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Explaining vegetarian and vegan dietary behavior among U.S. and Dutch samples applying a reasoned action approach

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The present research applied the framework of the Reasoned Action Approach (RAA) to investigate intention formation of adopting vegetarian and vegan diets among U.S. and Dutch samples. First, a belief elicitation study was carried out to determine salient beliefs regarding both dietary behaviors. The U.S. sample (N = 59) together provided a total of 551 beliefs (298 vegetarian, 253 vegan) and the Dutch sample (N = 30) 294 beliefs (171 vegetarian, 123 vegan). Second, a regression study determined which reasoned action variables—Attitude, Perceived Norm and Perceived Control—explained Intention to adopt a vegetarian or a vegan diet for two separate samples. For both samples RAA-variables explained Intention relatively well (i.e., between 30 and 43% of the variance). For U.S. participants (N = 204), Instrumental and Experiential Attitude were significant predictors of their Intention to have a vegetarian or a vegan diet. For Dutch participants (N = 345), Instrumental and Experiential Attitude and Descriptive Norm predicted Intention to adopt a vegetarian diet. For adopting a vegan diet, Experiential Attitude was the only predicting variable for the Dutch sample. Almost all salient beliefs collected in the belief elicitation study significantly correlated with Intention to adopt diet, regardless of which RAA-variable they belonged to. Based on our findings, we critically evaluate the use of RAA in explaining behavioral Intentions, especially for behavior with a strong social component. Moreover, we show the importance of—the often not employed—belief elicitation phase and as such, discourage using only a regression approach. From a societal perspective, we argue that there is a strong need for interventions if one wants to encourage behavior change in the field of vegetarianism and veganism as—amongst others—average Intention scores were very low. In addition, we show that while the U.S. and Dutch samples, sharing Western norms and values, often overlapped, they also differed in subtle—yet potentially important—ways when it comes to motivations and cognitions with regard to vegetarian and vegan dietary behavior. Hence, interventions may have to include different content in order to be effective for these seemingly similar target groups and target behaviors.

KEYWORDS

Reasoned Action Approach (RAA), survey research and quantitative research, belief elicitation, vegetarianism, veganism

1. Introduction

Animal-based products have a large, negative impact on the world and its inhabitants, most prominently so on climate change, animal wellbeing and human health (Steinfeld et al., 2006; Donham et al., 2007). As to the first point, experts have calculated that in order to meet stringent climate change targets, it is crucial that the consumption of animal-based products (e.g., meat, fish, dairy, and eggs) is reduced by at least 50% (Hertwich et al., 2010; Hedenus et al., 2014; Heller et al., 2020).

As far as animal wellbeing is concerned, animals that are used for food are often kept under poor conditions, and slaughtered well before they reach their natural age. And finally, humans also do not fare well in relation to the production of animal-based products. For example, human working conditions in the livestock industry tend to be poor (Pew Commission on Industrial Farm Animal Based-Production, 2008; Gray and Kayali, 2009). In addition, the way in which the animal-trade and meat industry are currently organized increases risks of contracting animal-borne diseases like SARS, MERS, and COVID-19 (Gray and Kayali, 2009; Rodriguez-Morales et al., 2020). Human health may also be compromised by consuming animal based-products, such as which can give rise to heart and vascular disease, resistance to antibiotics, obesity, diabetes type II, and a variety of cancers (e.g., Fraser, 1999; de Roos et al., 2003; Nolan and Hitt, 2006; Micha et al., 2010; van Grinsven et al., 2010; Pan et al., 2012; Montonen et al., 2013; Yokoyama et al., 2014; Friedrichsen, 2015; McEachran et al., 2015; WHO, 2015; Lippi et al., 2016).

For these reasons, organizations like the United Nations (UN), World Health Organization (WHO), and the World Wide Fund for Nature (WWF) encourage individuals to reduce their meat consumption and promote the adoption of vegetarian and vegan diets (UN, 2016; WHO, 2016; WWF, 2016). While the interplay of decisions made by governments, industrial factories, companies and (non-profit) organizations can influence the proportion of meat that is produced and consumed, individual consumers are also able to address the negative effects of animal agriculture when they choose to change toward more plant-based diets.

The empirical investigation of such diets has only begun quite recently (e.g., Rothgerber, 2013; Cooney, 2014; Carvalho et al., 2015). While especially the last couple of years saw an increase in research focusing on the avoidance of animal-based products (e.g., de Boer et al., 2016; Carfora et al., 2017; Dowsett et al., 2018), it is still unclear what exactly drives consumers to adopt a vegetarian or vegan diet. Systematic and scoping reviews on vegetarianism and veganism show there is a strong need to intensify research efforts (e.g., Corrin and Papadopoulos, 2017; Graça et al., 2019) in order to get a more thorough understanding of consumers' dietary choices and effective promotion of the avoidance or limiting of the consumption of animal products.

Investigating which beliefs to address in interventions aimed at convincing consumers to adopt a vegetarian or vegan diet has the potential to play a leading role in the reduction of animal based-product consumption. Therefore, the objective of the current research is investigating the cognitive components that are assumed to determine behavior change with respect to adopting a vegetarian and vegan diet. For this purpose, we used the Reasoned Action Approach (RAA), a cognitive theoretical framework of behavior. We explored for samples of student meat-eaters from the United States (U.S.) and the Netherlands which beliefs and other determinants of behavior were associated with their Intention to have a vegetarian diet on the one hand, and their Intention to have a vegan diet on the other.

It may seem counterintuitive to choose student samples as target samples in social science research because these are not representative of the general population, making it difficult to generalize findings over populations differently than the student samples in the study (e.g., Hanel and Vione, 2016). However, we do not aim to generalize over different populations than the population represented by the sample of our study. Indeed, Fishbein and Yzer (2003) stress that each behavior should be understood from the perspective of a specific target population. In this case we deliberately chose college students as our target population because we are convinced that the beliefs, Intentions and behaviors of this specific group are crucial for the transition to a sustainable food system.

The first reason is that changing -or shaping- habits of members of younger target groups will impact our planet more than trying to change habitual behavior of members of older target groups. That is, simply because the former will live longer on this planet. In addition, younger people are generally more likely to be influenced by persuasive messages (O'Keefe, 2002). Second, there is a growing awareness of—especially—young consumers that limiting meat consumption can reduce their negative impact on the environment, and diets like vegetarianism and veganism are gaining in popularity as sustainable, healthy, and ethical food trends among these groups. When one already posits positive associations on a given behavior, one becomes more open to persuasion (e.g., Cooney, 2014; Carvalho et al., 2015). A third reason is that in the transition from secondary school to university, students have to adapt to a new environment in which they are more free in making their own dietary choices, mostly or entirely independent from their parents or caregivers. It is a time in which their future food habits take shape and get determined for a great deal (Von Ah et al., 2004; Deliens et al., 2014).

