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Psychometric properties of the Dietarian Identity Questionnaire among vegetarians

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ABSTRACT

The decision to follow a vegetarian diet is intertwined with an individual's sense of identity. Whereas many qualitative studies have investigated identity aspects of vegetarianism, quantitative research in this domain is profoundly lacking. By assessing how people think, feel, and behave when it comes to eating or not eating animal products, Rosenfeld and Burrow (2018) Dietarian Identity Questionnaire (DIQ) can serve a valuable role in advancing quantitative research on vegetarian identity. First, however, it is important to ensure that the DIQ exhibits psychometrically sound properties among vegetarians, as Rosenfeld and Burrow (2018) validated the factor structure of the DIQ in samples comprised predominantly of meat-eaters. In the current research, I validated the DIQ's factor structure in a large sample of vegetarians (N = 992) by evaluating its items' factor loadings, model fit (including CFI, RMSEA, and SRMR), and subscales' internal consistencies. I also evaluated the DIQ variables' distributions and intercorrelations. Results suggest that the DIQ offers a suitable measure for assessing how vegetarians think, feel, and behave with respect to following their diets. Directions for the use of the DIQ in future research on vegetarianism are discussed.

1. Introduction

In many nations around the world, hundreds of thousands to several millions of people are vegetarians (i.e., including vegans) (European Vegetarian and Animals News Alliance, 2013). For many of these individuals, the decision to forgo meat is not simply an ethical stance or health behavior but rather a central feature of their identity—one that affects their social experiences and psychological well-being (Fox & Ward, 2008; Hirschler, 2011; Jabs, Sobal, & Devine, 2000; LeRette, 2014; MacInnis & Hodson, 2017; Torti, 2017; Twine, 2014; Rosenfeld & Burrow, 2017a). By deviating from social norms and inherently challenging dominant views of morality, vegetarians can readily internalize their diets as a defining attribute of their identity and feel stigmatized (Greenebaum & Dexter, 2017; LeRette, 2014; MacInnis & Hodson, 2017). Yet vegetarians are a heterogeneous group, differing not only in their views of morality and feelings of stigma but also in terms of what specific dietary pattern they follow, how strictly they follow that diet, and what motivations they have for their food choices (Hoffman, Stallings, Bessinger, & Brooks, 2013; Jabs et al., 2000; Radnitz, Beezhold, & DiMatteo, 2015; Rosenfeld, 2019, in press; Rosenfeld & Burrow, 2017a, 2017b; Rothgerber, 2014a; Ruby, 2012). Adopting an identity perspective in studying vegetarianism is critical to understanding how vegetarians and meat-eaters alike feel toward this eating behavior, which is particularly important given the known adverse health and environmental effects of overconsuming meat (McMichael, Powles, Butler, & Uauy, 2007). How might investigators study identity aspects of vegetarianism systematically?

One approach—on which this paper focuses—is to situate vegetarianism within Rosenfeld and Burrow (2018) concept of *dietarian identity*. Dietarian identity is theorized to comprise an identity domain specific to animal-product consumption within an individual's overall self-concept. Vegetarian identity can be thought of as a type of dietarian identity. According to Rosenfeld and Burrow (2018) theorizing, meat-eaters, semi-vegetarians, flexitarians, pescatarians, and vegetarians alike may make different food choices and label their diets in different ways, yet these categories simply reflect divergences in the expression of dietarian identity. Based on the Unified Model of Vegetarian Identity (Rosenfeld & Burrow, 2017a), dietarian identity encompasses eight variables that capture how people reflect on the question, Who am I when it comes to eating or not eating animal products? These eight variables are centrality; private, public, and out-group regards; prosocial, personal, and moral motivations; and strictness (see Table 1 for conceptual definitions).

Whether their participants are full-on meat-eaters or strict vegetarians, investigators can administer the Dietarian Identity Questionnaire (DIQ) (Rosenfeld & Burrow, 2018) in order to quantify

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Table 1
Conceptual definitions of DIQ variables (from Rosenfeld & Burrow, 2017a, 2018).

Variable	Conceptual Definition
Centrality	The extent to which one views following one's dietary pattern as a predominant feature of one's self-concept
Private Regard	One's personal feelings toward following one's dietary pattern and toward other people who also eat this way
Public Regard	One's feelings about how dietary out-group members and the larger society evaluate those who follow one's dietary pattern
Out-Group Regard	One's evaluation of people who follow a dietary pattern that differs from one's own
Prosocial Motivation	The extent to which a desire to benefit something beyond oneself is a reason for following one's dietary pattern
Personal Motivation	The extent to which a desire to benefit oneself is a reason for following one's dietary pattern
Moral Motivation	The extent to which beliefs about rightness and wrongness is a reason for following one's dietary pattern
Strictness	The extent to which an one adheres to one's dietary pattern

individuals' scores on dietarian identity variables. Given that its theoretical framing originated from the psychological literature on vegetarianism, the DIQ likely provides a particularly valuable measure for assessing within-group heterogeneity among vegetarians. Indeed, vegetarians differ from meat-eaters on all eight DIQ variables in directions which suggest that dietarian identity is particularly salient to them (Rosenfeld & Burrow, 2018). Relative to meat-eaters, vegetarians view their dietary patterns as more intertwined with their identity (higher centrality); have more positive feelings toward their dietary in-group (higher private regard); feel more stigmatized for following their dietary patterns (lower public regard); judge out-group dieters more negatively (lower out-group regard); have stronger prosocial, personal, and moral motivations for following their dietary patterns; and adhere to their diets more strictly (Rosenfeld & Burrow, 2018). Whereas these between-group differences are evident, less is known about within-group heterogeneity in dietarian identity among vegetarians.

