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Is a Plant-Based Diet Associated with Relationship Aggression?

Casey Taft (✉ casey.taft@va.gov)

National Center for PTSD

Molly Franz

University of Maryland, Baltimore County

Evelyn Hamilton

National Center for PTSD

Madeline Smethurst

National Center for PTSD

Anissa Garza

National Center for PTSD

Diana Padilla-Medina

University of Puerto Rico System

Maxine Davis

Rutgers School of Social Work

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Abstract

Examinations of links between plant-based diet and indices of physical and mental health have received increased attention in the scientific literature in recent years. However, there has been little to no published research examining associations between plant-based diet and use of aggressive behavior. The current study examined the link between a plant-based diet and partner aggression in a nationally representative United States sample of 1,763 individuals while controlling for childhood trauma and partner aggression victimization. Results indicated that while a plant-based diet was associated with greater use of relationship aggression at the bivariate level, this association did not remain significant when accounting for childhood trauma and aggression victimization. These results suggest the importance of considering the role of trauma and victimization when examining links between plant-based diet and aggression, and point to a number of possible avenues for additional investigation to better understand these associations.

Full Text

Plant-based diets have been increasingly popular over the past decade, with an estimated 3% of those in the United States following this diet (Reinhart, 2018). Numerous studies have examined links between a plant-based diet and physical health; findings are generally consistent in demonstrating links between plant-based diets and greater physical health (Pettersen et al., 2012; Tonstad, Butler, et al., 2009; Tonstad, Stewart, et al., 2013), as well as animal product consumption and poorer health (Cross et al., 2007; Larsson & Wolk, 2006; Vang et al., 2008). Research findings on the mental health effects of plant-based diets are sparser and less consistent than they are for physical health; prior work that has included fully plant-based comparison groups generally have either shown no differences on measures of depression, stress, and anxiety (Timko et al., 2012), or differences showing lower symptoms in plant-based dieters (Beezhold et al., 2015). We are aware of no prior research examining the link between plant-based diet and any form of aggressive behavior including intimate partner violence. In the current study, we examined associations between plant-based diets and use of relationship aggression in a representative United States sample while adjusting for prior trauma severity and relationship victimization.

The lack of research into plant-based diet and aggression is surprising given that there has long been interest in the links between diet and antisocial or criminal behavior (Schauss, 1981; Schoenthaler, 1985). Since aggression is often linked with psychiatric diagnoses and mental health factors (Shorey et al., 2012; Swogger et al., 2010), one might expect that any diet that contributes to improved mental health would also be associated with less aggression. It is also reasonable to expect that a plant-based diet might be linked with less aggression since presumably a substantial portion of those who adhere to this diet may maintain an ethic of nonviolence (Dyett et al., 2013; Radnitz et al., 2015).

Given the voluminous body of work demonstrating associations between trauma and aggressive behavior (Chandan et al., 2019; Macinnes et al., 2016), and suggestions that exposure to early trauma may encourage individuals to follow a plant-based diet (Lavalley et al., 2019) via sensitization to harms

inflicted on nonhuman animals, it would also seem important to control for the influence of trauma. In other words, it is possible that greater exposure to trauma may contribute to both adoption of a plant-based diet and use of aggressive behavior, and thus it is important to statistically tease apart these associations. It may also be important to control for the effects of abuse victimization in adulthood given some qualitative and anecdotal reports of increased experiences of microaggressions and bullying among those who identify as vegan (LeRette, 2015; Taft, 2017).

We examined associations between plant-based diet and partner aggression in a representative survey conducted within the United States controlling for severity of childhood trauma and relationship aggression victimization in addition to other covariates including age and gender. We hypothesized that (a) trauma exposure would be associated with adherence to a plant-based diet; and (b) adherence to a plant-based diet would be associated with lower partner aggression, over and above known contributors to partner aggression (i.e., childhood trauma and relationship aggression victimization).

Methods

Participants

Participants were recruited from an online research panel by Qualtrics, a survey company that used stratified quota sampling to gather a diverse sample of the United States. All participants volunteer for an opt-in panel with the intent to participate in research surveys, but the survey invitation did not include specific details about the nature of the study to avoid self-selection bias. All surveys included in the online research panel are offered equally to potential participants, and no one survey is advertised over another. Data were derived from a larger study in which the purpose was to test the usefulness of several measurement instruments. Eligibility requirements included living in the United States and being 18 years of age or older. Data was collected between April 2020 and May 2020, and consent was obtained from all participants. All study procedures were sanctioned by an institution review board (IRB) at a university located in the southern area of the United States.

