 1997; Somervell et al., 1993). This association between race/ethnicity and depression may be a result of the low socioeconomic status and history of social marginalization experienced by racial and ethnic minorities. In such cases, race may also serve as a proxy for SES when understanding rates of depression. Consequently, the present study's focus on factors affecting fruit and vegetable intake and depression must account for these established correlates (i.e., race, SES, metropolitan status).

METHOD

This study was part of a larger investigation of youth risk behavior established by the Centers for Disease Control and Prevention (CDC), entitled, "The Youth Risk Behavior Surveillance System" (CDC, 2004a). The Youth Risk Behavior Surveillance System (YRBSS) is a national surveillance system developed in 1990 to monitor the prevalence of multiple behavioral risk factors affecting morbidity, mortality, disability, and social problems in youth and young adulthood. These behaviors include tobacco use, unhealthy dietary behaviors, inadequate physical activity, alcohol and other drug use, sexual behaviors and behaviors associated with unintentional injuries and violence. The YRBSS data has been collected every two years since 1990. The present study involved national school-based surveillance data collected in 2003 using the Youth Risk Behavior Survey (YRBS), one component of the YRBSS.

Sampling Design

The 2003 national school-based survey used a three-stage cluster sample design involving a nationally representative sample of all public and private high school students in grades 9-12 located in the 50 states and the District of Columbia. U.S. territories were not included in this sampling frame. The first stage sampling frame included 1,262 primary sampling units (PSUs) comprised of large counties, sub-areas of large counties, or groups of small adjacent counties. These PSUs were stratified by degree of urbanization according to the metropolitan statistical area (MSA) status, and the relative percentage of black and Hispanic students, yielding 16 strata. Within these 16 strata, 57

(out of 1,262) PSUs were selected based on probability proportional to the size of school enrollment.

In the second sampling stage, a sampling frame of public and private schools in each PSU was created using the Quality Education Database (Data, 2004) and the Common Core of Data from the National Center for Education Statistics (US Department of Education, 2004). In this stage, 195 high schools within the 57 strata were selected based on probability proportional to the size of school enrollment. In this selection process, these high schools were divided into two groups: (1) schools enrolling twenty-five or more students in each grade constituted the "large" group and (2) schools enrolling less than 25 students in any grade constituted the "small" group. Approximately 25% of PSUs were selected for small school sampling and for each of these, one small school was drawn with probability proportional to school size when considering only small schools within that PSU. Next, for each sampled PSU, three large schools were selected with probability proportional to the size of school enrollment.

The second sampling stage also included an oversampling of schools containing a higher percentage of black and Hispanic students in order to employ separate data analysis on these subgroups. This oversampling was achieved in three ways: (1) using larger sampling rates to select PSUs listed in high-black and high-Hispanic strata; (2) using a modified measure of size to increase the probability of selecting schools characterized as having a disproportionate amount of minority enrollment; and (3) selecting two classes per grade in high-minority schools, rather than one class per grade.

The third sampling stage involved random selection of one or two required classes (e.g., English or social studies) from grades 9-12 from each selected high school. All students in each selected class were eligible to participate in the 2003 YRBS administration. Finally, sampled schools, classes, and students refusing participation were not replaced in order to preserve the integrity of the sampling design and to avoid including unmeasurable bias in the selected sample.

Sample

The YRBS data collected by the Centers for Disease Control and Prevention included 7,544 adolescent girls between the ages of 12 and 17 years old. Due to the inability to collect data on suicide behavior in certain schools, 934 adolescent girls were excluded from the current study due to missing data for these items. Also, due to the small number of adolescent girls identifying as American Indian/Alaska Native, Asian, Native Hawaiian/Other Pacific Islander, multiple-Hispanic and multiple-Non-hispanic, this study only included those adolescent girls self-identifying as black (n = 1,508), Hispanic (n = 1,457) or white (n = 2,927), yielding a total *N* of 5,892. There was an equal representation of girls in grades 9 -12 (i.e., approximately 25% in each grade level). The majority of adolescent girls sampled reported being 15 years (22.7%), 16 years (26.6%), or 17 years (25.9%) old. The remaining 25% were 14 years or younger (10%) or 18 years or older (15%). Approximately half (48.3%) of this sample resided in suburban areas whereas 34.5% resided in urban areas and 17.2% in rural areas.

Procedures

Local school procedures for soliciting and receiving parental permission were followed prior to administering the YRBS in any school. Either active or passive consent was obtained from parents, depending on the locality of the school. In some schools parents were required to sign and return permission forms indicating consent for their child's participation (active consent) and in other schools, parents were only required to sign and return permission forms if they did not consent to their child's participation (passive consent). In 2003, 38% of selected schools employed active parental permission and 62% used passive parental permission.

Data collectors were trained to follow a standardized protocol for administering the YRBS in selected schools. This uniform protocol included providing survey instructions using a standard script that provides an introduction to the survey. Students were informed that their participation in this survey was both anonymous and voluntary. All students were instructed to record their responses to the survey items on a computer-scannable booklet or answer sheet. Those students absent during the survey administration were provided an opportunity to make-up the survey whenever privacy could be ensured. Depending on the school, either the data collector or school personnel administered these make-up surveys. In 2003, 664 students (5% of all participating students) completed a make-up survey. Of the 195 sampled schools, 158 participated in the 2003 national school-based YRBS administration, yielding a school response rate of 81%. Of the 18,330 students invited to participate, 15,240 completed a survey and 15,214 of those surveys were deemed usable, yielding a student response rate of 83%.

Multiplying the school and student response rates produced an overall survey response rate of 67%.

Measures

The YRBS includes 97 items assessing many behavioral risk factors for youth. Below is a description of the present study's focus on four of these factors: (1) adolescent physical and sexual dating violence victimization, (2) depression, (3) fruit and vegetable intake, and (4) sports team involvement.

Demographics. Four items assessed the following demographic variables: age, race/ethnicity, grade level, and metropolitan status. Students were asked to indicate their age using a scale that ranged from 12 years old or younger to 18 years old or older. Students were also asked to describe themselves using a list of the eight most common racial and ethnic populations in the United States, namely, American Indian/Alaska Native, Asian, black, Hispanic, Native Hawaiian/Other Pacific Islander, white, multiple-Hispanic or multiple-Non-hispanic. Grade level was assessed on a 4 point scale ranging from 9th grade to 12th grade. In addition, each student was assigned a code indicating their metropolitan status based on the primary sampling unit (PSU) from which they were sampled.

Adolescent physical and sexual dating violence. Two items assessed adolescents' experiences of physical dating violence and sexual violence victimization. One item, assessing physical dating violence asked, "During the past 12 months, did your boyfriend or girlfriend ever hit, slap, or physically hurt you on purpose?" The second item, assessing sexual violence asked, "Have you ever been physically forced to have sexual

intercourse when you did not want to?" For both items, students were asked to indicate yes (1) or no (0) in response to these questions. Responses to these items were summed and ranged from 0 to 2 with higher scores indicating higher ADV victimization.

Depression, suicidality, and depressed affect. The YRBS includes five items that ask students to report experiences of depressed mood and suicidal behaviors. The present study defined depression with three indicator variables: depressed affect, suicidality, and depression. Depressed affect was measured by asking students to indicate yes (1) or no (0) to the following question, "During the past 12 months, did you ever feel so sad or hopeless almost every day for two weeks or more in a row that you stopped doing some usual activities?" Suicidality was measured by asking students to indicate whether they have ever considered suicide, made a suicide plan, actually attempted suicide, and/or sustained injuries due to a suicide attempt (see Appendix A). Each response was collapsed and recoded to reflect 0 (no) or 1 (yes), and then summed, yielding a range of 0 to 4, with higher scores indicating higher suicidality. The inter-item correlation for suicidality in this study was $\alpha = 0.79$. Finally, depression was assessed using the one depressed affect and four suicidality items. All five items were summed, yielding a range of 0 to 5, with higher scores indicating higher depression. The inter-item correlation for depression in this study was $\alpha = 0.76$.

Fruit and vegetable intake. Five items were used to assess adolescents' dietary intake. Students were asked to respond, on a seven-point, likert-type scale ranging from one to seven, the degree to which they consumed various fruits and vegetables (see Appendix B). Each item was recoded to reflect average intake for a day. A score of 1 =

0 (no consumption), 2 = 2/7 or 0.29 servings per day, 3 = 3/7 or 0.71 servings per day, 4 = 1 serving per day, 5 = 2 servings per day, 6 = 3 servings per day, and 7 = 4 or more servings per day. All items were summed to create an average daily consumption of fruits and vegetables and then dichotomized wherein a score of 0 indicated an average of less than five servings of fruits and vegetables per day and a score of 1 indicated an average of five or more servings of fruits and vegetables per day. This standard is widely used and recommended for assessing healthy diet in adolescents (CDC, 2004a).