Hence, while there is often protest—with good reason—against using students samples, in the case of vegetarian and vegan dietary behavior, we believe that there are clear advantages of using students over other samples. That is why we will investigate the more narrow, homogeneous student samples instead of more heterogeneous "general population" samples.

When it comes to choosing to investigate the U.S. and the Netherlands: we argue that it is valuable to carry out cross-cultural research with samples that are both from Western countries. While the U.S. and the Netherlands they are culturally speaking quite similar, they are certainly not identical in all their—animal—consumption patterns. In both the United States and The Netherlands, around 95% of all consumers eat meat (Stahler, 2019; de Waart, 2020). Ritchie et al. (2017) and Ritchie and Roser (2019) investigated how many kilograms of meat, fish/seafood, milk and egg are consumed around the world per capita in from 1961 to 2019. Their investigation was based on data from the Food & Agriculture Organization of the United Nations, an organization that provides free access to and use of data on food and agriculture (FAOSTAT, 2023). Consumption patterns for the U.S.A. and the Netherlands in 2017, the period our RAA studies were carried out, are shown in Table 1. The amount of fish/seafood and eggs that U.S. and Dutch citizens consume is quite similar. However, the amount of meat that is consumed in the U.S.A. is considerably higher than in the Netherlands, while the amount of milk consumed is considerably higher in the Netherlands compared to the U.S.A.

In addition, deviating trends are found in U.S. and Dutch consumers' beliefs on animal based-product consumption. For instance, de Boer et al. (2016) found in a representative Dutch and U.S. sample that only 12% of the Dutch and 6% of the U.S. respondents believed that eating less meat was effective in mitigating climate change. The Dutch sample had a somewhat higher willingness to reduce meat consumption than the U.S. sample. At the same time, knowledge about how members of different cultural groups, at

TABLE 1 Meat, fish/seafood, milk, and egg consumption kilograms per capita in 2017.

Country	Meat (kg)	Fish/Seafood (kg)	Milk (kg)	Egg (kg)
U.S.A.	124.10	22.36	254.87	15.57
The Netherlands	75.81	21.77	340.35	14.12

different stages of their life think about the consumption of meat and other animal based-products or the absence of it is lacking (Ruby, 2012). We believe it is therefore useful to study more specific and homogeneous samples to compare the Intention formation of two Western countries more reliably. As we had access to both Dutch and U.S. participants pools, we compared these two specific Western countries. For this purpose, first, a belief elicitation study was carried out to determine participants' salient belief structures. Second, we conducted a regression study to investigate which belief structures and determinants of Intention, following the RAA framework, explained behavioral Intention to have a vegetarian or a vegan diet.

From a theoretical perspective, we investigated and evaluated the strength of the RAA framework in explaining vegetarian and vegan diets and contributed to the current body of literature that investigates which cognitive components are related to Intention formation. To our knowledge, recent RAA belief elicitation studies on this topic are lacking, and other types of elicitation studies are scarce (e.g., Wyker and Davison, 2010; Zaal et al., 2017). Studies that do investigate belief structures often only look into the strength of beliefs, and use predetermined beliefs decided on by the researchers or based on prior research that uses different samples (e.g., Mullee et al., 2017). While such studies do give some insight into consumer beliefs structures, they do not provide sufficient space for participants' own cognitions and as such, may steer toward the researchers' own bias. That is why it is important to carry out a belief elicitation study before designing the regression study.

From a societal perspective, based on the results of this research we can make recommendations on which beliefs on vegetarian and vegan diets are possible candidate beliefs to use in interventions aimed on encouraging vegetarian and vegan dietary behavior for the population of the sample being investigated.

2. Theoretical framework

2.1. Reasoned action approach

According to RAA (Fishbein and Ajzen, 2010), the intention to have a vegetarian or vegan diet is formed on the basis of one's attitudes, perceived norms, and perceived behavioral control regarding these particular behaviors. Figure 1 (Peters, 2013, based on Fishbein and Ajzen, 2010) illustrates the hypothetical pathways of the different variables that influence Intention following the Reasoned Action Approach. Figure 1 is explained from right (behavior) to left (background factors) in this paragraph with the example of changing a meat-inclusive diet to a vegetarian diet. The Reasoned Action Approach proposes that for behavior change to occur, meat-eaters need an Intention to change their current diet into a vegetarian diet. While having an Intention to stop eating meat serves as a precondition for behavioral change, the Reasoned Action Approach describes two other factors that determine if one will actually act on this Intention, together termed actual control. First, one needs the necessary skills to perform the behavior, like knowing how to prepare a vegetarian meal, or where to buy one. Second, one should be able to overcome any environmental factors that prevent behavioral performance—for instance an unavailability of meat substitutes at the supermarket. Hence, while having an Intention to adopt a vegetarian diet is the most important predictor of actually adopting a vegetarian diet, actual control factors may serve as barriers to changing behavior. RRA focuses particularly on Intention formation, rather than the Intention-behavior relation.

Attitude is one's own evaluation of the behavior of eliminating one's consumption of meat and it includes Instrumental Attitude—an evaluation of positive and negative attributes of the behavior (e.g., necessary vs. unnecessary)—and Experiential Attitude—an evaluation of positive and negative affective experiences with the behavior (e.g., pleasant vs. unpleasant). Perceived Norms are expectations of how relevant others in one's environment evaluate the behavior. It includes Injunctive Norm—the extent to which one thinks important referents will approve or disapprove one having a vegetarian or vegan diet, and Descriptive Norm—whether important others have such diets themselves. Perceived Behavioral Control is the extent to which one thinks to be able to follow a vegetarian or vegan diet successfully. It includes Perceived Capacity—one's perceived ability to have either diet—and Perceived Autonomy—the extent to which people perceive themselves autonomous in the decision to change their diet.

Attitude, Perceived Norm, and Perceived Behavioral Control are a function of specific beliefs. Behavioral or attitudinal beliefs are beliefs about the perceived likelihood of the positive and/or negative consequences of having a vegetarian or vegan diet. Normative beliefs include perceptions about social support from specific individuals in one's social network. Control beliefs comprises perceptions of environmental contexts that facilitate or hamper behavior.

A background variable may or may not be a source of beliefs and cannot act as a moderate or somewhere later in the model following RRA. Background variables can be a belief source on an individual level, a social level and informational level. Examples of background variables are demographic background or personality traits. According to RAA, by introducing new beliefs to individuals or by emphasizing, reinforcing or changing existing beliefs, behavior change can be set in motion.

