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Violence from parents in childhood and obesity in adulthood: Using food in response to stress as a mediator of risk

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ABSTRACT

Guided by a life course perspective and concepts from models of stress and coping, this study tested the extent to which self-reported profiles of physical and psychological violence in childhood from parents were associated with greater odds of obesity in adulthood. This study also examined the extent to which adults' greater use of food in response to stress served as a mediator of potential associations of risk. Multivariate regression models were estimated using data from 1650 respondents in the 1995–2005 National Survey of Midlife in the U.S. (MIDUS). Results indicated that respondents who reported having experienced both psychological and physical violence from parents—with at least one type of violence having reportedly occurred frequently—were more likely to be classified as obese in contrast to respondents who reported never having experienced either type of violence from parents. Evidence from a sequence of models that tested mediation effects indicated that greater use of food in response to stress among respondents with problematic histories of violence explained, in part, their higher risk of adult obesity. Findings contribute to the growing body of evidence regarding psychosocial predictors of obesity, as well as the physical health consequences of childhood family violence. Results further suggest the importance of addressing particular aspects of life course social relationships—such as violence in childhood from parents—and their implications for psycho-behavioral uses of food within efforts to reduce rates of adult obesity.

A growing body of evidence suggests that obesity can pose problems for both individuals (e.g., Al Snih et al., 2007; Carr & Friedman, 2005) and society as a whole (e.g., Finkelstein, Fiebelkorn, & Wang, 2004; Østbye, Dement, & Krause, 2007). Given the costs associated with obesity—in combination with the growing proportion of obese individuals in the U.S. (Flegal, Carroll, Ogden, & Johnson, 2002) and worldwide (WHO, 2000)—scholars have directed increasing attention to understanding causes of obesity so as to better inform efforts to halt rising rates and to intervene with individuals who already are classified as obese. Although much scholarship on causes of adult obesity has focused on health behaviors—such as diet and exercise (Keith et al., 2006)—emerging evidence indicates that other factors contribute to individuals' heightened risk for obesity, including genetic characteristics (Herbert et al., 2006), community context (Boehmer, 2007), interpersonal relationships (Christakis & Fowler, 2007), and individuals' positions within macro-social systems of stratification (Wang & Beydoun, 2007).

Guided by an integrated life course and stress-and-coping perspective, the aim of this study was to examine one dimension of parent–child relationships–violence from parents–as an early life course risk factor for adult obesity. Given that child protective services agencies continue to investigate cases of maltreatment involving millions of children each year (U.S. Department of Health and Human Services, 2006), research on the long-term health consequences of this particular type of childhood adversity is important from a population-health perspective. In addition to exploring childhood family violence as a risk factor for adult obesity, we also examined greater use of food in response to stress as a mediator of potential associations of risk (i.e., as a factor that contributes to causal processes through which violence in childhood from parents might lead to adult obesity).

Theoretical background

Concepts from the life course perspective, as well as from stress-and-coping models, provide a strong foundation for positing that childhood family violence heightens individuals' risk for adult obesity. The life course perspective provides a contextual, dynamic, and heterogeneity-based approach to studying continuity and

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change across people's lives (Elder, Johnson, & Crosnoe, 2003). The perspective has particular utility in orienting attention to how individuals' past experiences in multiple life domains cumulatively and interactively influence future outcomes through complex life histories and trajectories (Settersten, 2003).

Concepts from stress- and coping-perspectives direct attention to childhood family violence as a particular condition that can place individuals on life course trajectories leading to greater risk of adult obesity. Previous studies documenting the negative developmental consequences of family violence on children (for a review, see English, 1998) suggest that violence can operate as a stressor, or condition of "threat, demand, or structural constraint that, by the very fact of (its) occurrence or existence, call(s) into question the operating integrity of the organism" (Wheaton, 1996, p. 32). The concept of coping, which refers to ways in which individuals attempt to avoid and manage stressors (Pearlin, 1999), orients attention to how individuals with histories of family violence might have developed particular patterns of behavior that originated, in part, from their attempts to manage the stress of childhood family violence. Scholars have suggested that when individuals are faced with stressors that are perceived to be difficult to control, such as violence in childhood from parents, they are more likely to use emotion-focused coping (Zeidner & Saklofske, 1996). Emotion-focused coping aims to reduce individuals' feelings of distress resulting from a stressor, which differs from problem-focused coping strategies that seek to eliminate the stressor itself (Lazarus & Folkman, 1984).