Within the literature on vegetarianism, an abundance of untested questions linger: Why do some vegetarians view their diets as highly central to who they are while other vegetarians see their diets as little more than a food preference? Why do some vegetarians feel more stigmatized than others, and what psychological consequences might vegetarians face from internalizing diet-based stigma? What factors may explain variances in the valence of vegetarians' attitudes toward meat-eaters? How do vegetarians' motivations influence their perceptions of dietary in-groups and out-groups, levels of dietary strictness, and likelihoods of maintaining their diets over time? Several studies have already begun to unravel these matters (e.g., Hodson & Earle, 2018; Hoffman et al., 2013; Jabs et al., 2000; LeRette, 2014; MacInnis & Hodson, 2017; Radnitz et al., 2015; Rothgerber, 2014a–2014c), yet much remains unknown. I advance that the DIQ can lend a useful tool for generating additional insights into these, and related, questions.

In contrast to the abundance of qualitative research on the link between vegetarianism and identity (e.g., Cherry, 2015; Fox & Ward, 2008; LeRette, 2014; Mycek, 2018; Romo & Donovan-Kicken, 2012; Sneijder & Te Molder, 2009; Stiles, 1998; Yeh, 2014), quantitative research in this domain is profoundly lacking. Although a few studies have already gainfully adopted quantitative approaches to studying vegetarian identity (e.g., Rothgerber, 2014b, 2014c, 2015a, 2015b), there is a need for additional systematic investigations that consider multiple dimensions of vegetarian identity in conjunction. Quantitative research using multidimensional models of racial and ethnic identities (e.g., Phinney, 1992; Sellers, Rowley, Chavous, Shelton, & Smith, 1997; Vandiver, Cross, Worrell, & Fhagen-Smith, 2002) has enabled investigators to identify ways in which dimensions within these identity domains shape, and are shaped by, how individuals construe their social environments (e.g., Burrow & Ong, 2010; Fuller-Rowell, Burrow, & Ong, 2011; Pascoe & Smart Richman, 2009; Sellers & Shelton, 2003). Applying an analogous perspective in implementing the DIQ may likewise be insightful in studying the psychology of vegetarianism.

In progressing toward this direction, however, it is important to ensure that the DIQ exhibits psychometrically sound properties among vegetarians, as Rosenfeld and Burrow (2018) validated the DIQ's factor structure in samples comprised predominantly of meat-eaters. In these samples, the DIQ exhibited strong item factor loadings, model fit indices, and subscale internal consistencies. Still, these properties of the DIQ remain unknown among vegetarian participants. The current research addresses this knowledge gap by validating the DIQ's factor structure in a large sample of vegetarians.

2. Method

2.1. Participants

In determining an appropriate sample size for this study, I focused on a core procedure of scale validation: confirmatory factor analysis (CFA). Based on Worthington and Whittaker (2006) recommendation that 10 participants per estimated parameter provides an optimal sample size for structural equation modeling (which is used for CFA), and the fact that the DIQ contains 94 parameters (as indicated by re-running a CFA on Rosenfeld & Burrow, 2018, data using their provided R scripts—available at https://osf.io/2agwb/), I aimed to retain at least 940 participants in my analyses. Taking into consideration my plan to exclude participants who failed an attention check from analyses, I set to recruit a total of 1000 vegetarian participants (i.e., those who self-identify as vegetarian and/or vegan).

One thousand vegetarian participants from the United States were recruited to take part in this study via Amazon Mechanical Turk (MTurk). This survey was advertised to MTurk workers as a "Survey for Vegetarians/Vegans." The survey task description emphasized that participants must be vegetarians or vegans to take this survey. Moreover, a screener item at the start of the survey instructed participants to confirm whether or not they were vegetarian/vegan. After excluding eight participants who failed an attention check, which asked them to indicate what 1 + 1 is equal to (responses to this attention check question included 0, 1, 2, and 3; participants who selected a response other than 2 were excluded from analyses), 992 participants (55% female) between the ages of 20 and 82 (M_{age} = 36.13, SD = 11.23) were retained for analyses (see Table 2 for demographic information).

2.2. Materials

2.2.1. The DIQ

Rosenfeld and Burrow (2018) DIQ assessed all eight dietarian identity variables. The DIQ began with an initial item that assessed which of the following animal products participants eat or do not eat: red meat, poultry, fish, egg, and dairy (see Fig. 1). Below this item was a prompt highlighting that, for the rest of the survey, a participant's "dietary pattern" referred to those foods he or she indicated eating and/or not eating. Following this dietary pattern item, the DIQ included 33 items assessing centrality; private, public, and out-group regards; prosocial, personal, and moral motivations; and strictness (see Table 3 for all items). Responses to items ranged from 1 (Strongly Disagree) to 7 (Strongly Agree).

Table 2
Demographic information of study participants.