Sports team involvement. One item was used to assess adolescent girls' participation on a sports team. Students were asked to indicate, "During the past 12 months, on how many sports teams did you play?" Response options ranged from 0 teams to 3 or more teams and were recoded and collapsed to indicate "no involvement" (0) or "involvement" (1).

Plan of Analyses

Given that the literature reports significant race and ethnic differences in the self-reports of dating violence, depression/suicidality, and fruit and vegetable intake, each racial/ethnic group was compared on all study variables using analysis of variance (ANOVA) techniques. Based on the racial/ethnic differences observed in these analyses, an analysis assessing the interaction of race and adolescent dating violence and its effect on fruit and vegetable intake and the three indicators of depression was performed. Detecting a race interaction effect gives cause for assessing the main study hypotheses separately for each racial/ethnic group.

The hypothesis that depression would mediate the relation between adolescent dating violence and fruit and vegetable intake was tested using hierarchical multiple regression (HMR) and logistic regression (LR) methods specified by Baron and Kenny (1986). Detecting a mediated effect for the present study requires that (1) the independent variable (adolescent dating violence) significantly account for the variance detected in the mediator variable (depression, suicidality, or depressed affect), (2) the mediator variable significantly account for the variance detected in the dependent variable (fruit and vegetable intake), and (3) when controlling for both equations, the previously significant relationship between the independent (adolescent dating violence) and dependent variables (fruit and vegetable intake) is no longer significant or reduces in strength (Baron & Kenny, 1986).

The hypothesis that sports team involvement would moderate the relation between adolescent dating violence and depression was also tested using hierarchical multiple regression (HMR) and logistic regression (LR) methods specified by Baron and Kenny (1986). Detecting a moderated effect for the present study required that the interaction, or product, of the independent (adolescent dating violence) and moderator (sports team involvement) variables account for a significant amount of variance in the dependent variable (depression, suicidality, and depressed affect). The interaction term was calculated by first centering the independent variable (ADV) and then multiplying the centered independent variable and the dichotomous moderator variable (sports team involvement) together. Hierarchical multiple regression was employed by separately regressing each dependent variable (depression, suicidality, and depressed affect) onto

the following: (1) race and metropolitan status (covariates) in the first step, (2) the independent variable (ADV) in the second step, (3) the moderator variable (sports team involvement) in the third step, and (4) the interaction term (ADV x sports team involvement) in the fourth step. Based on the large sample used in this study, when testing the main study hypotheses, a more stringent alpha level ($\alpha = .01$) was adopted to minimize the likelihood of committing a type I error.

RESULTS

To ensure the accuracy of the data used in this study, all study variables were examined for their mean, range, standard deviation, and distribution. All values were within the expected range, and means and standard deviations were plausible for each variable based on previous research findings published in the literature. Less than 5% of cases for this study had missing values. For such cases, the age and race group mean for that variable was used to replace missing values. Mean substitution is a commonly used method for estimating random missing values that do not exceed 5% of the total number of cases (Tabachnick & Fidell, 1996). This procedure was preferred over other methods for its conservative estimation of missing values. Using a group mean prevents the overall distribution for a particular variable from changing and it more closely approximates the value for the missing data for a particular age and racial/ethnic group member.

Evaluating the Effect of Race and Ethnicity

Prior to testing the study hypotheses and based on race and ethnic differences reported in the literature, black, Hispanic, and white adolescent girls were compared on all study variables using analysis of variance techniques (see Tables 1 and 2). According to these analyses of variance, black, Hispanic, and white females varied demographically and in their reports of dating violence experiences, depression, suicidality, fruit and vegetable intake and sports team involvement. Detecting racial/ethnic differences in these variables provides a rationale for analyzing the study hypotheses separately for each race.

Adolescent dating violence. The proportion of black females reporting physical and/or sexual dating violence was significantly higher than Hispanic and white females, $\eta^2 = 0.003$, $F(2, 5889) = 8.53$, $p \leq .01$ (see Table 1). Likewise, significantly more black females reported physical dating violence than Hispanic or white females, $\eta^2 = 0.01$, $F(2, 5889) = 8.53$, $p \leq .01$.

Fruit and vegetable intake. The proportion of black, white, or Hispanic females who reported having consumed the recommended daily serving of five or more fruits and vegetables did not differ (see Table 1). However, there were significant differences in the mean daily consumption of fruits and vegetables (see Table 2). On average, black females reported consuming significantly less servings of fruits and vegetables than both white and Hispanic females, $\eta^2 = 0.01$, $F(2, 5889) = 26.04$, $p \leq .01$. There were no differences detected in the average daily consumption of fruits and vegetables between white and Hispanic girls.

Sports Team Involvement. A significantly higher percentage of white females reported having participated on a sports team in the past 12 months when compared to both black and Hispanic females reporting such involvement, $\eta^2 = 0.03$, $F(2, 5889) = 85.26$, $p \leq .01$ (see Table 1). There were no differences, however, between the percentage of black and Hispanic girls who reported participating on a sports team.

Depression and Suicidality. Comparing each group of adolescent girls, significantly more Hispanic girls than black or white girls reported depressed affect (i.e., feeling so sad or hopeless almost every day for two weeks or more in a row that you stopped doing some usual activities), $\eta^2 = 0.01$, $F(2, 5889) = 13.34$, $p \leq .01$ (see Table 1).

Table 2 presents a mean comparison of self-reported depression and suicidality between racial and ethnic groups. Hispanic girls reported significantly more depression than black or white girls, and white girls reported significantly more depression than black girls, $\eta^2 = 0.01$, $F(2, 5889) = 16.89$, $p \leq .01$ (see Table 2) . Also, Hispanic girls reported significantly more suicidality than black or white girls, and white girls reported significantly more suicidality than black girls, $\eta^2 = 0.01$, $F(2, 5889) = 13.81$, $p \leq .01$.

Metropolitan Status. Table 1 presents the percentage of black, Hispanic, and white students residing in urban, rural, and suburban areas, covariates expected to affect the relationship between dating violence, depression, and fruit and vegetable intake. There were significantly more black and Hispanic females residing in urban areas than white females, $\eta^2 = 0.10$, $F(2, 5889) = 322.99$, $p \leq .01$, and significantly more white females residing in rural, $\eta^2 = 0.04$, $F(2, 5889) = 118.91$, $p \leq .01$, and suburban areas, $\eta^2 = 0.03$, $F(2, 5889) = 100.03$, $p \leq .01$, than both black and Hispanic females. There were also significant differences in metropolitan status between blacks and Hispanics. When compared to black females, more Hispanic females reported residing in suburban areas, $\eta^2 = 0.03$, $F(2, 5889) = 100.03$, $p \leq .01$, and significantly fewer Hispanic females reported living in rural areas, $\eta^2 = 0.04$, $F(2, 5889) = 118.91$, $p \leq .01$. Due to these differences, metropolitan status was entered as a covariate in subsequent analyses.

Variable associations. According to Baron & Kenny (1986), when testing a moderator model as proposed in the study hypothesis, the desired relation between the moderator variable and both the independent and dependent variables is that they are uncorrelated ($r < .80$) in order to clearly interpret any significant interactions. The

highest correlation observed between the independent (adolescent dating violence), dependent (depression, suicidality, depressed affect), and moderator (sports team involvement) variables was $r = .27$, $p \leq .01$ (see Table 3).

Race interactions. Prior to testing the study hypotheses that (1) depression mediates the relation between adolescent dating violence and fruit and vegetable intake and (2) sports team involvement moderates the relation between adolescent dating violence and depression, a preliminary analysis was conducted to assess the interaction of race and adolescent dating violence and its effect on fruit and vegetable intake and the three indicators of depression. Detecting an interaction effect for race and ADV provides a rationale for analyzing the study hypotheses separately for each race. Due to the exploratory nature of these preliminary analyses, a less conservative alpha level ($\alpha = .05$) was used to detect an effect for fruit and vegetable intake, depression, suicidality, and depressed affect.