One type of emotion-focused coping is individuals' use of food to self-soothe and manage negative emotions (Lehman & Rodin, 1989). Scholars have posited that linkages between stress, emotion, and fat accumulation involve behavioral, neurological, and endocrinological processes that operate in the context of other external-environmental and internal-genetic conditions (Volkow & Wise, 2005). Adam and Epel (2007), for example, have proposed ways in which chronic stress can lead to changes in the functioning of individuals' hypothalamic–pituitary–adrenal (HPA) axis. Changes in the HPA axis that expose individuals to increased levels of cortisol and insulin can lead to the dysregulation of appetite and visceral fat distribution.

Integrating these areas of theorizing suggests that experiences of violence in childhood—as a significant type of stress that is likely to elicit emotion-focused coping strategies—can place individuals on trajectories of using food in response to stress. This greater use of food among individuals with histories of violence might account for their heightened risk of obesity in adulthood.

Empirical background

With some exceptions, evidence for linkages between childhood family violence and adult obesity has been generated largely by studies drawing on clinical and nonprobability community samples and focusing primarily on sexual abuse (e.g., Mamun et al., 2007; Noll, Zeller, Trickett, & Putnam, 2007). Williamson, Thompson, Anda, Dietz, and Felitti (2002) used data from a large epidemiological sample to examine associations between both sexual and non-sexual types of violence and adult weight. Based on data from members of the Kaiser Permanente Health Maintenance Organization in San Diego, California, and controlling for sociodemographic factors and respondents' health behaviors, results indicated that respondents who reported histories of sexual abuse, psychological abuse, fear of physical abuse, and/or physical abuse in childhood weighed more on average than respondents who did not report that type of abuse. Respondents who reported being often verbally or physically abused demonstrated the highest risk for severe obesity in adulthood, and respondents' risk of obesity increased with the reported number of types of abuse experienced at high levels of frequency. Also using data from respondents in California, Alvarez, Pavao, Baumrind, and Kimerling (2007) demonstrated that among a random sample of women, reports of physical or sexual abuse in childhood were associated with greater risk of obesity, net of fruit and vegetable consumption, physical activity, and perceived stress. Similarly, Thomas, Hypponen, & Power (2008) used data from a 1958 British birth cohort and found that reports of verbal and/or physical abuse in childhood were associated with midlife obesity, even after statistically controlling for respondents' socioeconomic position and health behaviors (such as diet and exercise) earlier in adulthood.

As with the majority of studies regarding linkages between childhood family violence and adult obesity, investigations of associations between childhood family violence and problematic patterns of eating mostly have used data from clinical and regional community samples and largely have focused on sexual abuse (see Smolak & Murnen, 2002, for a review). Evidence from studies regarding linkages between non-sexual types of childhood family violence and problematic patterns of eating has been mixed. For example, using data from a regional study that recruited volunteer participants who thought they had an eating disorder or weight problem, Allison, Grilo, Masheb, and Stunkard (2007) found that reports of emotional—but not physical—abuse in childhood were higher among participants with binge-eating disorders and night-time eating disorders than among participants in an obese control group.

Despite these emerging findings of associations among childhood family violence, problematic patterns of eating, and adult obesity, the overall dearth of work in these areas, as well as conceptual and methodological limitations that characterize previous studies, indicate the importance of further investigation. In addition to most studies' exclusive focus on sexual violence, studies that have considered non-sexual types of violence rarely have examined the extent to which specific profiles of violence in childhood from parents—such as profiles distinguished by the reported number of types and frequency of violence experienced—are similarly associated with adult obesity. Given that *violence* is a broad term encompassing a range of behavioral phenomena (Besharov, 1990), advancing understanding of the long-term health effects of childhood family violence requires explicit attention to the heterogeneity of experiences among individuals with histories of violence. Also, although scholars have called for the examination of disordered eating as a mediator of linkages between childhood abuse and adult obesity (Gustafson & Sarwer, 2004), no studies to our knowledge have tested this potential process of risk. Finally, much of the previous evidence on linkages between childhood family violence and adult obesity has been generated by studies using data from clinical and nonprobability regional samples. While data from clinical samples are useful for understanding subgroups of individuals who are especially likely to receive specialized services (such as through a gastroenterological clinic), expanded population work in this area is necessary to examine the implications of childhood family violence for eating and obesity within a broader population of adults. Population studies make it more possible to adjust for potential confounding sociodemographic factors and to evaluate contrasts with adults who have not experienced childhood family violence.