Three-thousand seven-hundred fifty individuals expressed interest through the online research portal, of which 1,987 were excluded. Qualtrics is unable to report on the exact number of people who saw a survey but did not partake, but estimates that the number of people invited to complete a survey is nine to 10 times the amount of people who complete the survey. Thus, it can be estimated that approximately 33,750 to 37,500 people were invited to participate in the study. Exclusions were based on failing to meet eligibility requirements, refusals, and missing data. The final analytic sample consisted of 1,763 participants. The average age was 48.07 years old ($SD = 17.1$) and the gender breakdown of this sample consisted of 50.9% women, 47.9% men, and 1.2% "other". Further demographic information for this sample can be found in Table 1. Participants were compensated \$4.80 for their participation.

Procedure

Before beginning the survey, participants were informed of the general purpose of the study and that they could end their participation at any point in time. Upon providing consent, participants were prompted to begin the study. Demographic questions were provided first, followed by the other study questionnaires. After the study measures were completed, participants were provided with resources for intimate partner violence and debriefed.

Measures

Plant-Based Diet Assessment. To assess whether participants followed a plant-based diet, they were asked to endorse the best option reflecting their diet among three choices: (1) “I exclusively eat a plant-based diet (no animal foods or ingredients);” (2) “I eat a vegetarian diet that includes eggs and/or dairy but no meat”; (3) “I eat a diet that includes meat”. Endorsements on this measure were collapsed to reflect a dichotomous plant-based (item 1)/not plant-based (items 2 and 3) variable.

International Trauma Exposure Measure (ITEM; Hyland et al., 2021). This measure consists of 22 items that assess traumatic life events across three developmental periods: childhood, adolescence, and adulthood. Example items from the ITEM include “You were diagnosed with a life threatening illness,” “Someone close to you died in an awful manner,” “You were physically assaulted by a parent or guardian,” and “You were exposed to a natural disaster where your life was in danger.” Psychologically threatening events were excluded from the measure. An additional two items were added to assess a broader range of trauma exposure: “You were made fun of, picked on, pushed, shoved, hit, or threatened with harm because of your race or religion, or ethnicity” and “You were discriminated against, treated with disrespect, called names, heard negative comments because of your race or religion or ethnic group.” This resulted in a total of 19 items. Participants determined if they experienced each event “up to the age of 12,” “between ages 13-18,” and/or “after the age of 18.” Only events that occurred during childhood were examined for the purposes of this study. Childhood trauma was scored by summing the events that occurred “up to the age of 12.” Responses to the open-ended item “Any other event not listed (please specify)” were not interpreted, so they were not included in the sum scores.

(Modified) Extended-Hurt, Insult, Threaten, Scream (E-HITS; Chan et al., 2010; *Modified E-HITS;* Portnoy et al., 2018). The E-HITS and Modified E-HITS consist of 5 items that assess relationship aggression perpetration (Modified E-HITS) and 5 items that assess relationship aggression victimization (E-HITS) in the last six months. Items include “Screamed or cursed at partner,” “Insulted or talked down to partner,” “Threatened partner with harm,” “Physically hurt partner” and “Forced or pressured partner to have sexual contact against their will or when they were unable to say no.” Participants determined the frequency of each behavior by responding on a Likert scale ranging from 1 (*Never*) to 5 (*Frequently*). Perpetration and victimization items were dichotomized into 1 (*occurred in the last 6 months*) or 0 (*did not occur in the last 6 months*) and then summed to represent a count of the behaviors (ranging from 0-5 for each score). The E-HITS has exhibited strong psychometric properties, including good concurrent and discriminant validity, internal consistency, and reliability (Chan et al., 2010.) In a study examining the accuracy and acceptability of the Modified E-HITS in assessing IPV perpetration in comparison to the CTS-2, the gold-

standard for assessing IPV perpetration, the measure was deemed a promising screening tool for IPV perpetration (Portnoy et al., 2018).