Steps prescribed by Baron and Kenny (1986) were employed to detect an interaction effect of race/ethnicity and ADV for fruit and vegetable intake. The three racial/ethnic groups were dummy coded to produce two groups (i.e., a code of 1 indicates membership in the specified racial/ethnic group and a value of 0 indicates membership in another racial/ethnic group). Fruit and vegetable intake was regressed onto the dummy coded race variables in the first step, then on adolescent dating violence in the second step, and finally, fruit and vegetable intake was regressed on the product of each dummy coded race variable and the centered dating violence variable in the third step. Although small, there was a significant interaction effect of race and dating violence on the

dependent variable fruit and vegetable intake, $\Delta R^2 = .001$, $\Delta F(1, 5888) = 4.61$, $p = .03$. In addition, there was a significant, positive direct effect of ADV on fruit and vegetable intake, however, the effect was in the opposite direction than hypothesized, $B = .37$, $\Delta F(1, 5889) = 33.92$, $p = .001$.

The steps for detecting an interaction effect were repeated for each of the remaining dependent variables (depression, suicidality, and depressed affect). Although small, there was a significant interaction effect of race and dating violence on the dependent variables depression, $\Delta R^2 = .003$, $\Delta F(1, 5888) = 20.52$, $p = .001$, suicidality, $\Delta R^2 = .002$, $\Delta F(1, 5888) = 13.38$, $p = .001$, and depressed affect, $OR = .68$, $WS = 8.72$, $p = .003$.

Considering the significant interaction effects detected for race and adolescent dating violence, it is appropriate to assess the study hypotheses separately for each racial or ethnic group. Also, given that adolescent dating violence was associated with an *increase* in fruit and vegetable intake, tested above as a dichotomous variable (1 = five or more servings of fruits and vegetables or 0 = less than 5 servings of fruits and vegetables) it appears that ADV as a stressor may affect food consumption rather than food choices. That is, stress' affect on eating in this sample may be more characteristic of increased eating rather than a conscious choice to decrease healthy dietary intake such as fruits and vegetables in times of stress. Therefore, subsequent analyses to detect a mediated effect of depression for each racial group assessed average consumption of fruits and vegetables as a continuous variable.

Hypothesis 1: Depression's Mediating Effect

Depression. To test the mediated effect of depression on the ADV – dietary intake relation two hierarchical multiple regressions (HMR) were used according to the steps outlined by Baron and Kenny (1986). The hypothesis that depression would mediate the relation between adolescent dating violence and fruit and vegetable intake when controlling for metropolitan status was only confirmed for black adolescent girls. For black girls, ADV demonstrated a significant effect on depression, $B = 0.62$, $\Delta F(1, 1504) = 112.71$, $p \leq .001$ (see table 4). Also, ADV significantly affected fruit and vegetable intake, $B = 0.39$, $\Delta F(1, 1504) = 9.98$, $p \leq .001$, prior to controlling for depression and depression significantly affected fruit and vegetable intake, $B = 0.23$, $\Delta F(1, 1504) = 18.39$, $p \leq .001$ (see table 5). Finally, the effect of ADV on fruit and vegetable intake decreased to nonsignificance when controlling for depression, $B = 0.25$, $\Delta F(1, 1504) = 18.39$, $p = .05$ (see table 5). The total mediated effect for fruit and vegetable intake in black adolescent girls was $B = 0.06$, $p \leq .001$.

Although depression did not mediate the ADV – fruit and vegetable intake relation for Hispanic and white adolescent girls, there were significant direct effects of ADV. Table 6 shows the direct effects of ADV and depression indicator variables on fruit and vegetable intake for each racial/ethnic group. Contrary to the hypothesized direction, increases in ADV were associated with significant increases in fruit and vegetable intake for each racial/ethnic group. Black girls increased their fruit and vegetable intake .39 servings for every unit increase in dating violence reported, $p = .01$. Hispanic girls increased their fruit and vegetable intake more than half a serving ($B = .61$,

$p = .001$) for every unit increase in dating violence reported. However, for white girls, the increase in fruit and vegetable intake was .29 servings per unit increase in dating violence reported, $p = .001$. For Hispanic and white girls, depression was not a significant predictor of fruit and vegetable intake. Contrary to the hypothesized direction, increases in depression were associated with significant increases in fruit and vegetable intake for black girls and a nonsignificant increase in fruit and vegetable intake for Hispanic girls. For white girls depression had a nonsignificant negative relation with fruit and vegetable intake.

Suicidality. To test the mediated effect of suicidality on the ADV – dietary intake relation two hierarchical multiple regressions (HMR) were used. The hypothesis that suicidality would mediate the relation between adolescent dating violence and fruit and vegetable intake when controlling for metropolitan status was not confirmed for black, Hispanic, or white girls in this study. Although suicidality did not mediate the ADV – fruit and vegetable intake relation for Hispanic and white adolescent girls, there was a significant direct effect of ADV. Table 6 shows the direct effect of suicidality on fruit and vegetable intake for each racial/ethnic group. For black adolescent girls, suicidality significantly affected fruit and vegetable intake, $p \leq .001$. Once again, contrary to the hypothesized direction, an increase in suicidality was associated with an increase in fruit and vegetable intake in black girls, $B = 0.24$, $p \leq .001$. For Hispanic and white girls, suicidality was not a significant predictor of fruit and vegetable intake. Contrary to the hypothesized direction, increases in suicidality were associated with significant increases in fruit and vegetable intake for black girls and a nonsignificant

increase in fruit and vegetable intake for Hispanic girls. For white girls suicidality had a nonsignificant negative relation with fruit and vegetable intake.

Depressed Affect. To test the mediated effect of depressed affect, a dichotomous variable, one hierarchical logistic regression (HLR) and one hierarchical multiple regression was used. The hypothesis that depressed affect would mediate the relation between adolescent dating violence and fruit and vegetable intake when controlling for metropolitan status was not confirmed for black, Hispanic, or white girls in this study. Although depressed affect did not mediate the ADV – fruit and vegetable intake relation for Hispanic and white adolescent girls, there was a significant direct effect of depressed affect. Table 6 shows the direct effects of depressed affect on fruit and vegetable intake for each racial/ethnic group. For black adolescent girls, depressed affect significantly affected fruit and vegetable intake, $p \leq .001$. Once again, contrary to the hypothesized direction, an increase in depressed affect was associated with an increase in fruit and vegetable intake in black girls, $B = 0.43$, $p \leq .001$. For Hispanic and white girls, depressed affect was not a significant predictor of fruit and vegetable intake. Contrary to the hypothesized direction, increases in depressed affect were associated with a nonsignificant increase in fruit and vegetable intake for Hispanic girls. For white girls, depressed affect had a nonsignificant negative relation with fruit and vegetable intake.

Hypothesis 2: Sports Team Involvement's Moderating Effect

Depression. Using steps prescribed by Baron & Kenny (1986) to test the moderated effect of sports team involvement on the ADV – depression relation, one HMR was employed for each racial/ethnic group. The hypothesis that, sports team

involvement would moderate the relation between adolescent dating violence and depression was only confirmed for white adolescent girls. Although small, for white adolescent girls, there was a significant interaction effect of dating violence and sports team involvement on the dependent variable depression, $\Delta R^2 = .002$, $\Delta F(1, 2921) = 4.94$, $p \leq .001$ (see Table 7). It appears that, among white adolescent girls reporting dating violence, those who also reported being involved on a sports team indicated significantly less depression than those girls who did not report sports team involvement (see Figure 4). Specifically, the more dating violence reported the greater the difference in depression observed between those involved in a sports team and those who did not report such involvement.

In addition to detecting a moderated effect for white adolescent girls, there were significant direct effects of ADV and sports team involvement on depression for each racial/ethnic group (see Table 8). As expected, adolescent dating violence had a significant, positive effect on depression for each group, explaining between 6.9% and 13.3% of additional variance detected in reports of depression beyond that explained by metropolitan status. Sports team involvement had a significant negative effect on depression for white girls only, $B = -0.27$, $\Delta R^2 = .011$, $p \leq .001$. Contrary to the predicted direction, sports team involvement was associated with a nonsignificant increase in depression for black and Hispanic girls.