The Reasoned Action Approach has already identified significant predictors of behavioral intentions to adopt vegetarian and vegan diets. For instance, Attitude and Perceived Behavioral Control are often found as significant predictors to reduce meat consumption and to adopt vegan diets (e.g., Zur and Klockner, 2014; Graça et al., 2015; Carfora et al., 2017). Perceived Norm has been found to predict meat reduction (Zur and Klockner, 2014). Yet, the latter component seems to be a poorer predictor, and is found less often as a predictor in the meat consumption domain compared to Attitude and Perceived Behavioral Control (Graça et al., 2019). This could be due to the fact that often only a small minority in populations

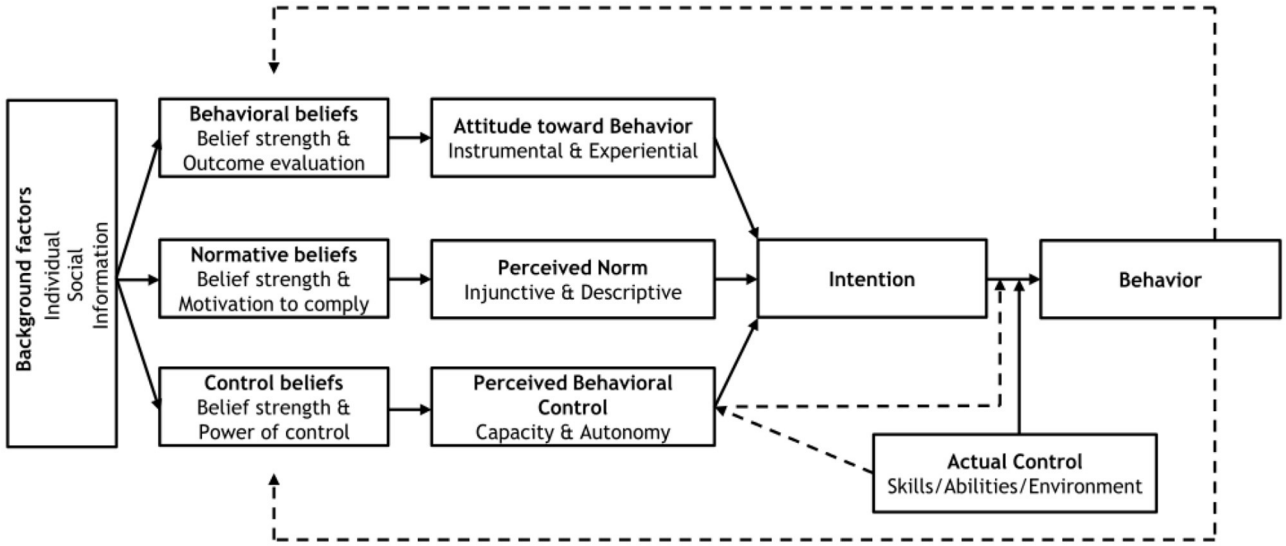

FIGURE 1
Schematic presentation of the reasoned action approach (Peters, 2013, based on Fishbein and Ajzen, 2010).

already have a vegetarian or vegan diet (± 5% for the populations being studied in this research) and it is arguably strongly normative behavior to consume animal products (Stahler, 2019; de Waart, 2020).

To identify the relationship between the unique beliefs that people have about a specific behavior and their behavioral Intention, RAA proposes conducting two types of studies (e.g., Fishbein and Ajzen, 2010). First, a belief elicitation study should be conducted to identify the most important beliefs that are associated with the given behavior. Belief elicitation studies are likely to increase the Reasoned Action Approach's ability to explain behavioral Intention by capturing the full range of important beliefs that ultimately determine one's target population's behavior (Downs and Hausenblas, 2005). Such a study uses a questionnaire with open-ended questions that asks a small sample of the target group about their attitudinal, normative and control beliefs. In a content analysis, participants' responses are categorized and rank ordered based on frequency mentioned. In the second study, the most frequently mentioned beliefs are converted to closed-ended questions, which will complement a questionnaire containing standard questions on RAA components in a second study. Using regression it can be determined which components are most strongly associated with behavioral Intention. In this paper, first the belief elicitation study is described in full (i.e., method-discussion), after which the regression study is presented in the same manner. We end with a general discussion of both studies.

2.2. Formulating target behavior

A vegetarian diet is characterized by not consuming flesh or organs from any animal or any by-products from animal slaughter. In a vegan, or plant-based diet, also products that are produced by animals are not consumed, like dairy and eggs (Stegeman, 1997). The results of previous research in the domains of vegetarianism and veganism are sometimes hard to compare because different, and sometimes ambiguous definitions are used of what it means to have a vegetarian or vegan diet (e.g., Ruby, 2012; Cooney, 2014).

Firstly, studies in the field of vegetarianism do not always clearly distinguish between vegetarianism and veganism, whereas research shows that adopting a vegetarian or vegan diet are two distinct behaviors (e.g., Povey et al., 2001). Secondly, the terms "vegan diet" and "plant-based diet" are often used interchangeably while at the same time studies do not use a uniform description of the target behavior. For instance, Wyker and Davison (2010) conceptualized a plant-based diet as decreasing one's consumption of meat, eggs, and dairy and Povey et al. (2001) classified a vegan diet as not consuming any animal-based products at all. Thus, these definitions differ both in terms of the degree of change (decreasing vs. completely avoiding) and in terms of the types of products avoided (only meat, eggs, and dairy vs. all animal-based products). Not uniformly defining the same behavior makes it very difficult to compare results from different studies directly, while formulating the target behavior in a reliable and valid manner is very important (Fishbein and Ajzen, 2010).

This research treats having a vegetarian diet and having a vegan diet as separate behaviors that will be operationalized following Doerr (2005) behavioral definition recommendations. Following RRA, it is useful to define behaviors as comprised of four elements: "[…] the *action* performed, the *target* at which the action is directed, the *context* in which it is performed, and the *time* at which it is performed (p. 29)." That is, we will consider adopting a vegetarian and vegan diet in frames of the target (meat and fish or meat, fish, dairy, and eggs), action (stopping to eat), context (for every consumption), and time elements (anytime in the next 6 months) for both study 1 and 2 questionnaires.

2.3. Language of the questionnaires

For the U.S. and Dutch sample, identical questionnaires are employed (i.e., the English questionnaire is not translated to Dutch). There are several experiments that show that even small linguistic alterations may lead to a different interpretation of the same question (Harkness et al., 2004; Doerr, 2005). Making respondents fill out a translated questionnaire (i.e., from English to Dutch) may influence answering behavior of respondents more than making respondents fill out a questionnaire in a foreign, but—for the most part—well-known language (i.e., Dutch participants who are very familiar with reading English texts, filling out an English questionnaire) (Sha, 2004; Giesen et al., 2010). Therefore, we chose to keep the questionnaire untranslated.

3. Study 1: Belief elicitation

To determine which attitudinal, normative and control beliefs two samples of meat-eating students have about vegetarian and vegan diets, a belief elicitation study was carried out. The first sample included students studying at the University of Minnesota, and the second sample included students studying at the University of Groningen. Permission to carry out the U.S. and Dutch study was granted by the ethical committees of the University of Minnesota and the University of Groningen, respectively.