Hypotheses

Building from previous theory and empirical findings in this area, we posited and tested the following hypotheses:

Hypothesis 1 (H1). Reports of having experienced some degree of physical and/or psychological violence in childhood from parents

(in contrast to reports of never having experienced physical or psychological violence) will be associated with higher odds of obesity in adulthood.

Hypothesis 2 (H2). Reports of having experienced some degree of physical and/or psychological violence in childhood from parents (in contrast to reports of never having experienced physical or psychological violence) will be associated with greater use of food in response to stress in adulthood.

Hypothesis 3 (H3). Greater use of food in response to stress in adulthood among individuals who experienced violence from parents will help to explain, or mediate, problematic associations between reports of some degree of physical and/or psychological violence in childhood from parents and higher odds of adult obesity.

Method

Data

This study used data from two waves of the 1995–2005 National Survey of Midlife in the U.S. (MIDUS). Specifically, we used data from respondents who comprise the national probability, random-digit-dial sample of noninstitutionalized, English-speaking adults residing in the conterminous United States and between the ages of 25 and 74 in 1995 (Time 1 [T1]). At T1, respondents were asked to complete both a telephone survey and self-administered questionnaire. In 2004–2005 (Time 2 [T2]), respondents were asked to complete a follow-up telephone interview and self-administered questionnaire. A total of 3024 individuals in the MIDUS national probability sample responded to both the telephone survey and self-administered questionnaire at T1 (60.8% response rate), and 1801 respondents completed both the telephone survey and self-administered questionnaire at T2 (approximately 64% of the respondents who participated in both the telephone survey and self-administered questionnaire at T1 who had not been confirmed deceased as of December 2005).

To account for the fact that non-respondents to the MIDUS tended to have lower levels of education and income and to be from non-majority racial/ethnic groups, as well as the fact that the survey design at T1 involved oversampling older adults and men, sampling weights that correct for selection probabilities and non-response were created that allow this sample to match the composition of the U.S. population on age, sex, race/ethnicity, and education in 2005. Multivariate regression analyses were conducted with both the weighted and unweighted data. Because results based on the weighted data were similar to those based on the unweighted data, estimates from analyses with the unweighted data are reported because these analyses provide estimates with more reliable standard errors (Winship & Radbill, 1994).

Measures

Obesity

This study's measure of obesity was based on respondents' self-reported weight and height in the T2 self-administered questionnaire. A multi-categorical variable indicating different body mass index (BMI) statuses was created based on guidelines from the National Center for Health Statistics (http://www.cdc.gov/nccdphp/dnpa/obesity/defining.htm). This variable included the categories of underweight (BMI < 18.5), healthy weight ($18.5 \geq$ BMI > 25), overweight ($25 \geq$ BMI > 30) and obese (BMI ≥ 30). Because very few respondents were classified as underweight ($n = 16$), these respondents were excluded from analyses. A dichotomous variable was created indicating whether respondents were classified as *obese* (coded 1) or *healthy weight or overweight* (coded 0). For a subgroup of respondents who also participated in a biomedical study ($n = 887$), the correlation between this self-reported measure of BMI and a measure of BMI assessed by clinical personnel was .93. Table 1 displays descriptive statistics for this and all other variables.

Profiles of violence in childhood from parents

As with most research on the long-term consequences of childhood family violence (Widom, Raphael, & DuMont, 2004), this

Table 1
Descriptives for analytic variables.