Demographic	Frequency (Percentage)
Race	
White/Caucasian	741 (75%)
Black/African American	64 (6%)
Hispanic or Latinx	55 (6%)
Asian or Pacific Islander	87 (9%)
Native American	16 (2%)
Mixed race/ethnicity	25 (3%)
Other	4 (< 1%)
Income	
$25,000 or less	150 (15%)
$25,001–$50,000	291 (29%)
$50,001–$80,000	302 (30%)
$80,001–$120,000	161 (16%)
$120,001–$200,000	73 (7%)
$200,001 or more	13 (1%)
Educational Attainment	
Less than high school diploma	4 (< 1%)
High school diploma or equivalent (e.g., GED)	79 (8%)
Some college, but no degree	199 (20%)
Associate degree	130 (13%)
Bachelor's degree	427 (43%)
Graduate or professional degree	151 (15%)

2.3. Procedure

After consenting to take part in this research, participants first indicated their dietary pattern and then completed all initial DIQ items. Participants completed the eight DIQ subscales in a randomized order. After completing the DIQ, participants completed demographic questions.

3. Results

All analyses were preregistered via the Open Science Framework (OSF) (see https://osf.io/pdbmj/register/5771ca429ad5a1020de2872e for preregistration). Data and analysis scripts are available at https://osf.io/prd5k/.

3.1. Factor loadings

I conducted an exploratory factor analysis (EFA) using maximum likelihood factoring and promax rotation to extract eight factors from the DIQ items (see Table 3 for factor loadings). I used promax rotation to extract factors because promax rotation is preferable to other rotation methods, such as direct oblimin, in providing solutions when factors within a model are significantly correlated with one another (Kahn, 2006; Matsunaga, 2010), as they are within the DIQ (Rosenfeld & Burrow, 2018). Each item loaded onto its theorized factor strongly. No significant degree of cross-loading was observed between factors. Together, these factors explained 75% of the variance of responses.

3.2. Model fit

Scale development and validation conventionally entails conducting an EFA in one sample and a confirmatory factor analysis (CFA) in a different sample. The reason for conducting the EFA and CFA in separate samples is to avoid constructing an over-fitted model and to ensure that the factor structure obtained from the first sample replicates successfully in a separate sample of unobserved participants. Typically, investigators use the results of the EFA to shorten their scale by eliminating items with poor factor loadings. Then, they confirm that the revised, shortened version of their scale fits the data well by examining its model fit through a CFA in a new sample of unobserved participants. This is the method that Rosenfeld and Burrow (2018) used initially in developing and validating the DIQ. In the current study, I conducted an EFA and CFA in the same sample for two intertwined reasons that distinguish the current investigation from conventional scale development and validation practice. First, this study is examining the factor structure and model fit of a scale (the DIQ) that has already been previously developed and validated. Second, because of this, I did not plan to revise the DIQ in any way based on EFA results before conducting a CFA. Thus, I did not run the risk of capitalizing on chance (i.e., overfitting my model) in confirming a scale in the same sample in which that scale was revised based on exploratory analyses. Rather, in the current study, I utilize a single highly powered sample in order to evaluate the DIQ's factor loadings (via EFA) and model fit (via CFA) with clear a-priori intentions.

I conducting a CFA using guidelines outlined by existing reviews (e.g., Ferguson & Cox, 1993; Hu & Bentler, 1999; Kahn, 2006; Kenny, 2011; Matsunaga, 2010) to assess model fit. A well-fitting model should have a CFI of at least 0.95 (Hu & Bentler, 1999; Kahn, 2006; Matsunaga, 2010), RMSEA of less than 0.06 (Kahn, 2006; Matsunaga, 2010), and SRMR of less than 0.08 (Hu & Bentler, 1999; Kahn, 2006; Kenny, 2011). The model I tested included eight factors, which I conceived as the eight aforementioned factors of dietarian identity. Within each factor of this model, I specified the items listed above, as organized by their factor, in Table 3. Each item was assigned to only one factor (for further clarification of this model, see the analysis script used to build this model at https://osf.io/prd5k/). According to these guidelines, the DIQ model revealed an excellent fit, χ^2 (467) = 1678.18, $p < .001$, CFI = 0.960, RMSEA = 0.051, SRMR = 0.035. The DIQ's RMSEA was not significant, $p = .232$, 95% CI [0.049, 0.054], suggesting furthermore that the DIQ's factor structure fit the data closely (Kenny, 2011).

3.3. Internal consistency

Internal consistencies were high for all eight DIQ subscales, ranging from $\alpha = 0.81$ for private regard to $\alpha = 0.96$ for out-group regard (see Table 4 for all subscales' internal consistencies; see Table 5 for subscale intercorrelations).

Fig. 1. Dietary pattern prompt of the DIQ, which participants complete prior to completing DIQ items.

Table 3
Factor Loadings. Loadings for each item's designated factor are displayed in bold. "(R)" indicates a reverse-scored item.