3.1. Materials and methods

3.1.1. Participants

U.S. participants were students recruited from the subject pool of the University of Minnesota's School of Journalism and Mass Communication. Fifty-nine meat-eating students of the University of Minnesota completed an online questionnaire for which they received course credit. Participants were 11 males (19%) and 48 females (81%). Their mean age was 20.42 years (SD = 1.62) ranging from 18 to 27. Data was collected in November and December 2016.

Dutch participants were students recruited during in-class courses in Communication- and Information sciences, Media studies and Journalism at the Faculty of Arts of the University of Groningen, the Netherlands. Thirty meat-eating students of the University of Groningen completed an online questionnaire. Participants were 8 males (27%) and 22 females (73%). Their mean age was 20.30 years (SD = 2.21) ranging from 18 to 30. Data was collected in May 2017. We acknowledge that gender is not proportionally distributed in both samples. However, both samples represent comparatively the distribution of students' gender within the mentioned departments of both universities.

3.1.2. Instrument

Survey-builder Qualtrics was used to design the questionnaire (for both studies). The questionnaire contained demographic questions on age [I am (__) years old], gender identification (i.e., What gender do you identify with?) and dietary habits with regard to animal—based—products ("Which of the following statements describes your diet, following the description above?: I eat meat; I never eat meat, but I do eat fish; I never eat meat or fish, but I do eat dairy and/or eggs; I never eat meat, fish, dairy or eggs").

For formulating the target behaviors we used three of the four recommendations of Fishbein and Ajzen (2010): action, target, and time. The "context frame," (Fishbein and Ajzen, 2010, p. 29), describing the situational context of the target behavior (i.e., "for every consumption"), was not explicated in questions. The context component was made apparent in the introduction of the questionnaire before participants answered any questions about either diet. It could be easily inferred that stopping to eat a certain food altogether implies excluding the product from every consumption.

Attitudinal beliefs (underlying Attitude) were addressed by asking: "What are the good things that might happen if you stop eating meat and/or fish anytime in the next 6 months?" and "What are the bad things that might happen if you stop eating meat and/or fish anytime in the next 6 months?" For normative beliefs (underlying Perceived Norm) participants answered "Are there any groups or people who would approve of you stopping to eat meat and/or fish anytime in the next 6 months?" and "Are there any groups or people who would disapprove of you stopping to eat meat and/or fish anytime in the next 6 months?" For control beliefs, underlying Perceived Behavioral Control, participants answered: "What factors or circumstances might make it easier for you to stop eating meat and/or fish anytime in the next 6 months?" and "What factors or circumstances would make it difficult or impossible for you to stop eating meat and/or fish anytime in the next 6 months?" For adopting a vegan diet, beliefs were addressed by asking the same questions for switching to a vegan diet anytime in the next 6 months. All belief elicitation questions were open questions without a word limit.

3.1.3. Procedure

After giving informed consent, participants were asked demographic questions. If participants indicated they never consumed meat or fish, they were excluded from this belief elicitation study, as the target group of this study only includes meat eaters. After answering demographic questions, the remaining participants read a description of a vegetarian diet [when you have a vegetarian diet, you don't consume any meat or fish, but you do eat dairy and/or eggs (products that contain milk, yogurt, cheese, and/or eggs)] and answered the belief elicitation questions on their attitudinal, normative, and control beliefs about adopting a vegetarian diet. Finally, all participants read a description of a vegan diet [when you have a vegan diet you don't consume any animal products: no meat, no fish, and no dairy or eggs (no products that contain milk, yogurt, cheese, and/or eggs) at all] and answered belief elicitation questions about adopting a vegan diet.

3.2. Results

In the belief elicitation study, fifty-nine U.S. participants provided 551 beliefs (298 about having a vegetarian diet, 253 about a vegan diet), with an average of 9.3 beliefs per participant. Thirty Dutch participants provided 294 beliefs (171 about having a vegetarian diet, 123 about a vegan diet), with an average of 9.8 beliefs per participant.

TABLE 2A Results belief elicitation questionnaire: most frequently mentioned (% of participants mentioned) attitudinal beliefs U.S. and Dutch sample.

Positive attitudinal beliefs	Frequency (%) U.S.		Frequency (%) Dutch		Negative attitudinal beliefs	Frequency (%) U.S.		Frequency (%) Dutch	
	Vegetarian	Vegan	Vegetarian	Vegan		Vegetarian	Vegan	Vegetarian	Vegan
Experience positive health consequences	13 (22.0%)	13 (22.0%)	10 (33.3%)	4 (13.3%)	Not get enough protein	25 (42.2%)	9 (15.3%)	5 (16.7%)	1 (3.3%)
Lose weight	12 (20.3%)	11 (18.6%)	1 (3.3%)	1 (3.3%)	Not get all the nutrients my body needs	15 (25.4%)	16 (27.1%)	6 (20.0%)	9 (30.0%)
Have a healthier diet*	5 (8.5%)	6 (10.2%)	–	2 (6.7%)	Have a one-sided diet**	4 (6.8%)	9 (15.3%)	2 (6.7%)	8 (26.7%)
Contribute to a more sustainable environment	5 (8.5%)	3 (5.1%)	8 (26.7%)	4 (13.3%)	Have less energy	5 (8.5%)	6 (10.2%)	5 (16.7%)	2 (6.7%)
Save animal lives	3 (5.1%)	5 (8.5%)	4 (13.3%)	2 (6.7%)	Miss the taste of meat/fish/dairy & eggs	6 (10.2%)	5 (8.5%)	5 (16.7%)	2 (6.7%)
Have a smoother skin*	2 (3.4%)	6 (10.2%)	1 (3.3%)	–	Experience negative health consequences	6 (10.2%)	5 (8.5%)	3 (10.0%)	2 (6.7%)
Behave more ethical concerning animal treatment	4 (6.8%)	3 (5.1%)	4 (13.3%)	1 (3.3%)	Feel hungry more often*	6 (10.2%)	4 (6.8%)	–	–
Improved mood (Feel happier*/better**)	4 (6.8%)	3 (5.1%)	4 (13.3%)	1 (3.3%)	Spend more time and effort on meals	6(10.2%)	3 (5.1%)	5 (16.7%)	6 (20.0%)
Have more energy	5 (8.5%)	1 (1.7%)	3 (10.0%)	1 (3.3%)	Spend more money on food	5 (8.5%)	4 (6.8%)	2 (6.7%)	4 (13.3%)
Feel less guilty	4 (6.8%)	2 (3.4%)	3 (10.0%)	–	Enjoy my meals less	2 (3.4%)	5 (8.5%)	3 (10.0%)	1 (3.3%)
Save money on food	3 (5.1%)	2 (3.4%)	4 (13.3%)	1 (3.3%)	Not get enough iron	5 (8.5%)	1 (1.7%)	4 (13.3%)	1 (3.3%)
Lower my cholesterol*	4 (6.8%)	–	1 (3.3%)	–	Lose too much weight*	3 (5.1%)	1 (1.7%)	–	1 (3.3%)
Consume more vegetables	2 (3.4%)	1 (1.7%)	2 (6.7%)	–	Have more difficulty building muscles*	3 (5.1%)	1 (1.7%)	–	–
Feel proud**	–	–	–	2 (6.7%)					
Improve my self-discipline**	–	–	–	2 (6.7%)					
Total	66	56	45	21		91	69	40	37

*U.S. survey only/**Dutch survey only.