Suicidality. To test the moderated effect of sports team involvement on the ADV – suicidality relation one HMR was employed for each racial/ethnic group. The hypothesis that, sports team involvement would moderate the relation between adolescent

dating violence and suicidality was confirmed for white adolescent girls only. For each racial/ethnic group, the dependent variable (suicidality) was regressed on the independent variable (dating violence) in the first step, then on the moderator variable (sports team involvement) in the second step, and finally, suicidality was regressed on the product of the centered dating violence variable and sports team involvement in the third step. For white adolescent girls, there was a significant interaction effect of dating violence and sports team involvement on the dependent variable suicidality, $\Delta R^2 = .002$, $\Delta F(1, 2921) = 6.17$, $p \leq .01$ (see Table 9). It appears that, among white adolescent girls reporting dating violence, those who also reported being involved on a sports team indicated significantly less suicidality than those girls who did not report sports team involvement (see Figure 5). Specifically, the more dating violence reported the greater the difference in suicidality observed between those involved in a sports team and those who did not report such involvement.

In addition to detecting a moderated effect for white adolescent girls, there were significant direct effects of ADV and sports team involvement on suicidality for each racial/ethnic group (see Table 8). As expected, adolescent dating violence had a significant, positive effect on suicidality for each group, explaining between 5.8% and 11.9% of additional variance detected in reports of suicidality beyond that explained by metropolitan status. Sports team involvement had a significant negative effect on suicidality for white girls only, $B = -0.18$, $\Delta R^2 = .008$, $p \leq .001$. Contrary to the predicted direction, sports team involvement was associated with a nonsignificant increase in suicidality for black and Hispanic girls.

Depressed Affect. To test the moderated effect of sports team involvement on the ADV – depressed affect relation one hierarchical logistic regression was employed for each racial/ethnic group. The hypothesis that, sports team involvement would moderate the relation between adolescent dating violence and depressed affect was not confirmed for black, Hispanic or white adolescent girls. Although a moderated effect was not observed, there were significant direct effects of ADV and sports team involvement on depressed affect for each racial/ethnic group (see Table 8). As expected, adolescent dating violence had a significant, positive effect on depressed affect for each group. It appears that those girls reporting experiencing dating violence were two to three times more likely to also report depressed affect than those adolescent girls not reporting such violent experiences. Sports team involvement had a significant negative effect on depressed affect for white girls only, $B = -0.43$, $OR = 0.65$, $p \leq .001$. Contrary to the predicted direction, sports team involvement was associated with a nonsignificant increase in depressed affect for black and Hispanic girls.

Summary of Results

To summarize the results presented here, depression mediated the relation between adolescent dating violence and fruit and vegetable intake for black girls only (see Table 10). Also, for white girls, sports team involvement moderated the relation between adolescent dating violence and depression and suicidality (see Table 10).

Table 1. Frequency comparisons between racial/ethnic groups on study variables

Variable	Black (n = 1508) % Yes	Hispanic (n = 1457) % Yes	White (n = 2927) % Yes
Metropolitan Status			
Urban	50.3_a	48.4_a	19.5_b
Rural	14.9_a	6.0_b	23.9_c
Suburban	34.8_a	45.6_b	56.5_c
Adolescent Dating Violence	19.6_a	$17.2_{a,b}$	14.4_b
Physical Dating Violence	12.1_a	8.9_b	7.2_b
Sexual Dating Violence	10.7_a	10.9_a	9.7_a
Five or more Fruit & Vegetables	9.6_a	11.7_a	11.8_a
Depressed Affect	33.6_a	41.1_b	33.7_a
Suicide Thoughts	15.5_a	20.9_b	21.8_b
Suicide Plan	13.3_a	18.7_b	15.5_a
Suicide Attempt	8.7_a	15.1_b	$10.2_{a,c}$
Suicide Injury	2.3_a	4.5_b	$2.6_{a,c}$
Sports Team Involvement	35.1_a	39.6_a	53.7_b

Means in a row that do not differ significantly according to the Tukey Post Hoc test, α = .01, share a common subscript.

Table 2. Mean comparisons between racial/ethnic groups on depression, suicidality, and fruit and vegetable intake

		All (N = 6892)		Black (n = 1508)		Hispanic (n = 1457)		White (n = 2927)	
Variable	Range	M	SD	M	SD	M	SD	M	SD
Depression	0-5	0.85	1.28	0.74_a	1.15	1.00_b	1.38	0.84_a	1.29
Suicidality	0-4	0.50	1.01	0.40_a	0.92	0.59_b	1.12	0.50_c	1.00
Fruit & Vegs	0-20	2.27	2.22	1.92_a	2.36	2.29_b	2.44	2.43_b	2.00

Means in a row that do not differ significantly according to the Tukey Post Hoc test, α = .01, share a common subscript.

Table 3. Zero Order Correlations Matrix for all Study Variables

	1	2	3	4	5	6	7	8	9	10	11	12	13	14
1. Black	---													
2. Hispanic	-.34*	---												
3. White	-.58*	-.57*	---											
4. Urban	.20*	.17*	-.31*	---										
5. Rural	-.04*	-.17*	.18*	-.33*	---									
6. Suburban	-.16*	-.03	.16*	-.70*	-.44*	---								
7. Adolescent Dating Violence	-.05*	.01	-.05*	.03	-.00	-.03	---							
8. Physical Dating Violence	.07*	.00	-.06*	.04*	-.03	-.02	.70*	---						
9. Sexual Dating Violence	.01	.01	-.02	.02	.02	-.03	.76*	.21*	---					
10. Depression	-.05*	.07*	-.01	-.00	-.02	.02	.27*	.20*	.26*	---				
11. Suicidality	-.06*	.05*	.00	-.01	-.01	.02	.25*	.17*	.25*	.94*	---			
12. Depressed Affect	-.02	.07*	-.04*	-.00	-.02	.02	.20*	.16*	.18*	.69*	.40*	---		
13. Fruits & Vegetables	-.03	.01	.02	.02	.00	-.02	.06*	.07*	.04*	.04*	.04*	.02	---	
14. Sports Team Involvement	-.12*	-.07*	.16*	-.10*	.05*	-.06*	-.05*	-.03	-.05*	-.05*	.04*	.05*	.06*	---

*p ≤ .01. (two-tailed)

Table 4. Depression regressed on Adolescent Dating Violence for Black Girls

Predictor Variable	R^2	ΔR^2	ΔF	B	
Step 1:	.004	.004	3.05		
Urban				-.12	
Rural				.04	
Step 2: Adolescent Dating Violence	.073	.069	112.71	.62	***

***p ≤ .001. **p ≤ .01.

Table 5. Fruit and Vegetable Intake regressed on Depression and Adolescent Dating Violence for Black Girls

Predictor Variable	R^2	ΔR^2	ΔF	B	
Step 1:	.003	.003	2.45		
Urban				.31	
Rural				.02	
Step 2: Adolescent Dating Violence	.010	.007	9.98	.25	
Step 3: Depression	.022	.012	18.39	.23	***

***p ≤ .001. **p ≤ .01.

Table 6. Direct Effects of ADV, Depression, Suicidality, and Depressed Affect on Fruit and Vegetable Intake, controlling for Metropolitan Status

Predictor Variable	ΔR^2	*B*	
Black			
Adolescent Dating Violence	.007	.39	**
Depression	.012	.23	***
Suicidality	.008	.24	***
Depressed Affect	.007	.43	***
Hispanic			
Adolescent Dating Violence	.013	.61	***
Depression	.001	.05	
Suicidality	.001	.07	
Depressed Affect	.000	.05	
White			
Adolescent Dating Violence	.004	.29	***
Depression	.000	-.03	
Suicidality	.000	-.04	
Depressed Affect	.000	-.05	

***p ≤ .001. **p ≤ .01.

Table 7. Depression regressed on Adolescent Dating Violence and Sports Team Involvement for White Girls

Predictor Variable	R^2	ΔR^2	ΔF	*B*	
Step 1:	.001	.001	1.30		
Urban				-.04	
Rural				-.08	
Step 2: Adolescent Dating Violence (ADV)	.080	.079	250.66	.91	***
Step 3: Sports Team Involvement (STI)	.090	.011	33.93	-.23	***
Step 4: ADV x STI	.092	.002	4.94	-.24	**