Revised Conflict Tactics Scale Short Form (CTS2S; Straus & Douglas, 2004; Straus et al, 1996). The CTS2S consists of five subscales: assault, injury, psychological aggression, sexual coercion, and negotiation. Each subscale consists of 2 behaviors, which are repeated to assess the participants and their partners' behaviors in the past six months. Only the assault and psychological aggression subscales were examined for the purposes of this study, resulting in a total score made up of 4 items assessing perpetration behaviors and 4 items assessing victimization behaviors. Participants determined the frequency of each behavior by responding on a Likert scale that was modified from 1 (*This has never happened*) to 6 (*More than 20 times in the past year*) to range from 1 (*Never*) to 5 (*Frequently*), with an option to select "This has happened before but not in the last 6 months." Scores were recoded to reflect perpetration that occurred within the last six months such that 1 = occurred in the last 6 months and 0 = did not occur in the last 6 months. Next, total relationship aggression perpetration and victimization in the last six months was scored by summing the count of the behaviors (ranging from 0-4 for each score). The CTS2S has demonstrated concurrent and construct validity similar to that of the CTS2, which has exceptional construct validity, content validity, internal consistency, and reliability (Straus and Douglas, 2004; Straus et al., 1996; Newton et al., 2001).

Data Analysis

Analyses were conducted with IBM SPSS for Windows, Version 27.0. Skewness and kurtosis of the dependent variables were within normal limits (i.e., less than +/- 3 and +/-10 respectively; Brown, 2006) and there was no evidence of multicollinearity among predictor variables (all r 's < .70). Given that less than 5% of data were missing across all variables, pairwise deletion was used to incorporate all available data. We conducted hierarchical linear multivariate regressions to examine associations between diet and relationship aggression perpetration. We ran separate regressions for EHITS perpetration and CTS-2 perpetration. Specifically, Step 1 included diet (plant-based vs. non-plant based) and demographic factors (participant age, participant sex). Step 2 included victimization count scores (either EHITS victimization or CTS-2 victimization) and childhood trauma frequency (continuous).

Results

Sample Characteristics and Bivariate Correlations

A total of 102 participants (5.8%) reported eating plant-based diets while 1586 participants (90%) reporting eating a diet consisting of animal products. Of note, a 2018 Gallup poll reported that 3% of the United States population described their diet as "vegan" (Reinhart, 2018), indicating that the percentage of participants who reported eating a plant-based diet is higher in this sample compared to the overall percentage of plant-based eaters within the United States.

Associations of demographic factors, diet, IPV victimization, and childhood trauma history with IPV perpetration

Results of the stepwise regression analyses are presented in Table 3. In Step 1, younger age (unstandardized coefficient = -0.01, $SE = 0.00$, $p < .001$), identifying as male (unstandardized coefficient = 0.20, $SE = 0.05$, $p < .001$), and consuming a plant-based diet (unstandardized coefficient = -0.82, $SE = 0.11$, $p < .001$) was associated with *greater* CTS-2 perpetration. In Step 2, CTS-2 victimization was entered and emerged as a significant predictor of CTS-2 perpetration (unstandardized coefficient = 0.81, $SE = 0.01$, $p < .001$). Childhood trauma was simultaneously entered and similarly emerged as a significant predictor (unstandardized coefficient = .02, $SE = 0.01$, $p > .05$). Younger age remained a significant predictor (unstandardized coefficient = -0.00, $SE = 0.00$, $p < .01$), but consuming a plant-based diet and gender no longer predicted CTS-2 perpetration. The first and second steps were both significant at $p < .001$, and the total variance explained in CTS-2 perpetration was 9.8% and 76.3% respectively.

Similar findings emerged when examining EHITS perpetration as the outcome. In Step 1, younger age (unstandardized coefficient = -0.02, $SE = 0.00$, $p < .001$), identifying as male (unstandardized coefficient = 0.31, $SE = 0.07$, $p < .001$), and consuming a plant-based diet (unstandardized coefficient = -0.97, $SE = 0.15$, $p < .001$) was associated with *greater* EHITS perpetration. In Step 2, EHITS victimization was entered and emerged as a significant predictor of EHITS perpetration (unstandardized coefficient = .84, $SE = 0.01$, $p < .001$). Childhood trauma was simultaneously entered and similarly emerged as a significant predictor (unstandardized coefficient = 0.03, $SE = 0.01$, $p > .05$). Younger age remained a significant predictor (unstandardized coefficient = -.00, $SE = 0.00$, $p < .001$), but consuming a plant-based diet and gender no longer predicted EHITS perpetration. The first and second steps were both significant at $p < .001$, and the total variance explained in EHITS perpetration was 11.4% and 80.1% respectively.