	Mean[a] (S.D.)	Range
Body mass index (BMI) classification[b]		
Healthy weight or overweight ($18.5 \leq$ BMI < 30)	.71 (.45)	0.00–1.00
Obese (BMI ≥ 30)	.29 (.45)	0.00–1.00
Use of food in response to stress[c]	1.89 (.94)	1.00–4.00
Profiles of physical and psychological violence in childhood from parents[c,d]		
Neither type (physical or psychological)	.25 (.43)	0.00–1.00
Rarely one type and never the other type	.18 (.38)	0.00–1.00
Frequently one type and never the other type	.06 (.24)	0.00–1.00
Rarely both types	.16 (.37)	0.00–1.00
Frequently one type and rarely the other type	.12 (.33)	0.00–1.00
Frequently both types	.22 (.42)	0.00–1.00
Gender[b]		
Female	.54 (.50)	0.00–1.00
Male	.46 (.49)	0.00–1.00
Age[b]	56.58 (12.47)	33.00–84.00
Parents' education[c]		
<12 years	.21 (.41)	0.00–1.00
12 years	.32 (.47)	0.00–1.00
12+ years	.34 (.47)	0.00–1.00
Missing	.13 (.34)	0.00–1.00
Biological parents together in childhood[c]	.78 (.41)	0.00–1.00
Receipt of welfare in childhood[c]		
Yes	.05 (.22)	0.00–1.00
No	.94 (.23)	0.00–1.00
Missing	.01 (.08)	0.00–1.00
Lifetime history of sexual assault[b]		
Yes	.10 (.30)	0.00–1.00
No	.59 (.49)	0.00–1.00
Missing	.31 (.46)	0.00–1.00
Race/Ethnicity[b,d]		
White	.85 (.36)	0.00–1.00
Black	.05 (.23)	0.00–1.00
Latino	.03 (.18)	0.00–1.00
Other race/ethnicity	.06 (.24)	0.00–1.00
Respondents' education[b]		
<12 years	.07 (.25)	0.00–1.00
12 years	.27 (.44)	0.00–1.00
13–15 years	.28 (.45)	0.00–1.00
16+ years	.38 (.49)	0.00–1.00
Household income (in $10,000 units)[b]	4.25 (3.11)	0.00–25.17
Current marital status[b]		
Married	.68 (.47)	0.00–1.00
Divorced/separated	.17 (.37)	0.00–1.00
Widowed	.08 (.28)	0.00–1.00
Never married	.07 (.26)	0.00–1.00

Note: Data are from a subsample of main respondents in the 1995–2005 National Survey of Midlife in the U.S. (MIDUS); analytic sample included respondents who participated in a telephone interview and self-administered questionnaire in 1995 and 2005, who reported body mass indexes ≥ 18.5, and who indicated that questions about violence in childhood from parents were applicable ($n = 1650$).

[a] Dichotomous variables are reported as proportions.
[b] Measured at T2 of the survey.
[c] Measured at T1 of the survey.
[d] Proportions do not sum to zero because of rounding error.

study used participants' retrospective reports to assess histories of violence. In the self-administered questionnaire at T1 only, respondents were presented with a series of items from a modified version of the Conflict Tactics Scales (CTS; Straus, 1979). The CTS—which includes multiple subscales to measure different types of violence—is among the most commonly used measuring tools in the field of family violence (Straus, Hamby, Finklehor, Moore, & Runyan, 1998). Respondents were introduced to the series of items on childhood family violence as "three lists of things that happen to some children." One list referred to acts of psychological violence, including "insulted you or swore at you; sulked or refused to talk to you; stomped out of the room; did or said something to spite you; threatened to hit you; smashed or kicked something in anger." Two lists referred to acts of physical violence, with one including "pushed, grabbed, or shoved you; slapped you; threw something at you" and the other including "kicked, bit, or hit you with a fist; hit or tried to hit you with something; beat you up; choked you; burned or scalded you."

Participants indicated the extent to which their "mother, or the woman who raised them," and their "father, or the man who raised them" engaged in any of the acts on each list by selecting among five response options—*never*, *rarely*, *sometimes*, *often*, and *does not apply*. The 27 respondents who reported that no lists of violence applied to either of their parents were excluded from the analyses to maintain a more precise contrast between respondents who were in a position to experience violence from parents, but who did not, and respondents who did experience violence from parents. Otherwise, responses of *does not apply* to particular items were coded as *never* if the respondent provided a valid response to at least one other item regarding a particular type of violence from parents.

Scores across the six items (one referring to each of the three lists of violence with respect to one of two parents) were used to code respondents into one of six distinct profiles of violence in childhood from parents. Given concerns over the discriminant validity between acts on the two lists of physical violence (Straus et al., 1998), respondents' highest of the frequency scores with respect to each of the two lists of physical violence from mothers and fathers was used to indicate the overall reported frequency of physical violence from parents. Also, to simplify categories of frequency at which violence reportedly occurred and to preserve cell sizes, while still maintaining distinctions between respondents who reported no violence versus occasional violence, as well as between respondents who reported occasional violence versus frequent violence, reports of *sometimes* and *often* were combined into a single frequency category of violence, which we hereafter refer to as *frequently*.