***p ≤ .001. **p ≤ .01.

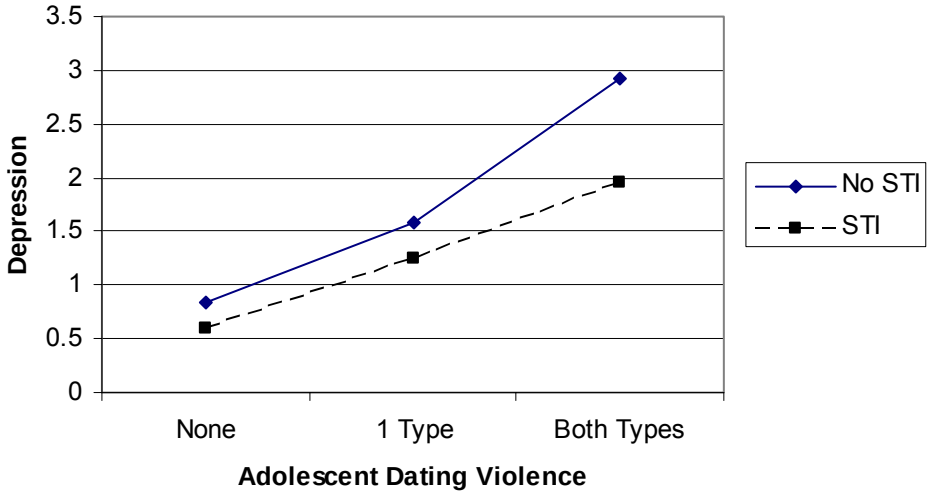

Figure 4. Sports Team Involvement's Moderated Effect on the ADV – Depression Relation for White Girls

Table 8. Direct effects of Adolescent Dating Violence and Sports Team Involvement on Depression Indicator Variables, controlling for Metropolitan Status

	Depression		Suicidality		Depressed Affect	
Predictor Variable	ΔR^2	*B*	ΔR^2	*B*	*OR*	*B*
Black						
Adolescent Dating Violence	.069	0.62***	.058	.45***	2.02	0.70***
Sports Team Involvement	.001	0.07	.000	.04	1.15	0.14
Hispanic						
Adolescent Dating Violence	.133	1.10***	.119	.84***	3.07	1.12***
Sports Team Involvement	.001	0.11	.001	.09	1.07	0.07
White						
Adolescent Dating Violence	.079	0.83***	.064	0.58***	2.94	1.08***
Sports Team Involvement	.011	-0.27***	.008	-0.18***	0.65	-0.43***

***p ≤ .001. **p ≤ .01.

Table 9. Suicidality regressed on Adolescent Dating Violence and Sports Team Involvement for White Girls

Predictor Variable	R^2	ΔR^2	ΔF	B	
Step 1:	.001	.001	0.88		
Urban				-.03	
Rural				-.05	
Step 2: Adolescent Dating Violence (ADV)	.065	.064	201.23	.65	***
Step 3: Sports Team Involvement (STI)	.073	.008	24.10	-.14	***
Step 4: ADV x STI	.075	.002	6.17	-.21	**

***p ≤ .001. **p ≤ .01.

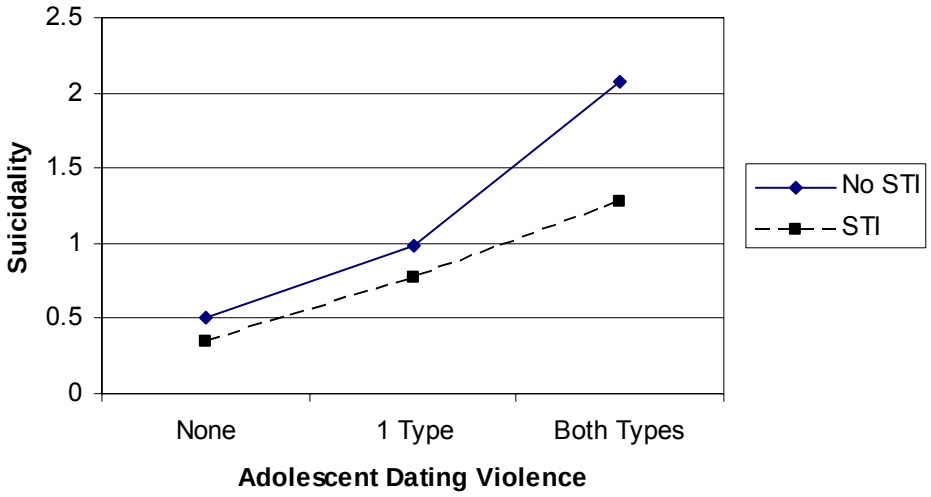

Figure 5. Sports Team Involvement's moderated effect on the ADV – Suicidality Relation for White Girls

Table 10. Summary of Results for Mediating and Moderating Study Hypotheses

Predictor Variable	Black	Hispanic	White
Mediated Effect			
Depression	**Yes**	No	No
Suicidality	No	No	No
Depressed Affect	No	No	No
Moderated Effect			
Depression	No	No	**Yes**
Suicidality	No	No	**Yes**
Depressed Affect	No	No	No

DISCUSSION

This study examined differences in adolescents' reports of dating violence, depression and suicidality, fruit and vegetable intake, and involvement in team sports for three racial and ethnic groups. Further, it examined how these variables are structurally related to place adolescents at risk for, or protect adolescents from, deleterious outcomes such as depression, suicidality, and inadequate fruit and vegetable intake. The rationale for examining these risk and protective factors was that diet and exercise in youth affects the development of lifelong behaviors that place adolescent girls at risk for obesity and other major public health concerns. This study's most important finding is that, for black adolescent girls, experiencing dating violence indirectly affects food consumption via depression. Also, this study demonstrated how participating in team sports serves to protect some adolescent girls from experiencing depression, specifically, white adolescent girls. In effect, this study contributes to the literature a better understanding of the relationship between adolescent dating violence and dietary intake and provides direction in the development of prevention research priorities and intervention strategies.

Depression's Mediating Effect for Black Girls

The effect of dating violence on fruit and vegetable intake was significant for all adolescent girls which supports previous research demonstrating stress' effect on eating (for a review see Greeno & Wing, 1994). Adolescent dating violence has the potential to increase the servings of fruits and vegetables consumed by black, Hispanic, and white adolescent girls by a small percentage (between one-third and one-half a serving of fruits and vegetables per day). Adolescent dating violence also had a significant effect on

depression for all girls, which also supports previous findings in the literature (Ackard & Neumark-Sztainer, 2002; Callahan et al., 2003; Hanson, 2002). However, only black girls' reports of depression were significantly related to an increase in fruit and vegetable intake. For black girls, depression has the potential to increase fruit and vegetable intake by a small, but significant, percentage (approximately one-fourth a serving of fruits and vegetables a day). These findings suggest that black girls victimized by dating violence experience depression which may affect their desire or motivation to eat properly. However, this relationship does not hold for all adolescent girls. It seems that, for Hispanic and white girls, experiencing severe depression does not alter eating behavior; however, experiencing dating violence does. In light of these findings, it is possible that other constructs better explain how adolescent dating violence affects eating in these subgroups. Perhaps anxiety mediates the relation between ADV and eating in Hispanic and/or white adolescent girls rather than depression.

Depression has been linked to both increased food consumption and decreased food consumption (McKenna, 1972; Resznick & Balch, 1977). Rather than focus on detecting overall increases or decreases in food consumption, this study theorized that stress leads individuals away from healthy food choices such as the recommended five or more servings of fruits and vegetables. However, instead of observing a decrease in fruit and vegetable intake theorized to result from a sense of hopelessness and motivation to eat healthily, the data evidenced an increase in fruit and vegetable intake.

The failure to detect a negative relation between ADV and fruit and vegetable intake is both important and surprising. In theorizing that ADV leads girls away from

proper fruit and vegetable intake, this study attempted to add to the literature additional ways to think about the stress-eating relation. However, it appears that this study supports existing research that argues for a positive association between stress and general food consumption. Although this study did not show a negative association between ADV and fruit and vegetable intake, the increased eating associated with stress (ADV) observed in this study may still reflect a learned coping response by which black girls used food to manage depression. In addition, this study adds to the literature an understanding of the effect of a naturally occurring stressor, ADV, on food consumption.

Significant to the mediated effect of depression detected for black girls is the finding that black girls reported less depression and suicidality than Hispanic and white girls, supporting previous findings (O'Donnell, O'Donnell, Wardlaw, & Stueve, 2004). As suggested by others, perhaps the methods by which black, Hispanic, and white girls perceived and expressed symptoms of severe depression, which includes suicidal ideation, plans, and/or attempts, varied based on their culture or ethnicity (Saez-Santiago & Bernal, 2003). Black girls may have reported less depression and suicidality due to the strong religious beliefs held by their cultural group (Neeleman, Wessely, & Lewis, 1998; Stack, 1998). Many contend that "religion may constrain suicide by condemning it as sinful, by promoting high levels of community attachment among congregants, and by fostering attitudes that are antithetical to suicide, including optimism and resiliency" (as cited in O'Donnell et al., 2004, p. 38). Maybe this added cultural stigma associated with severe depression explains the significant impact of depression on food consumption detected only in black girls.