Discussion

The purpose of this study was to examine links between adherence to a plant-based diet and relationship aggression in a nationally representative U.S. sample. Contrary to hypotheses, adherence to a plant-based diet was not associated with lower aggression when controlling for demographic factors, childhood trauma severity, and aggression victimization. Plant-based diet was positively associated with aggression at the bivariate level but regression analyses indicated that this association was accounted for by experiences of trauma and abuse victimization. In other words, those who adhered to a plant-based diet had experienced higher levels of trauma and abusive victimization, which seemed to confer risk for greater use of relationship aggression.

We are not aware of any prior study that has documented the association between child trauma and adherence to a plant-based diet. The link between trauma and dietary choice deserves more careful examination given the potential relevance to aggressive behavior. It may be that those exposed to early

trauma become sensitive to preventing trauma and violence towards non-human animals unable to defend themselves (Lavallee et al., 2019). While trauma experiences may create or exacerbate psychopathology and contribute to aggression towards others, those consuming plant-based diets may seek to protect animals because they did not receive the benefit of such protection themselves when younger. Future research could explore such questions via qualitative methods to better understand these links between early trauma, diet, and aggression.

Future research should also examine “veganism” more broadly defined, beyond dietary terms. While the current study presents meaningful data regarding plant-based diets, we cannot generalize these results to all who self-identify as “vegan” since the latter term encompasses more than just dietary choice. According to The Vegan Society (1979) who initially coined the term, veganism is defined as: “A philosophy and way of living which seeks to exclude all forms of exploitation of, and cruelty to, animals for food, clothing or any other purpose; and by extension, promotes the development and use of animal-free alternatives for the benefit of humans, animals and the environment.” Since veganism is a broader ethic to minimize harm, it is possible that those who identify as vegan due to ethical reasons would evidence different associations than plant-based dieters who do not. Relevant to this discussion is the construct of “speciesism,” or viewing some species as having less moral status than others, a concept related to other forms of oppression such as sexism and racism (Adams, 1990; Gruen, 1994; Singer, 1975). Those who espouse anti-speciesist beliefs tend to be lower on sexism (Caviola et al., 2019; Nibert, 1994), which (among vegans) may be protective against use of aggression towards intimate partners (Allen et al., 2009). Other research demonstrates links between negative attitudes and behaviors towards nonhuman animals and engaging in violence against humans (Ascione & Arkow, 1999; Potts, 2010).

Other potential explanatory variables not included in this study deserve additional examination. There may be other negative experiences that we could not account for beyond the influence of trauma and abuse victimization. For example, evidence indicates that vegans experience more negative social stigma and negative reactions from others (Bresnahan et al., 2016). They may experience more social isolation and distress as they are regularly challenged about their views and are perceived as judgmental by their family and peers (Greenebaum, 2012; Guérin, 2014; Hirschler, 2011; Lindquist, 2013). In order to develop a clearer understanding of links among diet and aggression, it is helpful to consider contextual factors from a trauma-informed, biopsychosocial perspective. Another potentially important area of future study in examining the link between plant-based diet and aggression is diet quality. Some recent evidence suggests that diet quality may moderate the association between plant-based diet and mental health outcomes such that a healthier plant-based diet confers greater benefit (Lee, Eather, & Best, 2021).

Other limitations of this study include a reliance on self-reports of the variables of interest and cross-sectional analyses. Longitudinal studies and multi-modal assessments including clinical interviews, use of biological data, and fuller assessments of dietary factors, nutrition, trauma, and aggression are needed. Perhaps most importantly, randomized controlled trials examining the impact of a plant-based diets on aggression would assist in better determining causal pathways among the variables of interest given the complexity of these phenomena and their inter-relationships.