Thus, the final categorization scheme included six profiles of violence in childhood from parents: (1) never physical and never psychological violence, (2) rarely one type of violence and never the other, (3) frequently one type of violence and never the other, (4) rarely both types of violence, (5) rarely one type of violence and frequently the other, and (6) frequently both types of violence. Table 1 includes the proportion of respondents belonging to each of the profiles of violence. One-quarter of the sample reported never having experienced psychological or physical violence from parents, but an almost equal proportion of respondents (22%) reported having experienced the most severe profile of violence (i.e., frequently both types of violence).

Use of food in response to stress

In the self-administered questionnaire at T2, respondents were asked to indicate the extent to which a series of phrases described how they "usually experience a stressful event" (1 = *a lot*; 4 = *not at all*). Two items—new to the 2005 MIDUS—included "I eat more of my favorite foods to make myself feel better" and "I eat more than I usually do." Responses to the two items were reverse coded and averaged such that higher scores indicated greater use of food in response to stress. The correlation between the two items was .83.

Control variables

Given findings from previous studies indicating that a variety of sociodemographic factors are associated both with violence against children (e.g., Belsky, 1980; Berger, 2005), and adult obesity (e.g., Wang & Beydoun, 2007), this study included measures of several additional variables as covariates in all models. At T1, various aspects of respondents' childhood family background characteristics were assessed, including whether respondents reported living with both of their biological parents until the age of 16, whether respondents reported a period of 6 months or more when their family was on welfare or Aid to Families with Dependent Children (AFDC) during their childhood and adolescence (yes, no, or missing data on receipt of welfare in childhood), and respondents' reports of their parents' highest level of educational attainment (less than 12 years, 12 years, more than 12 years, or missing data on parents' education). A multi-categorical variable based on an item included only at the second wave of data collection in 2005 was used to assess respondents' history of sexual assault (self-reported history of sexual assault, no self-reported history of sexual assault, or missing data on history of sexual assault). Other control variables included T2 measures of respondents' educational attainment (less than 12 years, 12 years, 13–15 years, or 16 or more years), household income adjusted for household size, marital status (married, divorced/separated, widowed, or never married), race/ethnicity (non-Hispanic White, African American, Latina/o, or other race/ethnicity), gender, and age.

Data analytic sequence

Binary logistic and ordinary least squares regression models were estimated to examine evidence regarding this study's three hypotheses. All models included all control variables. With the exception of the multi-categorical control variables for which we created a "missing" category (i.e., history of sexual assault, receipt of welfare in childhood, and parents' educational attainment), as well as for the variable of household income (for which an imputation procedure was used for missing data), models employed listwise deletion, in which cases with incomplete data were excluded.

The five dichotomous variables indicating respondents' categorization into each of the childhood family violence profiles was entered into models, with respondents who reported never physical and never psychological violence from parents serving as the reference group. Preliminary analyses tested for gender differences in associations between profiles of childhood family violence and adult obesity by estimating a model with five gender interaction terms. Because none of the interaction terms achieved statistical significance, models were estimated with data from men and women in a single analytic group.

We employed Baron and Kenny's (1986) criteria for testing mediation. To test H1 regarding linkages between violence in childhood from parents and greater odds of adult obesity, a binary logistic model was estimated that regressed the dichotomous measure of obesity on the multi-categorical variable indicating profiles of childhood family violence. To test H2 regarding linkages between violence in childhood from parents and greater use of food in response to stress, an ordinary least squares regression model was estimated that regressed the continuous measure of use of food in response to stress on the multi-categorical variable indicating profiles of childhood family violence. To test H3 regarding

greater use of food in response to stress as a mediator of associations between violence in childhood from parents and adult obesity, a final binary logistic model was estimated that regressed obesity on the multi-categorical variable indicating the profiles of childhood family violence, as well as on the measure of using food in response to stress.

Results

Linkages between profiles of violence in childhood from parents and adult obesity

Table 2, Model 1 displays estimates with respect to H1. No evidence was found for linkages between violence in childhood from parents and greater odds of obesity among adults who reported *violence at exclusively low levels of frequency*. Specifically, odds of obesity among adults who reported (1) rarely one type of violence only ($OR = 1.03$, $p = .888$) or (2) rarely both types of violence ($OR = 1.28$, $p = .196$) from one or both parents were comparable to odds of obesity among adults who reported never having experienced physical or psychological violence in childhood from parents. Likewise, no evidence was found for linkages between reports of violence in childhood from parents and greater odds of obesity among adults who reported having experienced only a *single type of violence even at a relatively high level of frequency*. Odds of obesity among adults who reported having frequently experienced one type of violence only ($OR = 1.02$, $p = .931$) were comparable to odds of obesity among adults who reported never having experienced physical or psychological violence in childhood from parents.