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A content analysis was carried out (by the first author) in which all responses were first categorized into a belief group (attitudinal, normative or control) and then into individual beliefs. Tables 2A–C show the beliefs (and their frequency) that were included in the regression study. In general, the most frequently mentioned beliefs were converted to evaluative statements and included in the regression studies. An exception is "Having a one-sided diet" (mentioned often in U.S. and Dutch samples, yet not included in U.S. regression study).

Because the most frequently mentioned beliefs about having vegetarian and vegan diets overlapped, these responses are grouped together in the tables. Beliefs that can be considered as belonging to the same overarching category were only treated as separate beliefs when they were mentioned more than twice. For instance, the behavioral belief that one will experience having more energy by following a vegetarian or vegan diet falls within the scope of the belief of experiencing positive health consequences. However, because the former belief recurred more than twice, it was treated as a belief that could be salient by itself.

As the Dutch sample was smaller, inclusion criteria were a bit more flexible. For instance, some beliefs that were not mentioned by the U.S. sample, and were mentioned only once or twice in the Dutch sample, were still included in the Dutch regression study (e.g., "Improve my self-discipline"). Some beliefs were only included in the Dutch regression study for having a vegan diet ("Experience health concerns" and "Better indication of products being vegan") as these were only mentioned for having a vegan diet. Men and women as normative referents were mentioned in both belief elicitation studies but were only included in the regression study for the Dutch sample. Including these two categories only in the Dutch study was done because the relative frequency of male referents being mentioned in the Dutch belief elicitation (20% of participants mentioned male referents) was a lot higher compared to the U.S. belief elicitation (6.8%). The possible usefulness of distinguishing between male and female referents and including these as such in the regression study was only recognized after carrying out the second belief elicitation study. Lastly, one control belief that was not mentioned in both belief elicitation studies was incorporated in the regression study, the belief that "Preparing vegetarian (vegan meals) is just as easy as preparing meals with animal-based products." This belief was added as we believed that it could be useful to incorporate a more specific version of the facilitating control belief that was mentioned in both elicitation studies: "Ease of cooking vegetarian meals." Taken together, the discrepancies between beliefs incorporated in the U.S. and Dutch regression study were due to frequency of mentioning and progressive insights after carrying out the U.S. belief elicitation and regression study.

Tables 2A–C displays the attitudinal, normative and control beliefs that are included in the regression study with its frequency mentioned and percentage of participants mentioned. Attitudinal themes most often mentioned were health considerations and weight loss for both the U.S. and Dutch sample. Normative referents mentioned were mostly one's family members and friends for the U.S. sample and friends and male referents (father/male friends) for the Dutch sample. Control perceptions were for both samples primarily about nutritional considerations, important referents' eating habits and availability of meat, vegetarian and vegan products.

TABLE 2B Results belief elicitation questionnaire: most frequently mentioned (% of participants mentioned) normative beliefs U.S. and Dutch sample.

Normative beliefs approve	Frequency (%) U.S.		Frequency (%) Dutch		Normative beliefs disapprove	Frequency (%) U.S.		Frequency (%) Dutch	
	Vegetarian	Vegan	Vegetarian	Vegan		Vegetarian	Vegan	Vegetarian	Vegan
Friends	12 (20.3%)	8 (13.6%)	9 (30.0%)	3 (10.0%)	Family	12 (20.3%)	17 (28.8%)	3 (10.0%)	3 (10.0%)
Family	2 (3.4%)	3 (5.1%)	3 (10.0%)	1 (3.3%)	Doctor*	4 (6.8%)	5 (8.5%)	–	–
Women (mother)**	1 (1.7%)	2 (3.4%)	1 (3.3%)	1 (3.3%)	Friends	3 (5.1%)	5 (8.5%)	3 (10.0%)	4 (13.3%)
					Men (father/male friends)**	4 (6.8%)	2 (3.4%)	6 (20.0%)	1 (3.3%)
					Women (mother)**	3 (5.1%)	3 (5.1%)	–	1 (3.3%)
Total	15	13	13	5		26	32	12	9

*Only U.S. survey. **Only Dutch survey.

TABLE 2C Results belief elicitation questionnaire: most frequently mentioned (% of participants mentioned) control beliefs U.S. and Dutch sample.

Facilitating control beliefs	Frequency (%) U.S.		Frequency (%) Dutch		Hindering control beliefs	Frequency (%) U.S.		Frequency (%) Dutch	
	Vegetarian	Vegan	Vegetarian	Vegan		Vegetarian	Vegan	Vegetarian	Vegan
Learn to maintain a fully nutritional vegetarian (vegan) diet	12 (20.3%)	8 (13.6%)	3 (10.0%)	3 (10.0%)	Experience resistance from important referent	8 (13.6%)	8 (13.6%)	8 (26.7%)	4 (13.3%)
Meat and fish (meat, fish, dairy, and eggs) becomes less available	13 (22.0%)	2 (3.4%)	2 (6.7%)	1 (3.3%)	Experience health/nutritional concerns***	8 (13.6%)	7 (11.9%)	6 (20.0%)	9 (30.0%)
Important referents stop/decrease eating meat and fish (meat, fish, dairy, and eggs)	3 (5.1%)	10 (16.9%)	9 (30.0%)	7 (23.3%)	Experience a lack of motivation	6 (10.2%)	9 (15.3%)	2 (6.7%)	1 (3.3%)
Learn that eating meat and/or fish (meat, fish, dairy, and eggs) lead to negative health consequences	9 (15.3%)	4 (6.8%)	1 (3.3%)	–	Experience a lack of availability of vegetarian (vegan) options	8 (13.6%)	5 (8.5%)	2 (6.7%)	4 (13.3%)
Price reduction vegetarian (vegan) products	3 (5.1%)	6 (10.2%)	4 (13.3%)	2 (6.7%)	Experience a difficulty in changing habits	6 (10.2%)	5 (8.5%)	7 (23.3%)	6 (20.0%)
Price increase meat or fish (meat, fish, dairy, and eggs)	3 (5.1%)	3 (5.1%)	4 (13.3%)	–	Often not feel full (enough) if having a vegetarian (vegan) diet*	5 (8.5%)	2 (3.4%)	–	–
Improvement availability vegetarian (vegan) options	3 (5.1%)	2 (3.4%)	7 (23.3%)	6 (20.0%)	Experience a lack of time to put in a vegetarian (vegan) diet*	3 (5.1%)	4 (6.8%)	–	2 (6.7%)
Enjoy vegetarian (vegan) food just as much as meat or fish	3 (5.1%)	2 (3.4%)	1 (3.3%)	3 (10.0%)	Experience a lack of convenience	6 (10.2%)	1 (1.7%)	2 (6.7%)	1 (3.3%)
Ease of cooking vegetarian (vegan) meals	1 (1.7%)	2 (3.4%)	3 (10.0%)	1 (3.3%)					
If vegan meals were prepared for me	–	3 (5.1%)	–	–					
Better indication of products being vegan**	–	–	–	1 (3.3%)					
Preparing vegetarian (vegan meals) was just as easy***	–	–	–	–					
Total	50	42	34	24		50	41	27	27

*Only U.S. survey. **Only Dutch survey vegan diet. ***Not mentioned in U.S. nor Dutch belief elicitation study.