Declarations

Disclosure statement

The authors report there are no competing interests to declare

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Tables

Table 1. *Demographic Characteristics*

Baseline characteristic	<i>n</i>	%
Gender		
Female	897	50.9
Male	845	47.9
Other	21	1.2
Race/Ethnicity		
White/European American	1204	64.6
Black/African American	215	11.5
Latinx/Hispanic American	314	16.9
Asian/Asian American	106	5.7
Native Hawaiian/Other Pacific Islander	1	0.1
American Indian/Alaskan Native	5	0.3
Multicultural	12	0.6
Other	5	0.3
Relationship status		
Unmarried	848	48.1
Married	910	51.6
Prefer not to say	5	0.3
Education		
No schooling completed	6	0.3
Some primary or secondary education	61	3.5
High school grad/GED/vocational school	385	21.8
Some college/associates degree	522	29.7
Bachelor's degree	452	25.6
Post-bachelor's degree	335	19
Prefer not to say	2	0.1
Annual Household Income		
\$0 - \$1,000	50	2.8
\$1,001 - \$9,000	43	2.4

\$9,001 - \$19,000	139	7.9
\$19,001- \$29,000	178	10.1
\$29,001 - \$39,000	174	9.9
\$39,001 - \$49,000	150	8.5
\$49,001 - \$59,000	146	8.3
\$59,001 - \$69,000	135	7.7
\$69,001 - \$79,000	129	7.3
\$79,001 - \$99,999	172	9.8
\$100,000 - \$150,000	239	13.6
> \$150,000	164	9.3
Prefer not to say	44	2.5

Note. Due to missing data (< 5% across variables), *n*'s range from 1688 to 1763. Participants were on average 48.07 years old (*SD* = 17.1).

Table 2. *Descriptive Statistics and Summary of Correlations*

Variables	Mean (<i>SD</i>) or %	1	2	3	4	5	6	7	8
1. Age	48.07 (17.07)	-							
2. Gender	47.9% Male	.01	-						
3. Diet	5.8% plant-based	.16**	-.07*	-					
4. Revised CTS-2 Victimization	0.69 (1.14)	-.23**	.12**	-.23***	-				
5. Modified EHITS Victimization	1.26 (1.53)	-.26**	.12**	-.21***	.66**	-			
6. Child Trauma Exposure	0.64 (1.08)	-.16**	.08**	-.15***	.31**	.26**	-		
7. Revised CTS-2 Perpetration	1.17 (1.48)	-.24**	.11**	-.22***	.87**	.62**	.30**	-	
8. Modified EHITS Perpetration		-.28**	.11**	-.20***	.61**	.89**	.26**	.64**	-

Note: Diet is dichotomized such that 1 = plant-based diet and 2= diet that includes animal products. Sex is dichotomized such that 1 = female and 2 = male. Due to missing data (< 5% across variables), *n*'s range from 1688 to 1763. CTS-2 = Conflict Tactics Scale Short Form. EHITS = Extended-Hurt, Insult, Threaten, Scream.

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

Table 3. *Linear Regression Analyses Examining CTS-2 and Modified EHITS Aggression Outcomes*

	CTS-2 Total				Modified EHITS Total			
Variable	<i>B</i>	<i>SE</i>	<i>t</i>	<i>p</i>	<i>B</i>	<i>SE</i>	<i>t</i>	<i>p</i>
Step 1								
Age	-.013	.001	-8.904	<.001	-.022	.002	-10.940	<.001
Gender	.203	.050	4.048	<.001	.308	.068	4.520	<.001
Diet	-.820	.107	-7.675	<.001	-.967	.145	-6.670	<.001
Step 2								
Age	-.002	.001	-2.753	.006	-.004	.001	-4.017	<.001
Gender	-.006	.026	-.225	.822	.024	.033	.727	.467
Diet	-.080	.056	-1.431	.153	-.067	.070	-.956	.339
IPV Victimization	.808	.012	65.301	<.001	.837	.011	73.690	<.001
Child Trauma	.021	.009	2.313	.021	.029	.011	2.530	.011

Note: Unstandardized estimates. Diet is dichotomized such that 1 = plant-based diet and 2= diet that includes animal products. Sex is dichotomized such that 1 = female and 2 = male. IPV Victimization is represented by the CTS-2 Total Victimization score and the Modified EHITS Total Victimization scale, respectively. Missing data were addressed with pairwise deletion; *n*'s range from 1688 to 1763. CTS =

Conflict Tactics Scale; EHITS = Extended – Hurt, Insulted, Threaten, Scream; ITEM = International Trauma Exposure Measure. Significant effects are bolded.