In the present study, black girls reported significantly more physical dating violence than both Hispanic and white girls, which also supports previous research on adolescent dating violence (Raiford, 2004). Researchers studying the prevalence of violence in black communities discuss the issue of "black on black" violence wherein black male youth are most likely the victims of homicide by known associates and black female youth are most likely to be victimized by interpersonal violence inflicted by a boyfriend or spouse (Reese, Vera, & Hasbrouck, 2003, p. 466). However, such observations should be interpreted within the social and historical context in which they emerged. Perhaps the use of violence noted in the present study imitates the violence initially experienced in these communities due to enslavement and a history of marginalization (Reese et al., 2003). Although difficult to assess, the experience of institutionalized racism and oppression such as inadequate educational systems, low-paying jobs, and other barriers to economic mobility may explain the increased victimization reported by black adolescent girls in the present investigation. Such violent victimization can produce feelings of hopelessness and depression which may have affected black girls eating behavior.

Sport Team Involvement as a Risk-Reduction Strategy

In addition to supporting the existing literature that shows victims of ADV report significantly more depression and suicidality than those who have not been victimized, the present study also demonstrated depression and suicidality's negative association with sports team involvement. Physical activity, particularly team sports, is associated with decreases in depression and suicidal ideation (Sabo, Miller, Melnick, Farrell, & Barnes,

2005; Vilhjalmsson & Thorlindsson, 1992; Wild et al., 2004). As hypothesized, this study detected a moderated effect for the relation between adolescent dating violence and depression/suicidality. Specifically, sports team involvement moderated the relation between ADV and depression and ADV and suicidality for white girls. For this group of adolescent girls, participating on a sports team served to protect girls reporting dating violence experiences from experiencing depression and suicidality at the high rate reported by victims not involved on a sports team.

Sport team involvement allows adolescent girls the opportunity to become more socially integrated in peer networks that encourage the development of personal resources – resources that potentially lower the risk for suicide, particularly when attempting to cope with dating violence experiences (DuBois, Felner, Brand, Phillips, & Lease, 1996; E. L. Richman & Shaffer, 2000; Sabo et al., 2005; Weiss, Smith, & Theeboom, 1996). The present study's findings of a negative association between sports team involvement and depression/suicidality, as well as the moderated effect of sports team involvement in the ADV – depression/suicidality relation, supports the theory that team involvement is a potential source of social support and/or opportunity to enhance self-esteem/self-worth.

When generating possible reasons why sports team involvement appears to serve as a protective factor for white adolescent girls, as opposed to black or Hispanic girls, it is important to consider the role of socioeconomic status in female sports activity (Pederson & Seidman, 2004; Santos, Esculcas, & Mota, 2004). According to the National Education Longitudinal Study (as cited in Quinn, 1995), approximately one-third of

adolescents from the lowest SES quartile participated on a team sport compared to the more than 45% of adolescents from the highest SES quartile. Also, although less than 30% of adolescent females participate in organized team sports, ethnic minority adolescents participate at even lower rates than the national average (Kimm, Glynn, Kriska, & Barton, 2002; Quinn, 1995). Less participation in sports leads to a rapid decline in physical activity pursuits, particularly for African American girls who demonstrate a more rapid decline in physical activity when compared to European American girls. For example, at ages 9 and 10, almost all girls report some leisure-time physical activity such as sports; however, by middle adolescence, 56% of African American girls report no physical activity compared to 31% of European American girls (Kimm et al., 2002). Due to limitations in data on SES, the present study used race and metropolitan status as factors indicative of a girl's socioeconomic status. Significantly more white girls reported sports team involvement and residing in suburban areas than did both black and Hispanic girls. Also, among girls reporting both dating violence and sports team involvement, almost half resided in suburban areas, whereas one-third and one-fifth lived in urban or rural areas.

Researchers suggest that the socioeconomic differences detected in sports team involvement are likely explained by several barriers to participation for youth from lower-income families, specifically, ethnic minorities residing in urban cities (Pederson & Seidman, 2004). Barriers to sports team participation in these communities include the lack of opportunities to engage in team sports, inadequate school facilities and resources to support sports activities, and cultural demands to work, care for family members,

and/or lack of transportation to attend sporting events (Elkins, Cohen, Koralewicz, & Taylor, 2004; Quinn, 1995). Another major barrier to lower income, ethnic minority adolescents' participation in sports team activities is the possible lack of parental support and encouragement to participate. In their research on the relationship between adolescents' choices to participate in physical activity and their parents' socioeconomic status, Santos and colleagues (2004) found that, when compared to adolescents from lower SES, adolescents from higher SES chose significantly more organized physical activities like sports clubs than nonorganized activities like walking. Perhaps parents of higher socioeconomic status encourage their children to engage in organized sports more often than parents of lower socioeconomic status (Santos et al., 2004; Zeijl, te Poel, du Bois-Reymond, Ravesloot, & Meulman, 2000).

Lack of parental support and encouragement in lower income, ethnic minority groups may be due to cultural demands considered higher in priority. Inner-city/urban minority families are often times single-female headed households where it may not be a priority to encourage daughters to participate in sports. Other basic needs such as safety, earning a living, and/or caring for siblings and other family members after school may receive more attention than participating on a sports team, which may be considered a leisure activity. Cultural demands that outrank sports involvement might explain why, in their study on physical activities of black and white adolescent girls, Dowda and colleagues (2004) found that ethnic minority girls rated sports team participation lower in importance than white adolescent girls. However, historical failure in the development of

athletic services supporting economically disadvantaged adolescent girls may partially, or wholly, explain the disparities detected in sports team involvement (Quinn, 1995).

In the majority culture, sports team involvement appears to be considered important to adolescent development. In their study on upper middle-class, white/non-Hispanic families, Davison and colleagues (2003) found that both logistic parental support of girls' sports activity (i.e., enrolling and transporting daughter to sports activities) and explicit parental support (i.e., parental modeling of sports behavior) were associated with higher physical activity among 9-year old girls. Perhaps the moderated effect detected in the present study for white girls is due to this groups' acknowledgement of the benefits of participation. Also, those black or Hispanic adolescent girls who reported both dating violence and sports team involvement may have been one of few racial/ethnic minorities on their team(s), considering the low participation rate for minorities. As a result, these ethnic minority girls may not receive needed support due to lack of commonalities or sense of relatedness with non-ethnic minority teammates; hence, the ecological effects of sports team involvement do not occur for these youth.

Implications for Policy, Practice, and Research

This study illuminated several important health disparities between different racial and ethnic groups of adolescent girls. These findings have several implications for policy, practice, and research in the field of violence prevention, and adolescent nutrition and physical activity. In order to identify and prevent health-compromising behaviors such as depression/suicide, inadequate fruit and vegetable intake and physical inactivity in adolescence, it is important to target the developmental, geographic, and sociopolitical

environments in which these behaviors occur. An acknowledgment that these environments are constructed by race/ethnicity and social class is the first step in developing effective preventive interventions, policy, and research.

Dating Violence Prevention. Developing interventions to prevent dating violence in adolescence can occur simultaneously with the development of interventions on dealing effectively with depression, increasing physical activity and involvement in sports, and establishing a healthy diet. Due to the occurrence of dating violence between school-aged adolescents, schools should assess the need for a dating violence prevention curriculum and/or programming for both male and female students. According to previous literature (Molidor & Tolman, 1998; Sousa, 1999), schools appear to be a common setting in which adolescents engage in violent behaviors, between both peers and dating partners, and therefore, should assume some responsibility in assisting students to end and prevent violent behaviors such as dating violence.

Primary prevention interventions such as Wolfe et al.'s (1996) youth relationships group approach is recommended for schools and other institutions where adolescents engage. In the present study, black girls reported significantly more physical dating violence victimization than both white and Hispanic girls, which supports previous research findings (Raiford, 2004). Perhaps cultural support groups for African American boys and girls can assist in intervening to prevent dating violence. Local churches and historically black fraternity- and sorority-sponsored youth groups are also excellent settings for encouraging black adolescent boys and girls to learn about alternatives to violence, how to solve problems in a nonviolent way, and best practices for ending

violence in their relationships. Regardless of race and ethnicity, traditional youth groups organized by schools, churches, and community agencies are ideal settings to teach youth how to develop healthy, and avoid/end abusive, peer and dating relationships.