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3.3. Discussion study 1

The large amount and variety of beliefs that were mentioned by the participants show that belief elicitation studies provide fruitful insights into salient belief structures of the two samples. Taken together, health, nutritional and environmental beliefs were the attitudinal themes most often indicated. Normative referents mentioned were mostly one's family members and friends. Beliefs mentioned when asked for control perceptions were primarily about important referents' eating habits and convenience of one's current diet.

In addition, the elicitation study showed that the beliefs related to adopting a vegetarian vs. a vegan diet overlapped to a large degree. For instance, almost a third of all participants mentioned the attitudinal belief that they would not get all the nutrients they need if they would adopt a vegetarian or vegan diet. At the same time, the attitudinal belief that one would experience positive health consequences was mentioned often for both diets. But there were also differences, for instance which beliefs were considered important—based on the frequency with which they were mentioned. For example, the attitudinal belief of having more energy appeared four times more often in the context of adopting a vegetarian diet than a vegan diet.

Furthermore, there was a considerable overlap in beliefs mentioned by the U.S. vs. the Dutch sample, although there were also some notable differences in the extent to which they were considered focal (again, based on frequency). For example, the attitudinal belief that one would contribute to a more sustainable environment was mentioned about three times more often by the Dutch sample compared to the U.S. sample for both diets. Conversely, the attitudinal belief that one would not get enough protein was mentioned around three times more often by the U.S. sample compared to the Dutch sample for both diets. Hence, although the U.S.A. and the Netherlands are both Western cultures sharing many commonalities, there are differences in the beliefs that come to mind when answering questions on attitudinal, norm and control beliefs in relation to vegetarian and vegan dietary behavior, at least for Dutch and U.S. college students. These results resonate with the findings of de Boer et al. (2016), who reported that the belief that consuming less meat had the potential to mitigate climate change, was twice as common in their Dutch sample as compared to their U.S. sample.

What the present two samples seem to have in common is the focus on health-related reasons surrounding adopting vegetarian and vegan diets. This concurs with the outcome of a scoping review by Corrin and Papadopoulos (2017) who showed that health (i.e., nutritional) concerns are prominent barriers when it comes to adopting meatless diets in Western cultures.

In sum, finding both similarities and differences underscores the importance of conducting belief elicitation studies. Even when one uses seemingly similar samples and/or similar behaviors there can be (subtle) differences that may nevertheless be relevant with regard to forming belief structures. Which of the beliefs that were collected in this belief elicitation study most strongly relate to Intention to have a vegetarian or vegan diet, was tested in the second study.

TABLE 3 Descriptives for gender, age and meat, fish, dairy, and/or egg consumption.

Participants	U.S. sample	Dutch sample
Omnivorous diet (eating meat)	204 (91.1%)	345 (87.4%)
Non-omnivorous diet (not eating meat, excluded)	20 (8.9%)	58 (12.6%)
Gender		
Male	38 (18.8%)	136 (39.4%)
Female	162 (80.2%)	209 (60.6%)
Other	2 (1.0%)	N/A
Age [M (SD)]	20.5 (1.7)	21.6 (2.5)
Consumption in number of days per week [M (SD)]		
Meat	4.7 (1.9)	4.7 (1.9)
Fish	0.7 (1.0)	0.8 (1.0)
Dairy and/or eggs	5.4 (2.0)	5.6 (2.0)

4. Study 2: Regression study

The objective of the regression study was to investigate the correlational structure of the Intention formation to have a vegetarian and a vegan diet as a function of Attitudes, Perceived Norm, Perceived Behavioral Control, and underlying beliefs in two samples: a sample of U.S. students and a sample of Dutch students. Following the RAA framework, study 2 samples differ from study 1 samples.

4.1. Materials and methods

4.1.1. Participants

U.S. participants were students ($N = 204$) recruited from the subject pool of the University of Minnesota's School of Journalism and Mass Communication. They received course credit for participation. They all answered questions about a vegetarian and a vegan diet. Dutch participants were students recruited *via* an online educational environment (Nestor) on the Communication and Information Sciences' study-page, and during in-class courses of Media Studies, University of Groningen. One hundred eighty-two of the meat-eating Dutch participants answered questions on both a vegetarian and vegan diet, while, for entirely practical reasons, 163 Dutch participants completed questions either on the vegetarian ($N = 81$) or the vegan diet ($N = 82$). Participants who indicated they did not eat meat were excluded from further analysis. Table 3 shows descriptives for U.S. and Dutch participants' diet, gender, and animal based-product consumption in the number of days per week.

4.1.2. Instrument

Fishbein and Ajzen (2010) measurement recommendations were used to develop measures of reasoned action variables, again with the exception of the context frame (see Section 3.1.2). Questions were framed in terms of "stop eating meat and fish anytime in the next 6 months" for a vegetarian diet, and "stop eating meat, fish, dairy, and eggs anytime in the next 6 months" for a vegan diet.

4.1.2.1. Attitude

To measure Attitudes toward having a vegetarian/vegan diet, eight seven-point semantic differential scales were presented to participants: "Me stopping to eat meat and fish (meat, fish, dairy, and eggs) anytime in the next 6 months, would be extremely...:" bad-good; foolish-wise; negative-positive; harmful-beneficial; unnecessary-necessary [Instrumental Attitude: $\alpha = 0.93$ (U.S.)/$\alpha = 0.90$ (Dutch) for a vegetarian and $\alpha = 0.94$ (U.S.)/$\alpha = 0.87$ (Dutch) for a vegan diet]; and unenjoyable-enjoyable; stressful-relaxing; unpleasant-pleasant [Experiential Attitude: $\alpha = 0.90$ (U.S.)/$\alpha = 0.83$ (Dutch) for a vegetarian and $\alpha = 0.92$ (U.S.)/$\alpha = 0.87$ (Dutch) for a vegan diet].