Items	Factor Loadings							
	1	2	3	4	5	6	7	8
Out-Group Regard								
It bothers me when people eat foods that go against my dietary pattern. (R)	**0.93**	0.00	0.01	−0.04	−0.01	0.00	0.02	−0.01
If I see someone eat foods that go against my dietary pattern, I like him or her less. (R)	**0.93**	0.00	−0.03	0.02	−0.04	−0.02	0.06	0.07
I judge people negatively for eating foods that go against my dietary pattern. (R)	**0.91**	0.00	0.00	0.00	0.02	0.02	0.00	0.00
Seeing people eat foods that go against my dietary pattern makes me upset or angry. (R)	**0.90**	−0.02	0.00	0.00	0.00	0.01	0.01	0.04
I view people as less moral for eating foods that go against my dietary pattern. (R)	**0.88**	0.02	0.00	0.02	0.03	0.00	−0.07	0.04
People should feel guilty about eating foods that go against my dietary pattern. (R)	**0.83**	−0.01	0.04	0.01	−0.01	−0.01	−0.05	−0.07
Seeing someone eat foods that go against my dietary pattern makes him or her less attractive to me. (R)	**0.81**	0.02	−0.01	−0.04	0.03	0.00	−0.01	−0.06
Prosocial Motivation								
I follow my dietary pattern because I want to benefit society.	−0.03	**0.97**	0.02	−0.01	0.03	0.01	−0.08	−0.07
I am motivated to follow my dietary pattern because I want to help others.	−0.01	**0.93**	0.04	−0.02	0.02	−0.03	−0.01	−0.08
Concerns about social issues motivate me to follow my dietary pattern.	−0.06	**0.85**	−0.01	−0.01	0.01	0.02	−0.01	−0.05
I follow my dietary pattern because eating this way is good for the world.	0.06	**0.85**	−0.01	0.02	−0.03	0.00	0.01	0.07
I feel motivated to follow my dietary pattern because I am concerned about the effects of my food choices on other beings.	0.05	**0.80**	−0.05	0.03	−0.02	−0.06	0.11	0.04
I view my dietary pattern as a way of making the world a better place for others.	0.01	**0.75**	0.01	0.01	−0.03	0.07	0.04	0.10
Centrality								
My dietary pattern defines a significant aspect of who I am.	0.00	0.03	**0.91**	−0.01	0.04	−0.05	−0.01	0.03
My dietary pattern has a big impact on how I think of myself.	0.01	0.04	**0.88**	0.00	−0.02	0.03	−0.01	−0.03
Following my dietary pattern is an important part of who I am.	0.01	−0.03	**0.88**	0.03	−0.01	0.00	0.04	0.02
My dietary pattern is an important part of how I would describe myself.	0.00	0.01	**0.87**	0.00	−0.01	0.01	0.06	−0.03
A big part of my lifestyle revolves around my dietary pattern.	−0.03	−0.04	**0.83**	−0.01	−0.02	0.01	−0.06	0.03
Strictness								
I can be flexible and sometimes eat foods that go against my dietary pattern. (R)	−0.02	0.02	0.01	**0.96**	0.01	−0.02	0.00	−0.03
From time to time, I eat foods that go against my dietary pattern. (R)	−0.04	0.00	0.00	**0.96**	0.00	0.01	−0.02	−0.05
I would eat a food product that goes against my dietary pattern if I were to hear that it tastes exceptionally good. (R)	0.06	−0.03	−0.02	**0.81**	0.00	0.01	0.01	0.09
Public Regard								
People who follow my dietary pattern are judged negatively for their food choices. (R)	0.03	0.00	−0.04	0.02	**0.90**	0.01	0.04	0.01
People who follow my dietary pattern tend to receive criticism for their food choices. (R)	0.00	0.04	−0.03	−0.01	**0.90**	−0.02	0.00	−0.02
Following my dietary pattern is associated with negative stereotypes. (R)	−0.01	−0.04	0.07	0.00	**0.87**	0.01	−0.01	0.01
Personal Motivation								
I follow my dietary pattern because I am concerned about the effects of my food choices on my own well-being.	−0.01	0.01	−0.02	0.00	0.00	**0.93**	0.01	−0.05
When thinking about which animal products to consume, I consider the effects of my food choices on my own health.	−0.03	−0.04	−0.05	−0.04	0.00	**0.82**	0.02	0.04
I follow my dietary pattern because eating this way improves my life.	0.05	0.02	0.07	0.03	0.01	**0.79**	−0.03	0.01
Moral Motivation								
I follow my dietary pattern because eating this way is the morally right thing to do.	−0.01	0.13	−0.02	−0.02	0.02	0.01	**0.85**	0.04
I am motivated to follow my dietary pattern because eating foods that go against my dietary pattern is immoral.	−0.09	0.07	0.02	−0.01	0.02	0.01	**0.81**	−0.03
I feel that I have a moral obligation to follow my dietary pattern.	0.04	0.15	0.05	0.02	−0.02	−0.02	**0.77**	0.00
Private Regard								
Following my dietary pattern is a respectable way of living.	0.07	−0.02	0.00	−0.03	−0.01	−0.04	0.01	**0.89**
People who follow my dietary pattern should take pride in their food choices.	0.05	−0.01	0.01	0.01	−0.01	0.05	0.04	**0.75**
People who follow my dietary pattern tend to be good people.	−0.17	0.06	0.03	−0.03	0.05	−0.03	−0.08	**0.64**
Eigenvalue	5.52	4.51	3.86	2.51	2.40	2.18	2.03	1.84
Proportion of variance explained	0.17	0.14	0.12	0.08	0.07	0.07	0.06	0.06

3.4. Exploratory analyses: distinguishing vegans from other vegetarians

Although vegans are conceived conventionally as a subgroup of vegetarians (Beardsworth & Keil, 1992; Rosenfeld & Burrow, 2017a; Ruby, 2012), with the term "vegetarians" referring to both vegetarians and vegans, inclusively—as is the case throughout the current paper—it may be informative to test whether the DIQ exhibits strong model fit and internal consistencies among both vegans and other types of

Table 4
DIQ subscales' descriptive statistics and internal consistencies.