Nevertheless, linkages between histories of violence from parents and greater odds of adult obesity were observed among respondents who reported having experienced *both physical and psychological violence in childhood from parents, with at least one type having occurred frequently*. Specifically, adults who reported (1) rarely one type of violence and frequently the other type of violence ($OR = 1.65$, $p = .013$), and (2) frequently both types of violence ($OR = 1.41$, $p = .049$) indicated higher odds of obesity in contrast to adult who reported never having experienced physical or psychological violence in childhood from parents. (Additional analyses testing the extent to which these two coefficients differed in size from each other failed to find a statistically significant difference.) These results provide partial evidence in support of H1, suggesting that experiences of both physical and psychological violence in childhood—with at least one type having occurred relatively frequently—are associated with individuals' greater risk for adult obesity.

Linkages between profiles of violence in childhood from parents and use of food in response to stress in adulthood

Table 3 displays estimates with respect to H2. Similar to results for H1, two profiles of violence were associated with greater use of food in response to stress in adulthood. These profiles included respondents who reported (1) rarely one type of violence and frequently the other type of violence ($b = .22$, $p = .006$), and (2) frequently both types of violence ($b = .14$, $p = .040$). (Additional analyses testing the extent to which these two coefficients differed in size from each other failed to find a statistically significant difference.) No other profiles of childhood family violence were associated with greater use of food in response to stress (rarely one type only, $b = -.05$, $p = .461$; frequently one type only, $b = -.06$, $p = .581$; rarely both types, $b = .03$, $p = .717$). In sum, these results provide partial evidence in support of H2, suggesting that reports of physical and psychological violence in childhood—with at least one type having occurred relatively frequently—are associated with adults' greater use of food in response to stress.

Greater use of food in response to stress in adulthood as a mediator of linkages between profiles of childhood family violence and adult obesity

Table 2, Model 2 displays estimates with respect to H3. In contrast to the coefficients displayed in Model 1 (Table 2), coefficients in Model 2—which added the measure of using food in response to stress—indicated that the associations between problematic profiles of violence in childhood from parents and adult obesity were reduced in size and became either no longer statistically significant or reduced to a statistical trend (frequently both types of violence, $OR = 1.30$, $p = .158$, coefficient reduced by 26%; rarely one type of violence and frequently the other type of violence, $OR = 1.44$, $p = .083$, coefficient reduced by 24%). In Model 2, use of

Table 2
Estimated odds ratios for the associations between profiles of violence in childhood from parents and adult obesity.

	Model 1[a]			Model 2[b]		
	OR	95% CI	*p* value	*OR*	95% CI	*p* value
Reference group						
Neither physical nor psychological violence	1.00			1.00		
One type of violence only (physical or psychological)						
Rarely one type only	1.03	.71–1.49	.888	1.06	.72–1.59	.754
Frequently one type only	1.02	.60–1.75	.931	1.07	.61–1.88	.820
Both types of violence (physical and psychological)						
Rarely both types	1.28	.88–1.86	.196	1.30	.88–1.92	.180
Rarely one type + frequently one type	1.65	1.11–2.44	.013	1.44	.95–2.19	.083
Frequently both types	1.41	1.00–2.00	.049	1.30	.90–1.87	.158
Use of food in response to stress				2.14	1.88–2.45	.000
Constant	1.00	1.00–1.00	.998	.29	.12–.66	.004
Valid *N*	1543			1543		

Notes: Data are from a subsample of main respondents in the 1995–2005 National Survey of Midlife in the U.S. (MIDUS; refer to note in Table 1 for more information about the analytic sample). All models included as covariates measures of parents' education, childhood family structure, receipt of welfare in childhood, lifetime history of sexual assault, respondents' household income in adulthood, respondents' marital status, respondents' race/ethnicity, respondents' education, respondents' age in adulthood, and respondents' gender.

[a] This model evaluated Hypothesis 1, which posited linkages between profiles of childhood family violence and greater odds of adult obesity.

[b] This model evaluated Hypothesis 3, which posited that greater use of food in response to stress would mediate linkages between profiles of childhood family violence and greater odds of adult obesity. (For results regarding Hypothesis 2, refer to Table 3.).

Table 3
Estimated unstandardized regression coefficients for the associations between profiles of violence in childhood from parents and use of food in response to stress in adulthood.