4.1.2.2. Perceived norm

To measure Injunctive Norm, participants were asked: "How do you think most people important to you would feel about you stopping to eat meat and fish (meat, fish, dairy, and eggs) anytime in the next 6 months? They would...:" 1 = strongly approve-7 = strongly disapprove. To measure Descriptive Norm, participants were asked about future behavior of important referents instead of past or current behavior, on the basis of the nature of the behavior under investigation (Fishbein and Ajzen, 2010). As only a small percentage of the U.S. and Dutch population can be considered vegetarian or vegan, it was decided that an appropriate measure would be future behavior. Therefore, the following question was asked for Descriptive Norm: "How many of the people who are most important to you do you think would stop eating meat and fish (meat fish, dairy, and eggs) anytime in the next 6 months? If you are not sure, make your best guess:" 1 = none, 2 = a few, 3 = some, 4 = most, 5 = all.

4.1.2.3. Perceived behavioral control

Perceived Behavioral Control over having a vegetarian/vegan diet was measured by the following seven-point semantic differential scales for Perceived Autonomy [$r = 0.77$ (U.S.)/$r = 0.65$ (Dutch) for a vegetarian and $r = 0.90$ (U.S.)/$r = 0.69$ (Dutch) for a vegan diet]: "Me stopping to eat meat and fish (meat, fish, dairy, and eggs) anytime in the next 6 months, would be...:" not under my control-under my control; not up to me-up to me. To measure Perceived Capacity, the following question was asked: "There can be a variety of obstacles to you to stop eating meat and fish. Even in the face of such obstacles, how sure are you that if you really wanted to you can stop eating meat and fish anytime in the next 6 months?" 1 = completely sure I cannot-7 = completely sure I can.

4.1.2.4. Intention

Intention was measured by asking participants "I can see myself stop eating meat and fish (meat, fish, dairy, and eggs) anytime in the next 6 months:" 1 = very unlikely-7 = very likely. The same question was repeated for "I will stop [...];" and "I intend to stop [...]" [$\alpha = 0.89$ (U.S.)/$\alpha = 0.88$ (Dutch) for a vegetarian and $\alpha = 0.92$ (U.S.)/$\alpha = 0.91$ (Dutch) for a vegan diet].

4.1.2.5. Beliefs

To measure attitudinal beliefs, questions were framed as "How likely is it that the following would happen to you if you stop eating meat and fish (meat, fish, dairy, and eggs) anytime in the next 6 months. I will..." [e.g., experience positive health consequences; contribute to a more sustainable environment], with 1 = very unlikely-7 = very likely.

To measure normative beliefs, the questions were framed as follows: "How do you think your [e.g., close friends] would feel about you stop eating meat and fish (meat, fish, dairy, and eggs) anytime in the next 6 months? They would..." (1 = strongly disapprove−7 = strongly approve) and, "How many of your [e.g., close friends] do you think would stop eating meat and fish (meat, fish, dairy, and eggs) anytime in the next 6 months? If you are not sure, make your best guess" (1 = none, 2 = a few, 3 = some, 4 = most, 5 = all).

Finally, control beliefs were measured by framing questions as: "How sure are you that you can stop eating meat and fish (meat, fish, dairy, and eggs) anytime in the next 6 months, if..." [e.g., people important to me would decrease their meat and fish (meat, fish, dairy, and egg) intake; you experience a lack of motivation], with 1 = very unlikely-7 = very likely. Belief measures are not scaled and analyzed individually.

4.1.3. Procedure

After giving informed consent, participants were asked demographic questions. Then, they read a description of a vegetarian diet and answered questions about attitudinal, normative and control components related to switching to a vegetarian diet. Finally, all participants who finished two questionnaires read a description of a vegan diet and answered the same questions about switching to a vegan diet.

4.2. Results

First, we will show the descriptives. We show correlations, means and standards deviations for each measured RAA variable for having a vegetarian and vegan diet for both samples. Second, we show the results of a regression analysis in which we regressed Intention to have a vegetarian/vegan diet on Instrumental and Experiential Attitude, Injunctive and Descriptive Norm, and Perceived Capacity and Autonomy for both samples. The regression analysis shows which of the RAA components are significantly predictive for Intention. Lastly, we will show the results of a belief identification analysis, in which we examined which specific beliefs correlated strongest with Intention to have a vegetarian and vegan diet for both samples.

4.2.1. Vegetarian diet: Descriptives

Table 4 shows the correlations, means and standard deviations for having a vegetarian diet for U.S. and Dutch participants. Both participant groups' Attitude toward a vegetarian diet was somewhat negative. In addition, all participants expected neither a high or low level of approval from people important to them to have a vegetarian diet and they did not expect important referents to adopt a vegetarian diet in the near future. They felt somewhat capable and autonomous in their decision to have a vegetarian diet, but reported a very low Intention to have a vegetarian diet. The two Normative scales (Injunctive & Descriptive) and the two Control scales (Capability & Autonomy) showed weak correlations for the U.S. and Dutch participants ($r < 0.50$) The two Attitude scales were moderately correlated for Dutch participants ($r = 0.66$) and relatively strongly correlated for U.S. participants ($r = 0.73$).

TABLE 4 Descriptive statistics: correlations, means, and standard deviations for having a vegetarian diet U.S.A. and Netherlands.

	Correlations						Means (M) and standard deviations (SD)	
U.S.A.	IA	EA	IN	DN	PC	PA	M_a	SD
Behavioral intention	0.58**	0.56**	0.25**	0.28**	0.28**	0.07	1.97	1.33
Instrumental attitude (IA)		0.73**	0.28**	0.23**	0.32**	0.28**	3.49	1.28
Experiential attitude (EA)			0.23**	0.26**	0.32**	0.22**	2.97	1.28
Injunctive norm (IN)				0.18*	0.18**	0.22*	3.71	1.29
Descriptive norm (DN)					0.08	0.08	1.72	0.72
Perceived capacity (PC)						0.27**	4.08	1.90
Perceived autonomy (PA)							5.12	1.63
Netherlands								
Behavioral intention	0.53**	0.56**	0.37**	0.38**	0.27**	0.28**	2.18	1.40
Instrumental attitude (IA)		0.66**	0.33**	0.29**	0.34**	0.35**	4.09	1.14
Experiential attitude (EA)			0.37**	0.27**	0.33**	0.31**	3.19	1.03
Injunctive norm (IN)				0.38**	0.28**	0.28**	3.77	1.55
Descriptive norm (DN)					0.08	0.15**	1.66	0.65
Perceived capacity (PC)						0.45**	4.88	1.81
Perceived autonomy (PA)							4.82	1.68

*Significant at $p < 0.05$.

**Significant at $p < 0.001$.

[a]Means are relative to scales ranging from 1 (negative; weak) to 7 (positive; strong) except for descriptive norm, for which the mean is relative to a scale ranging from 1 (negative; weak) to 5 (positive; strong).