Researchers and practitioners should take advantage of the adolescent stage of identity development and this period of attitude formation, particularly the formation of attitudes and beliefs concerning interpersonal relationships. Conducting qualitative research on dating violence would add value in understanding the context of violence in adolescent dating relationships. Adolescents may be able to benefit from dialogue about what it means to be in a romantic relationship, methods youth employ to understand and make sense of the violence they experience, how past and potential violence affects their response to violent situations, and how these strategic responses ultimately affect their attitudes, beliefs, and self-perceptions of interpersonal violence. Prevention interventions should also target attitudes and expectations held by adolescent boys and girls regarding gender roles and gender role stereotypes.

Depression and Suicide Prevention: Promoting Healthy Diet and Exercise. The present study uncovered some possible responses to violence reported by adolescent girls, namely, increased food consumption and depression with or without suicidal ideation, plans and/or attempts. Historically, black and Hispanic adolescents were considered "immune" to suicide as such behavior was culturally associated with considerable stigma in these racial/ethnic groups (U.S. Department of Health and Human Services, 1999). However, depression and suicide in these groups of adolescents is on the rise and more attention is needed to understand and prevent suicide among all youth (CDC, 1998,

2000). Important to prevention and treatment of depression and suicidality is the acknowledgement that, in racial and ethnic communities, teens are most likely to seek help from church, friends, or family members than from professional sources such as crisis centers or psychiatrists (McMiller & Weisz, 1996). Hence, suicide prevention efforts targeting these individuals must include training clergy on how to effectively deal with depressed and/or suicidal youth, screening for depression and suicidality in youth presenting at local hospitals with physical and/or sexual violence symptoms, and educating communities on the effects of dating violence, the warning signs of depression/suicide, and how to seek professional help.

Prevention efforts targeting adolescent girls should include educating adolescent girls on how to effectively deal with dating violence experiences and resulting depression. Girls need to be educated and encouraged to avoid turning to food to self-soothe or cope in times of stress or depression. Prevention initiatives should include identifying and developing social networks that teens can access including formal (i.e., parents, teachers, and counselors) and informal (i.e., peers, siblings) help seeking. Since teens will tend to seek informal help first when dealing with relationship concerns, encouraging involvement in activities that increase youth interaction with prosocial peers is important. Initiatives targeting adolescent girls' engagement in team sports are one way to increase girls' social support networks.

Encouraging youth to participate in team sports and other physical activity pursuits will also provide adolescent girls with the benefits of exercise. Specifically, interventions should focus on increasing adolescent girls' participation in physical

activity and sports in order to increase their self-esteem and self-worth in addition to increasing their bodies' production of mood elevators that serve to decrease depressive symptoms (Erkut & Tracy, 2002; Jacobs, 1994; Salmon, 2001). Interventions should also include targeting peer pressure experienced by adolescent girls to conform to more traditional gender role stereotypes that discourage sports team participation (Pederson & Seidman, 2004).

Previous research shows that adolescent girls decrease their level of physical activity as they enter adolescence (Pederson & Seidman, 2004; Santos et al., 2004). In addition, girls participate in sports far less than boys and, when compared to whites, ethnic minority girls, particularly those residing in urban cities, participate in sports and other physical activities at an even lower rate (CDC, 2002; Kimm et al., 2002). Coupled with black girls' low reports of fruit and vegetable intake, as demonstrated in this study and others, the low rate of physical activity for black adolescent girls contributes to the disproportionately high rates of overweight and obesity observed in this subgroup of adolescents (Dowda et al., 2004). As observed in the present study, depression is one mechanism by which the stress of adolescent dating violence affects food consumption in black girls, which has direct implications for intervening to prevent obesity and obesity-related outcomes.

Future research on adolescent motivation to participate in team sports should employ qualitative methods to explore ethnic minority adolescent girls' beliefs about sports team participation and perceived benefits of being a part of a team. Qualitative

research on British, predominantly white, adolescent boys and girls found the following motivational incentives for youth sports team participation:

1. receiving encouragement and praise from peers to improve;
2. having opportunities to provide feedback to peers;
3. receiving equal treatment by making everyone feel important and valued, considering each others opinion, finding positive things to say to each other and talking to each other;
4. receiving support through relatedness (i.e., support and look out for teammates, being honest with, trusting, and depending on teammates);
5. feeling a part of a unit/of a whole; and
6. creating a friendly and cooperative atmosphere among teammates (Vazou, Ntoumanis, & Duda, 2005, p. 505)

All of these qualities could serve to assist ethnic minority youth in accomplishing important developmental tasks such as cognitive and emotional growth and development. Researchers note that youth who identify with their peers are "more inclined to ask other people, peers as well as friends, parents, and other adults, for support, to accept their offers of support, and to talk about their problems than low-identifiers" (Pombeni, Kirchler, & Palmonari, 1990, p. 366). In summary, increasing attachment to peer groups prevents or lessens the alienation experienced in adolescence.

It is also important to go beyond comparing adolescents reporting stressful life events and sports team involvement with those reporting only stressful life events. Future research should explore the link between perceived social support received from being a

member of a team and the decrease in depression and suicidality reported by those involved in team sports. Future research should also include assessing factors related to the steady decrease in physical activity among adolescent girls in general, as well as among ethnic minority girls and girls from lower socioeconomic backgrounds (Santos et al., 2004).

In addition to directly encouraging adolescent girls to participate on sports teams, policy makers and school officials must intervene to improve the conditions and opportunities to participate in athletic activities, particularly for ethnic minority girls. Title IX legislation passed in 1972 has demonstrated some success in its efforts to ensure equal access to athletics for both boys and girls (Pederson & Seidman, 2004). However, more attention is needed to evaluate efforts taken to ensure equal access to athletics for ethnic minority girls, especially in more socioeconomically disadvantaged locations. Environmental barriers to overcome include inadequate school facilities and sports programs offered and lack of transportation to attend sport-related activities. It is imperative that interventions developed to increase sports team participation for ethnic minority adolescent girls consider the "culture-associated differences in the motivation to participate in physical activities and sports" (Yan & McCullagh, 2004, p. 378). Whether sports team activities occur as school-based initiatives or community-based programming, these organized physical activities should reflect preferences in sports reported by black, Hispanic, and other racial/ethnic groups of adolescent girls to increase motivation to participate (Dowda et al., 2004).

Finally, parents must encourage their daughters to value, appreciate, and most of all, participate in team sports. The civil rights movement brought about needed change in the attitudes fostered by society and individual families about female participation in sports (Lopiano, 2004). Prior to this era, parents, school personnel, communities, and the media perpetuated the social myth that the world of athletics was a strictly masculine domain (Lopiano, 2004). Although girls are no longer being systematically discouraged from participating in sports as they were in the past, they are still not encouraged, to the same degree as boys, to engage in sports activities. Mothers and fathers of all socioeconomic backgrounds must deliver positive messages to their sons and daughters that female sport is important. One author of an article on gender equity in sports suggests that, as parents, when celebrating Christmas and birthdays,

> "[We] find books about girls in sports, give gifts of sports equipment and sports lessons. Take our sons and daughters to see women playing sports so they grow up appreciating and respecting the sports skills of women and so our daughters see images of themselves excelling in sports. Mom must be a role model for her children" (Lopiano, 2004, p. 28).

Strengths and Limitations

There were several strengths as well as limitations of the present study. Major strengths include operationalizing adolescent dating violence as a specific, naturally occurring stressor, the assessment of fruit and vegetable intake as opposed to commonly assessed food items like fatty foods and carbohydrates, and the use of a nationally representative sample. Previous studies on the effects of stress on dietary intake have

generally not studied stress in a specific context. For example, previous research has manipulated and observed laboratory-induced stress conditions (Cartwright et al., 2003; Willenbring et al., 1986). The present study, however, examined whether this established stress-eating relation is consistent in a different, meaningful context – experiences of physical and sexual dating violence. Also, when examining the stress-eating relation, the literature has predominantly focused on unhealthy food choices such as fatty foods. The present study attempted to examine this stress-eating relation with a specific, contextual stressor and its effect on an understudied food class in the stress-eating literature, fruit and vegetable intake. Finally, the nationally representative sample used in this study allows for the generalizability of research findings for black, Hispanic, and white high school-aged adolescents from varying metropolitan areas across the United States.