Subscale	Mean (SD)	1st Quartile	3rd Quartile	Skew	Kurtosis	Cronbach's α
Centrality	4.94 (1.46)	4.00	6.00	−0.80	0.11	0.94
Private Regard	5.33 (1.00)	4.67	6.00	−0.71	1.46	0.81
Public Regard	3.48 (1.51)	2.33	4.33	0.58	−0.35	0.92
Out-Group Regard	5.05 (1.57)	3.86	6.29	−0.54	−0.78	0.96
Prosocial Motivation	4.90 (1.47)	4.17	6.00	−0.82	0.19	0.95
Personal Motivation	5.73 (1.18)	5.00	6.67	−1.26	1.97	0.88
Moral Motivation	4.79 (1.67)	4.00	6.00	−0.65	−0.38	0.93
Strictness	5.02 (1.67)	3.67	6.67	−0.39	−1.11	0.93

Table 5
Intercorrelations between DIQ subscales.

	Cen.	Priv.	Pub.	Out.	Pro.	Per.	Moral
Centrality	–	–	–	–	–	–	–
Private Regard	0.49***	–	–	–	–	–	–
Public Regard	−0.12***	−0.19***	–	–	–	–	–
Out-Group Regard	−0.34***	−0.26***	0.24***	–	–	–	–
Prosocial Motivation	0.44***	0.48***	−0.16***	−0.40***	–	–	–
Personal Motivation	0.36***	0.34***	−0.06	0.06*	0.17***	–	–
Moral Motivation	0.46***	0.44***	−0.11***	−0.47***	0.69***	0.10**	–
Strictness	0.19***	0.22***	−0.02	0.09**	0.16***	0.13***	0.22***

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

Table 6
DIQ subscales' internal consistencies by vegetarian versus vegan status.

Subscale	Cronbach's α Among Vegetarians	Cronbach's α Among Vegans
Centrality	0.94	0.95
Private Regard	0.81	0.81
Public Regard	0.92	0.91
Out-Group Regard	0.96	0.96
Prosocial Motivation	0.95	0.95
Personal Motivation	0.88	0.87
Moral Motivation	0.93	0.93
Strictness	0.93	0.94

vegetarians (in this section, simply referred to as "vegetarians"). Accordingly, I conducted two separate CFAs, using the same methodology outlined earlier in this paper, on vegetarians and vegans. Within the current study's total sample of 992 participants were 729 self-identified vegetarians and 263 self-identified vegans. The DIQ model revealed strong fit among vegetarians, χ^2 (467) = 1398.19, $p < .001$, CFI = 0.958, RMSEA = 0.052, SRMR = 0.037, and among vegans, χ^2 (467) = 980.70, $p < .001$, CFI = 0.940, RMSEA = 0.065, SRMR = 0.049. Moreover, internal consistencies were high for all eight DIQ subscales among both vegetarians and vegans (see Table 6 for internal consistencies by group). All eight subscales' internal consistencies were either the same or 0.01 points different between vegetarians and vegans.

4. Discussion

These results replicate those of Rosenfeld and Burrow (2018), validating the DIQ's factor structure among vegetarians. First, EFA results indicated that each DIQ item loaded onto its designated factor strongly. Second, CFA results indicated that the DIQ's factor structure captured participants' responses well, as all fit indices assessed lent support for strong model fit. Third, all DIQ subscales exhibited high internal consistencies, suggesting that items within each subscale measured a similar construct. Thus, there is evidence to suggest that the DIQ offers a psychometrically suitable measure for assessing dimensions of vegetarian identity—how vegetarians think, feel, and behave with respect to following their diets.

Psychometric advancements can enable investigators to assess constructs with greater precision and coherence across studies. A number of other scales, aside from the DIQ, have emerged within the recent literature on vegetarianism and offer useful tools for future work (Rosenfeld, 2018). These new measures can assess how people assign various forms of meaning to their eating behaviors (Arbit, Ruby, & Rozin, 2017); the extents to which people endorse carnism, the ideology of eating animals (Monteiro, Pfeiler, Patterson, & Milburn, 2017), and speciesism, the assignment of different moral worth to different species of animals (Caviola, Everett, & Faber, 2018); how people rationalize, justify, and morally disengage from meat consumption (Graça, Calheiros, & Oliveira, 2016; Piazza et al., 2015; Rothgerber, 2012); and the extent to which people are emotionally attached to meat (Graça, Calheiros, & Oliveira, 2015). With unique roots in social identity theory (Tajfel & Turner, 1985), the DIQ can add to this compilation of measures by assessing how the decision to follow a vegetarian diet shapes one's self-perception (Rosenfeld & Burrow, 2018). That is, in refraining from consuming meat, vegetarians are inclined to categorize themselves into a distinct social category, one that defies social norms in most cultures (Rosenfeld & Burrow, 2017a). The DIQ can enable investigators to measure how individuals express the social identity of being vegetarian by assessing how central being vegetarian is to their self-concept (i.e., centrality), how much pride they take in being vegetarian and how positively they view their vegetarian in-group (i.e., private regard), and how negatively judged and stigmatized by others they feel for being vegetarian (i.e., public regard).