	Model 1[a]	
	b (s.e.)	*p* value
Reference group		
Neither physical nor psychological violence		
One type of violence only (physical or psychological)		
Rarely one type only	−.05 (.07)	.461
Frequently one type only	−.06 (.11)	.581
Both types of violence (physical and psychological)		
Rarely both types	.03 (.07)	.717
Rarely one type + frequently one type	.22 (.08)	.006
Frequently both types	.14 (.07)	.040
Constant	1.70 (.16)	.000
R^2	.11	
Valid *N*	1543	

Note: data are from a subsample of main respondents in the 1995–2005 National Survey of Midlife in the U.S. (MIDUS; refer to note in Table 1 for more information about the analytic sample). The model included as covariates measures of parents' education, childhood family structure, receipt of welfare in childhood, lifetime history of sexual assault, respondents' household income in adulthood, respondents' marital status, respondents' race/ethnicity, respondents' education, respondents' age in adulthood, and respondents' gender.

[a] This model evaluated Hypothesis 2, which posited linkages between profiles of childhood family violence and greater use of food to cope with stress in adulthood. (For results regarding Hypotheses 1 and 3, refer to Table 2.)

food in response to stress remained a significant predictor of higher odds of obesity ($OR = 2.14$, $p = .000$). This final model supports H3 and provides evidence that greater use of food in response to stress among adults with problematic histories of physical and psychological violence from parents accounts, in part, for their greater risk of adult obesity.

Discussion

Guided by insights from the life course perspective and concepts from models of stress and coping, this study examined linkages between profiles of violence in childhood from parents and odds of obesity in adulthood. Findings indicated that adults who reported the most severe profiles of childhood violence from parents (i.e., experiencing both physical and psychological violence from one or both parents with at least one type reportedly having occurred sometimes or often) were at greater risk for adult obesity than respondents who reported never having experienced either type of violence from parents. These findings are consistent with previous scholarship on the problematic neurophysiological effects of stress that is particularly severe and long lasting (Adam & Epel, 2007). Results from this study are also consistent with findings from Williamson et al.'s (2002) study, which similarly found that adults who reported having experienced multiple types of abuse, especially at high levels of frequency, were most at risk for adult obesity.

To help elucidate processes through which violence in childhood from parents contributes to greater risk of obesity in adulthood, this study examined adults' greater use of food in response to stress as an explanatory factor for linkages between problematic profiles of childhood family violence and greater odds of adult obesity. Results from models testing mediation provided support for this causal hypothesis, suggesting the importance of the quality of life course social relationships—particularly with respect to their implications for individuals' psycho-behavioral uses of food—as part of dynamic processes that contribute to adult obesity. Additional studies are necessary to test the extent to which other types of stress within children's relationships—such as parental death or parental substance abuse—are similarly associated with greater use of food in response to stress, as well as greater risk of adult obesity. Also, as the association between the problematic profiles of violence and odds of adult obesity were reduced by about one-quarter in size within mediation models, additional studies are also necessary to examine other factors that contribute to processes from severe experiences of childhood family violence to greater risk of adult obesity, such as those comprising more direct neurophysiological processes (Adam & Epel, 2007).

The results of this study suggest the importance of advising social services and health care professionals to assess patterns of eating among children facing family violence, as well as among adults with histories of violence. Nonetheless, better understanding the mechanisms from violence to problematic eating is critical for developing effective interventions to reduce rates of obesity due to childhood family violence. Scholars have suggested a variety of mechanisms through which childhood family violence might be linked to adult obesity, including more negative mood and emotions, behavioral impulsivity, body image disturbance, substance abuse, poor self-esteem, and psychobiological dysregulation (Gustafson & Sarwer, 2004). Identifying for whom which mechanisms most strongly contribute to causal processes from violence to greater use of food in response to stress holds the promise of ascertaining more targeted interventions. For example, psychosocial mechanisms suggest the importance of more psychosocial-oriented interventions, such as mental health counseling, whereas more psychobiologically rooted mechanisms suggest the potential additional utility of biomedically focused interventions, such as pharmacological agents.