The quality of data used in this study was rated as high based on previous and current reliability tests, response rates, the level of nonresponse to questions[1], standardized survey administrations, and research on active vs. passive parental consent. Items used in this study produced moderate to high reliability estimates (Cronbach's α ranged from .76 to .79), which reflects previous reliability estimates reported in the literature on this national survey (Brener et al., 2002). The survey used in this study also obtained a relatively high student (83%) and school (81%) response rate. The nonresponse rate for two-thirds of all survey items was less than 5%, and for 11% of all survey items, the nonresponse rate was 1% or less. Also, all surveys were administered using a standardized procedure to ensure consistency in data quality. However, one

[1]nonresponse to questions include blank responses, invalid responses, out-of-range responses, and responses that do not meet edit criteria.

inconsistency in the survey administration procedures was the use of active or passive parental consent in differing localities. However, based on research conducted by the CDC, data quality should not be affected due to differing consent procedures (see, Eaton, Lowry, Brener, Grunbaum, & Kann, in press). In their study, CDC established that with high student response rates, type of parental permission does not affect reported prevalence rates of adolescent behavior. Given the present study's high response rates, variations in parental permission should not have significantly affected this study's findings. If the effects observed in the present study were affected by parental consent type, this would most likely indicate a selection bias, in which those students most likely to report unhealthy behaviors like dating violence or depression are also the students most likely to not return active consent forms allowing them to participate. Therefore, it is possible that there was an underreporting of health-compromising behaviors (e.g., ADV, depression, low fruit and vegetable intake). However, for those effects deemed significant, the underreporting of such behaviors should serve to protect against type I error in that the probability of detecting an effect when in fact there was none was reduced.

Some limitations of this study related to methodology include the use of a nonexperimental, cross-sectional design, varying time frames for dating violence experiences and fruit and vegetable intake, and self report data. In studying the effect of stress on eating, observing an individual's eating behavior while under stress is ideal and recommended (Cartwright et al., 2003). However, in the present study, it was unethical and methodologically implausible to create a stressful condition such as a dating violence

experience with the intent to observe adolescent girls' eating behavior. The present study was also limited because the time frames used for assessing an individual's fruit and vegetable intake and their experience of dating violence were different. In this study, participants were asked to report, retrospectively, any lifetime physical or sexual dating violence victimization while also reporting, in a shorter time frame, how often they consumed specific fruits and vegetables in the past 7 days. Hence, it is possible that the use of varying time frames for assessing fruit and vegetable intake and dating violence minimized the association observed between adolescent dating violence and fruit and vegetable intake, thereby increasing the likelihood of a Type II error.

As with many studies, the use of self-report data in the present study may have limited the effects detected in the study hypotheses. As it is with all self-report data, the degree to which students under- or overreported participation in certain behaviors cannot be assessed. CDC conducted a literature review of potential factors affecting the validity of adolescent self-reporting of behaviors assessed with the YRBS. In their review, CDC concluded that students completing the YRBS in a school setting were more likely to report sensitive behaviors when compared to students completing the survey within the student's home (Grfroerer, Wright, & Kopstein, 1997; Kann, Brener, Warren, Collins, & Giovino, 2002; Rootman & Smart, 1985). Therefore, although it was not possible to detect the degree to which students under- or overreported behaviors, all students did complete the survey at school, as opposed to at home where sensitive data is least likely to be reported. Also, due to the cross-sectional study design, this study is limited in its ability to infer causality among the study variables. However, the associations detected in

this study provides a rationale for future longitudinal research on the effects of dating violence on food consumption, depression, suicide risk, and sports team involvement in adolescent girls.

Some limitations of this study related to the measurement of study variables includes the lack of variety in taste class of food items presented to participants and the lack of questions on less severe indicators of depression. Previous studies assessing the degree to which fruit and vegetable intake (a healthy diet) decreases in times of stress have generally used varying taste classes of food as a means of providing options to participants (Cartwright et al., 2003; Grunberg & Straub, 1992). For example, in Cartwright and colleagues' (2003) study, children were asked how often they eat several types of food items (e.g., potato chips, sweets/chocolates, hamburgers, fruits, and vegetables). In the present study, adolescent girls were only asked to indicate how often they consumed fruits and vegetables (healthy foods) as opposed to also inquiring about unhealthy, or fatty foods (e.g., potato chips, fries, pudding). Therefore, the present study is limited in it's ability to predict whether adolescent victims of dating violence actually consumed more fatty foods as opposed to healthier items like fruits and vegetables, or whether general food consumption increased as a result of stress. Perhaps this limitation in the selection of taste class explains the positive association detected between dating violence and fruit and vegetable intake found in the present study.

Finally, it is important to note that the items used to measure depression may have been culturally inappropriate for some groups of adolescent girls as different racial and ethnic groups perceive and express symptoms of depression in different ways (Saez-

Santiago & Bernal, 2003). The items assessing depression most likely captured those individuals experiencing severe depression, hence, this variable may have failed to detect sufficient variability in depression resulting in the inability to detect an effect when in fact there was one. However, in the present study, effects for depression in black and white girls were found to be significant; therefore use of such extreme indicators of depression may have served to mitigate against type I error in some analyses.

Conclusion

The findings presented here provide evidence that depression explains how experiences of dating violence affect eating behavior for a high-risk group, black adolescent girls. Recognizing depression's contribution to this group's high rate of obesity and overweight is an important step in preventing obesity and obesity-related outcomes in this population. Also, this study highlights an important source of social support, sports team involvement, and its potential to protect dating violence victims from experiencing depression and suicidal ideation, plans, and attempts. In light of the protective effects found for white girls, these findings command attention to how researchers and practitioners can increase these effects in other, racial and ethnic groups. Recognizing the potential of sports team involvement to protect against depression and suicidality in black adolescent girls highlights its additional potential to subsequently reduce and/or prevent unhealthy eating in this group. Attention to these findings is likely to result in enhanced prevention and intervention with adolescent girls regarding dating violence, depression/suicidality, diet, and exercise.

Appendix A

Measure of Depression, Suicidality, & Depressed Affect

1. During the past 12 months, did you ever feel so sad or hopeless almost every day for two weeks or more in a row that you stopped doing some usual activities?

   1 No
   2 Yes

2. During the past 12 months, did you ever seriously consider attempting suicide?

   1 No
   2 Yes

3. During the past 12 months, did you make a plan about how you would attempt suicide?

   1 No
   2 Yes

4. During the past 12 months, how many times did you actually attempt suicide?

   1 0 times
   2 1 time
   3 2 or 3 times
   4 4 or 5 times
   5 6 or more times

5. If you attempted suicide during the past 12 months, did any attempt result in an injury, poisoning, or overdose that had to be treated by a doctor or nurse?

   1 I did not attempt suicide during the past 12 months
   2 Yes
   3 No

Appendix B

Measure of Dietary Intake

1. During the past 7 days, how many times did you eat fruit? (Do **not** count fruit juice.)

    1 I did not eat fruit during the past 7 days
    2 1 to 3 times during the past 7 days
    3 4 to 5 times during the past 7 days
    4 1 time per day
    5 2 times per day
    6 3 times per day
    7 4 or more times per day

2. During the past 7 days, how many times did you eat green salad?

    1 I did not eat green salad during the past 7 days
    2 1 to 3 times during the past 7 days
    3 4 to 5 times during the past 7 days
    4 1 time per day
    5 2 times per day
    6 3 times per day
    7 4 or more times per day

3. During the past 7 days, how many times did you eat potatoes? (Do **not** count french fries, fried potatoes, or potato chips.)

    1 I did not eat potatoes during the past 7 days
    2 1 to 3 times during the past 7 days
    3 4 to 5 times during the past 7 days
    4 1 time per day
    5 2 times per day
    6 3 times per day
    7 4 or more times per day

4. During the past 7 days, how many times did you eat carrots?

    1 I did not eat carrots during the past 7 days
    2 1 to 3 times during the past 7 days
    3 4 to 5 times during the past 7 days
    4 1 time per day
    5 2 times per day
    6 3 times per day
    7 4 or more times per day

5. During the past 7 days, how many times did you eat other vegetables? (Do **not** count green salad, potatoes, or carrots.)

    1 I did not eat other vegetables during the past 7 days
    2 1 to 3 times during the past 7 days
    3 4 to 5 times during the past 7 days
    4 1 time per day
    5 2 times per day
    6 3 times per day
    7 4 or more times per day

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