Yet beyond assessing core social identity constructs of centrality, private regard, and public regard (Luhtanen & Crocker, 1992; Sellers et al., 1997) within vegetarian identity, the DIQ can also assess constructs capturing how people evaluate dietary out-group members (out-group regard), what motivations people have for following their diets (prosocial, personal, and moral motivations), and how closely people actually adhere to their dietary pattern (strictness). Assessing these constructs can be informative to a number of lines of research. For one, although some meat-eaters stereotype vegetarians as judgmental and preachy (Minson & Monin, 2012), findings from the current study suggest that the majority of vegetarians do not judge meat-eaters negatively for their food choices (only approximately one-quarter of vegetarians scored below the scale midpoint (4) on out-group regard). Additional research is needed to explain not only why meat-eaters anticipate excessive amounts of judgment from vegetarians but also why vegetarians vary in their evaluations of meat-eaters. In other lines of research that center on dietary motivation, implementing the DIQ's motivation subscales may be useful for quantifying motivations as continuous variables (i.e., *to what extent* vegetarians endorse particular motivations) rather than discrete categories (i.e., *whether or not* vegetarians report having a particular motivation). Distinguishing between prosocial and moral motivations related to vegetarianism may also be beneficial, as these constructs have typically been conceived together as "ethical" motivation (Rosenfeld & Burrow, 2017a, 2017b). Lastly, by assessing a construct of strictness (i.e., dietary adherence), the DIQ may be informative as investigators continue to explore the apparent contradiction that many self-identified vegetarians truly eat meat on occasion (Rothgerber, 2017).

Because the DIQ was published within the past year, only a limited number of studies have implemented it. One study demonstrated that vegetarians and vegans differ along seven of the eight dietarian identity constructs—all except for strictness—with vegans having higher centrality, higher private regard, lower public regard, lower out-group regard, higher prosocial motivation, higher personal motivation, and

higher moral motivation (Rosenfeld, 2019). In another study, Rosenfeld (in press) investigated the link between vegetarians' motivations and their dietary strictness, finding that vegetarians motivated by concerns about animals adhere to their diets more strictly than do vegetarians motivated by either health or environmental reasons, an effect explained by animal-motivated vegetarians' greater feelings of disgust toward meat. In a third study, Rosenfeld and Tomiyama (2018) investigated dietarian identity differences between pescatarians (people who eschew red meat and poultry but eat fish) who self-identify as vegetarian and pescatarians who do not self-identify as vegetarian. Results suggest that pescatarians who self-identify as vegetarian have higher private regard, lower public regard, higher prosocial motivation, and higher moral motivation. Together, these studies provide early evidence that the DIQ can be useful in identifying psychological differences between meat-avoiders who follow different types of dietary patterns, have different dietary motivations, and label their diets (i.e., self-identify) in different ways.

Given that the DIQ's subscales measure distinct constructs, rather than measuring multiple components of a common latent variable, investigators should examine each DIQ subscale as its own variable as opposed to summing up all eight subscales into some overall measure of dietarian identity. With proper justification, however, investigators may wish to sum up more than one DIQ subscale in order to create new variables for their research. For example, one might see value in creating a variable to reflect the extent to which participants' dietary motivations are multifaceted by summing up the DIQ's prosocial, personal, and moral motivations subscales together.

One limitation of this study is that it is challenging to know whether participants may misrepresent themselves as vegetarians. This survey was advertised to MTurk workers as a "Survey for Vegetarians/Vegans." The survey task description emphasized that participants must be vegetarians or vegans to take this survey. Moreover, a screener item at the start of the survey instructed participants to confirm whether or not they were vegetarian/vegan. As with all survey research, we as researchers put our good faith in trusting that participants provide honest responses—in the current study, such that participants were in fact vegetarians. With increasing consideration of the importance of conducting highly powered research with large samples, it would be incredibly useful for crowdsourcing platforms, such as MTurk, to survey all workers on whether or not they are vegetarian—just as MTurk surveys its workers on their age, income, educational attainment, political affiliation, and much more through its premium qualifications feature—so that researchers can prescreen for vegetarian participants more effectively and with greater confidence.

A second limitation of this study is that it focused solely on self-identified vegetarians (i.e., participants who indicated that they are vegetarian and/or vegan). This methodology is in contrast to an alternative approach whereby investigators can ask participants whether or not they eat meat—or more specifically, which types of animal products they eat and do not eat—and then classify participants as vegetarian or not accordingly. Given that the current research centers on understanding vegetarianism as an identity, I chose to define vegetarianism based on how participants self-identified rather than what type of diet they reported following. Future research may benefit from examining dietarian identity among people who avoid eating certain kinds of meat and/or other animal products (e.g., egg, dairy) but do not necessarily consider themselves to be vegetarian or vegan. Furthermore, it could be insightful to use the DIQ in studying flexitarians—people who limit their meat intakes yet still include meat in their diets (Rosenfeld, 2018)—through the dietarian identity framework.

Lastly, I encourage investigators to examine the DIQ's factor structure, construct validity, and predictive ability further. Scale development and validation is a process, and the findings reported here constitute an extension of Rosenfeld and Burrow (2018) investigation on which future research should continue to build.

5. Conclusion

The current study's findings suggest that the DIQ offers a psychometrically suitable measure for assessing dietarian identity among vegetarians. Qualitative research on vegetarian identity is abundant and has revealed important insights into vegetarian eating behaviors. Quantitative research on identity aspects of vegetarianism, in contrast, is only in its infancy. As research on other identity domains has demonstrated, quantitative research implementing multidimensional models of identity can prove fruitful by illuminating not only the theoretical underpinnings of identity phenomena but also the relevance these phenomena have for everyday life and psychological well-being. Vegetarianism is a practice that can improve public health and promote environmental sustainability. Yet for the millions of people in nations around the world who follow a vegetarian diet, forgoing meat is not an action that operates in isolation; rather it intersects with one's life history, sociocultural environment, and social network. With the DIQ, investigators can systematically acquire novel insights into what it truly means to be a vegetarian.