An additional critical direction for future research is the timing of obesity among individuals with histories of violence. For decades, scholars have noted childhood obesity as a powerful risk factor for adult obesity (National Institutes of Health Consensus Statement Online, 1985), and scholarship on obesity increasingly emphasizes that individuals who are obese at a particular point in their adulthood differ as to how long they have been obese (e.g., Ferraro, Thorpe, & Wilkinson, 2003; Schafer & Ferraro, 2007). These conceptualizations of obesity as a life course phenomenon suggest the importance of considering the time sequences over which childhood family violence contributes to adult obesity, particularly through using food to cope with stress. For some individuals, severe experiences of violence in childhood might lead to (or reinforce) emotion-based eating and subsequent obesity in childhood that directly persist into adulthood; whereas for others, early experiences of violence might lead to weight gain that takes place more gradually over time, resulting in obesity only in adulthood. Moreover, associations between using food to cope with stress and obesity might be reciprocal over time. A more refined understanding of the timing of processes linking interpersonal relationships, behavioral uses of food, and obesity can help guide programs to reduce rates of obesity, especially with respect to programs focused on prevention.

Despite this study's contributions to advancing the understanding of early life course risk factors for adult obesity, several methodological features limit the full extent to which conclusions can be made. First, processes of selective memory make possible incongruencies between individuals' reported experiences of childhood family violence and their actual experiences—particularly with respect to the frequency by which they actually experienced particular types of violence. (For a discussion of the use of retrospective reports in studies of childhood family violence, refer to Kendall-Tackett & Becker-Blease, 2004; Widom, Raphael, & DuMont, 2004.) Another limitation of this study's measure of childhood family violence is the remaining variability in experiences of

violence even among specific profile groups of violence. Sources of variability include specificity regarding the particular parent or parents who engaged in violence, as well as differences in the motivation and contexts surrounding the use of violence (e.g., reasoned discipline versus acts of unprovoked rage). Furthermore, despite this study's inclusion of many statistical controls, there are other factors that this study did not control for, which might account for both respondents' reported experiences of violence in childhood from parents, as well as greater risk of adult obesity—including obesity in childhood; psychological distress that follows from obesity in adulthood (that also might, in part, lead to individuals reporting more negative experiences in childhood); and genetic characteristics. Taking into account these other factors could render a more complex causal story than we have suggested here. Furthermore, this study's assessments of obesity and use of food in response to stress were conducted at the same point in time, limiting the strength of conclusions regarding use of food in response to stress as a unidirectional cause of greater risk of obesity.

Other limitations of this study relate to its measure of obesity. This study classified respondents' problematic weight status by using a dichotomous measure of obesity. This study did not classify respondents along other important weight-related characteristics, which also have been linked to health outcomes, such as severity levels of obesity, distributions of adiposity across the body, and weight cycling (e.g., Diaz, Mainous, & Everett, 2005). Also, this study relied on respondents' self-reported weight and height, which previous studies have found to lead to an underestimation of body mass index, particularly among certain subgroups of adults (e.g., Spencer, Appleby, Davey, & Key, 2001).

Another potential measurement limitation involves this study's two-item index that gathered respondents' self-reports of consuming more food in response to stress; this measure does not correspond exactly with diagnostic definitions of disordered eating. For example, this index did not ask respondents to report on their potential feelings of loss of control when eating in response to stress, which is a criterion for a diagnosis of binge eating (American Psychiatric Association, 2000). Additionally, both items comprising this index asked respondents about eating *more* in response to stress. Previous studies have documented that some individuals eat less when faced with stress (Torres & Nowson, 2007)—a pattern of using food in response to stress that this study did not address. Furthermore, linkages among childhood family violence, obesity, and use of food in response to stress are likely to differ in other national contexts where food is not as readily available for individuals to consume when confronted with stress.

Finally, although we used a national probability sample for these analyses, because individuals who experience childhood family violence are more likely to experience incarceration (e.g., Browne, Miller, & Maguin, 1999) and homelessness (e.g., Sullivan, Burnam, & Koegel, 2000), some adults with histories of violence are less likely to be included in this study's noninstitutionalized sample.

Despite these limitations, this study's findings regarding linkages between profiles of severe violence in childhood from parents and greater risk of obesity in adulthood—as well as evidence for greater use of food in response to stress as a mechanism of risk—help to advance understanding of interpersonal, life course contributors to adult obesity. Results also indicate away in which individuals' experiences of violence in childhood can have long-lasting and interconnected mental and physical health effects. Continuing to develop a better understanding of the complex biopsychosocial processes that comprise pathways from childhood stressors, such as childhood family violence, to poorer physical health in adulthood is critical for informing programs and policies aimed at reducing disparities in health across the life course.

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