Appendix A. Supplementary data

Supplementary data to this article can be found online at https://doi.org/10.1016/j.foodqual.2019.01.020.

References

Arbit, N., Ruby, M., & Rozin, P. (2017). Development and validation of the meaning of food in life questionnaire (MFLQ): Evidence for a new construct to explain eating behavior. *Food Quality and Preference, 59*, 35–45.

Beardsworth, A. D., & Keil, E. T. (1992). The vegetarian option: Varieties, conversions, motives and careers. *The Sociological Review, 40*, 253–293.

Burrow, A. L., & Ong, A. D. (2010). Racial identity as a moderator of daily exposure and reactivity to racial discrimination. *Self and Identity, 9*, 383–402.

Caviola, L., Everett, J. A., & Faber, N. S. (2018). The moral standing of animals: Towards a psychology of speciesism. *Journal of Personality and Social Psychology*. https://doi.org/10.1037/pspp0000182.

Cherry, E. (2015). I was a teenage vegan: Motivation and maintenance of lifestyle movements. *Sociological Inquiry, 85*, 55–74.

European Vegetarian and Animals News Alliance (2013). Vegetarians around the world. Retrieved from http://www.evana.org/index.php?id=70650.

Ferguson, E., & Cox, T. (1993). Exploratory factor analysis: A users' guide. *International Journal of Selection and Assessment, 1*, 84–94.

Fox, N., & Ward, K. J. (2008). You are what you eat? Vegetarianism, health and identity. *Social Science & Medicine, 66*, 2585–2595.

Fuller-Rowell, T. E., Burrow, A. L., & Ong, A. D. (2011). Changes in racial identity among African American college students following the election of Barack Obama. *Developmental Psychology, 47*, 1608–1618.

Graça, J., Calheiros, M. M., & Oliveira, A. (2015). Attached to meat? (Un)Willingness and intentions to adopt a more plant-based diet. *Appetite, 95*, 113–125.

Graça, J., Calheiros, M. M., & Oliveira, A. (2017). Situating moral disengagement: Motivated reasoning in meat consumption and substitution. *Personality and Individual Differences*.

Greenebaum, J., & Dexter, B. (2016). Vegan men and hybrid masculinity. *Journal of Gender Studies, 27*, 637–648.

Hirschler, C. A. (2011). "What pushed me over the edge was a deer hunter": Being vegan in North America. *Society & Animals, 19*, 156–174.

Hodson, G., & Earle, M. (2018). Conservatism predicts lapses from vegetarian/vegan diets to meat consumption (through lower social justice concerns and social support). *Appetite, 120*, 75–81.

Hoffman, S. R., Stallings, S. F., Bessinger, R. C., & Brooks, G. T. (2013). Differences between health and ethical vegetarians. Strength of conviction, nutrition knowledge, dietary restriction, and duration of adherence. *Appetite, 65*, 139–144.

Hu, L. T., & Bentler, P. M. (1999). Cutoff criteria for fit indexes in covariance structure analysis: Conventional criteria versus new alternatives. *Structural Equation Modeling: A Multidisciplinary Journal, 6*, 1–55.

Jabs, J., Sobal, J., & Devine, C. M. (2000). Managing vegetarianism: Identities, norms and interactions. *Ecology of Food and Nutrition, 39*, 375–394.

Kahn, J. H. (2006). Factor analysis in counseling psychology research, training, and practice: Principles, advances, and applications. *The Counseling Psychologist, 34*, 684–718.

Kenny, D. A. (2011). Measuring model fit. Retrieved from http://davidakenny.net/cm/fit.htm.

LeRette, D. E. (2014). *Stories of microaggressions directed toward vegans and vegetarians in social settings* (Doctoral dissertation)Fielding Graduate University.

Luhtanen, R., & Crocker, J. (1992). A collective self-esteem scale: Self-evaluation of one's social identity. *Personality and Social Psychology Bulletin, 18*, 302–318.

MacInnis, C. C., & Hodson, G. (2017). It ain't easy eating greens: Evidence of bias toward vegetarians and vegans from both source and target. *Group Processes & Intergroup Relations, 20*, 721–744.
Matsunaga, M. (2010). How to factor-analyze your data right: Do's, don'ts, and how-to's. *International Journal of Psychological Research, 3*, 97–110.
McMichael, A. J., Powles, J. W., Butler, C. D., & Uauy, R. (2007). Food, livestock production, energy, climate change, and health. *The Lancet, 370*, 1253–1263.
Minson, J. A., & Monin, B. (2012). Do-gooder derogation: Disparaging morally motivated minorities to defuse anticipated reproach. *Social Psychological and Personality Science, 3*, 200–207.
Monteiro, C. A., Pfeiler, T. M., Patterson, M. D., & Milburn, M. A. (2017). The carnism inventory: Measuring the ideology of eating animals. *Appetite, 113*, 51–62.
Mycek, M. K. (2018). Meatless meals and masculinity: How veg* men explain their plant-based diets. *Food and Foodways, 1–23*. https://doi.org/10.1080/07409710.2017.1420355.
Pascoe, E. A., & Smart Richman, L. (2009). Perceived discrimination and health: A meta-analytic review. *Psychological Bulletin, 135*, 531–554.
Phinney, J. S. (1992). The multigroup ethnic identity measure: A new scale for use with diverse groups. *Journal of Adolescent Research, 7*, 156–176.
Piazza, J., Ruby, M. B., Loughnan, S., Luong, M., Kulik, J., Watkins, H. M., & Seigerman, M. (2015). Rationalizing meat consumption. The 4Ns. *Appetite, 91*, 114–128.
Radnitz, C., Beezhold, B., & DiMatteo, J. (2015). Investigation of lifestyle choices of individuals following a vegan diet for health and ethical reasons. *Appetite, 90*, 31–36.
Romo, L. K., & Donovan-Kicken, E. (2012). "Actually, I don't eat meat": A multiple-goals perspective of communication about vegetarianism. *Communication Studies, 63*, 405–420.
Rosenfeld, D. L. (2018). The psychology of vegetarianism: Recent advances and future directions. *Appetite, 131*, 125–138.
Rosenfeld, D. L. (2019). A comparison of dietarian identity profiles between vegetarians and vegans. *Food Quality and Preference, 72*, 40–44.
Rosenfeld, D. L., & Tomiyama, A. J. (2018). How proximal are pescatarians to vegetarians? An investigation of dietary identity, motivation, and attitudes toward animals. Manuscript submitted for publication.
Rosenfeld, D. L., & Burrow, A. L. (2017a). The unified model of vegetarian identity: A conceptual framework for understanding plant-based food choices. *Appetite, 112*, 78–95.
Rosenfeld, D. L., & Burrow, A. L. (2017b). Vegetarian on purpose: Understanding the motivations of plant-based dieters. *Appetite, 116*, 456–463.
Rosenfeld, D. L., & Burrow, A. L. (2018). Development and validation of the Dietarian Identity Questionnaire: Assessing self-perceptions of animal-product consumption. *Appetite, 127*, 182–194.
Rosenfeld, D. L. (in press). Why some choose the vegetarian option: Are all ethical motivations the same? Motivation and Emotion. https://doi.org/10.1007/s11031-018-9747-6.
Rothgerber, H. (2012). Real men don't eat (vegetable) quiche: Masculinity and the justification of meat consumption. *Psychology of Men & Masculinity, 14*, 363–375.
Rothgerber, H. (2014b). Evaluation of ingroup disloyalty within a multigroup context. *Social Psychology, 45*, 382–390.
Rothgerber, H. (2014c). Horizontal hostility among non-meat eaters. *PLoS One, 9*, e96457.
Rothgerber, H. (2014a). A comparison of attitudes toward meat and animals among strict and semi-vegetarians. *Appetite, 72*, 98–105.
Rothgerber, H. (2015a). Can you have your meat and eat it too? Conscientious omnivores, vegetarians, and adherence to diet. *Appetite, 84*, 196–203.
Rothgerber, H. (2015b). Underlying differences between conscientious omnivores and vegetarians in the evaluation of meat and animals. *Appetite, 87*, 251–258.
Rothgerber, H. (2017). Attitudes toward meat and plants in vegetarians. In F. Mariotti (Ed.). *Vegetarian and plant-based diets in health and disease prevention* (pp. 11–35). London, UK: Academic Press.
Ruby, M. B. (2012). Vegetarianism. A blossoming field of study. *Appetite, 58*, 141–150.
Sellers, R. M., Rowley, S. A., Chavous, T. M., Shelton, J. N., & Smith, M. A. (1997). Multidimensional Inventory of Black Identity: A preliminary investigation of reliability and construct validity. *Journal of Personality and Social Psychology, 73*, 805–815.
Sellers, R. M., & Shelton, J. N. (2003). The role of racial identity in perceived racial discrimination. *Journal of Personality and Social Psychology, 84*, 1079–1092.
Sneijder, P., & Te Molder, H. (2009). Normalizing ideological food choice and eating practices. Identity work in online discussions on veganism. *Appetite, 52*, 621–630.
Stiles, B. (1998). Vegetarianism: Identity and experiences as factors in food selection. *Free Inquiry in Creative Sociology, 26*, 213–226.
Tajfel, H., & Turner, J. C. (1985). The social identity theory of intergroup behavior. In S. Worchel, & W. G. Austin (Vol. Eds.), *Psychology of Intergroup Relations: Vol. 2*, (pp. 7–24). Chicago: Nelson-Hall.
Torti, J. M. (2017). *The social and psychological well-being of vegetarians: A focused ethnography* (Doctoral dissertation)University of Alberta.
Twine, R. (2014). Vegan killjoys at the table—Contesting happiness and negotiating relationships with food practices. *Societies, 4*, 623–639.
Vandiver, B. J., Cross, W. E., Jr., Worrell, F. C., & Fhagen-Smith, P. E. (2002). Validating the cross racial identity scale. *Journal of Counseling Psychology, 49*, 71–85.
Worthington, R. L., & Whittaker, T. A. (2006). Scale development research: A content analysis and recommendations for best practices. *The Counseling Psychologist, 34*, 806–838.
Yeh, H. Y. (2014). Voice with every bite: Dietary identity and vegetarians' "the-second-best" boundary work. *Food, Culture & Society, 17*, 591–613.