4.2.2. Vegan diet: Descriptives

Table 5 shows correlations, means and standard deviations for having a vegan diet for U.S. and Dutch participants. Again, participants did not have a very positive Instrumental Attitude or Experiential Attitude. Participants expected from people important to them to slightly disapprove if they decided to have a vegan diet and they did not expect important referents to adopt a vegan diet in the near future. Participants felt somewhat to rather autonomous in their decision to have a vegan diet and showed lower levels of Perceived Capacity Again, behavioral Intention was very low). The correlations between the two Normative scales ($M = 0.42$) and two Control scales ($r = 0.36$) were moderate for both participant groups ($r < 0.45$). The two Attitude scales were again moderately correlated for the Dutch participants ($r = 0.60$) and strongly correlated for the U.S. participants ($r = 0.76$). A collinearity test showed that the high correlation did not imply that Instrumental and Experiential Attitude formed a single Attitude variable for U.S. participants for both diets (Vegetarian diet: Instrumental Attitude, tolerance = 0.44, VIF = 2.27; Experiential Attitude, tolerance = 0.45, VIF = 2.22)/Vegan diet: Instrumental Attitude, tolerance = 0.40, VIF = 2.50; Experiential Attitude, tolerance = 0.38, VIF = 2.67). In sum, both vegetarian and vegan dietary behaviors show support for the Reasoned Action Approach's dual component conceptualization of determinants (i.e., Attitude consists of two components, Fishbein and Ajzen, 2010).

4.2.3. Regression vegetarian diet

4.2.3.1. U.S.A.

Intention to have a vegetarian diet was regressed on Instrumental and Experiential Attitude, injunctive and Descriptive Norm and Perceived Autonomy and capacity (Table 6). These six variables explained 37% of the variance in Intention to have a vegetarian diet for U.S. participants. Intention proved to be a function of Instrumental Attitude ($\beta = 0.35, p = 0.000$) and Experiential Attitude ($\beta = 0.32, p = 0.002$).

4.2.3.2. Netherlands

The six determinants together explained 40% of the variance in Intention to have a vegetarian diet for Dutch participants. Intention proved to be a function of Instrumental Attitude ($\beta = 0.20$, $p = 0.003$), Experiential Attitude ($\beta = 0.33$, $p = 0.000$), and Descriptive Norm ($\beta = 0.20, p = 0.000$).

4.2.4. Regression vegan diet

4.2.4.1. U.S.A

Intention to have a vegan diet was regressed on the six reasoned action components (Table 6). The light-gray marked areas in the table show significant determinants. The six determinants together explained 43% of the variance in Intention to have a vegan diet. Again, the two Attitude components were a function of Intention (Instrumental Attitude $\beta = 0.21$, $p = 0.022$, Experiential Attitude $\beta = 0.49$, $p = 0.000$).

4.2.4.2. Netherlands

The six determinants together explained 30% of the variance in Intention to have a vegan diet for Dutch participants. Intention proved to be a function of Experiential Attitude ($\beta = 0.43$, $p = 0.000$) only.

TABLE 5 Descriptive statistics: correlations, means, and standard deviations for having a vegan diet.

	Correlations						Means (M) and standard deviations (SD)	
U.S.A.	IA	EA	IN	DN	PC	PA	M_a	SD
Behavioral intention	0.57**	0.65**	0.41**	0.46**	0.45**	0.14*	1.69	1.22
Instrumental attitude (IA)		0.76**	0.40**	0.33**	0.35**	0.22**	3.07	1.36
Experiential attitude (EA)			0.46**	0.39**	0.35**	0.13	2.53	1.25
Injunctive norm (IN)				0.42*	0.41**	0.22*	2.95	1.44
Descriptive norm (DN)					0.24**	0.00	1.36	0.62
Perceived capacity (PC)						0.36**	2.85	1.95
Perceived autonomy (PA)							3.57	1.19
Netherlands								
Behavioral intention	0.41**	0.54**	0.27**	0.22**	0.24**	0.23**	1.31	0.74
Instrumental attitude (IA)		0.60**	0.38**	0.27**	0.27**	0.25**	4.11	2.07
Experiential attitude (EA)			0.39**	0.25**	0.31**	0.23**	2.79	1.54
Injunctive norm (IN)				0.30**	0.47**	0.33**	2.81	1.46
Descriptive norm (DN)					0.12	0.05	1.32	0.55
Perceived capacity (PC)						0.44**	3.58	2.06
Perceived autonomy (PA)							4.49	1.88

*Significant at $p < 0.05$. **Significant at $p < 0.001$.

[a]Means are relative to scales ranging from 1 (negative; weak) to 7 (positive; strong) except for descriptive norm, for which the mean is relative to a scale ranging from 1 (negative; weak) to 5 (positive; strong).

4.2.5. Belief identification

Next, all three types of beliefs (related to Attitude, Perceived Norm, and Perceived Behavioral Control) were examined to test which specific beliefs would have predictive value pertaining to behavioral Intention to have a vegetarian and vegan diet best. Tables 7–9 show correlations of behavioral, normative, and control beliefs about having a vegetarian and having a vegan diet with behavioral Intention. The light-gray marked areas in the table show significant correlations. Some beliefs were evaluated for only one of the diets or one of the samples in accordance with the outcomes of the belief elicitation study (i.e., beliefs that were mentioned by only one sample of for only one diet were only explored for that sample/diet: if a belief was not applicable it is labeled as n/a in Tables 7–9).

4.2.5.1. Attitudinal beliefs

Tables 7A, B shows how the attitudinal beliefs (i.e., perceptions about the perceived likelihood of the positive and/or negative consequences of having a meatless diet that underlie Attitude) correlate with Intention to have a vegetarian and vegan diet for both the U.S. and Dutch sample.

4.2.5.1.1. Vegetarian diet

U.S.A.

Attitudinal beliefs that were most strongly and positively associated with Intention were the beliefs that one would be happier, feel less guilty, experience positive health consequences, have a healthier diet, have more energy, contribute to a more sustainable environment, behave more ethically concerning animal treatment and would lose weight when adopting a vegetarian diet. Attitudinal beliefs that were most strongly negatively related to Intention to have a vegetarian diet were the beliefs that one would miss the taste of meat, enjoy meals less, have less energy and not get all the nutrients needed

Netherlands

Attitudinal beliefs that were most strongly and positively associated with Intention were the beliefs that one would feel better, feel less guilty, experience positive health consequences, have more energy, feel proud, contribute to a more sustainable environment, behave more ethical concerning animal treatment, improve one's self-discipline, and save animal lives when adopting a vegetarian diet. Attitudinal beliefs that were most strongly negatively related to Intention to have a vegetarian diet were the beliefs that one would enjoy meals less, miss the taste of meat, not get all the nutrients needed, not get enough iron, have a one-sided diet, not get enough protein, have less energy and spend more time and effort on meals.

4.2.5.1.2. Vegan diet

U.S.A.

Attitudinal beliefs that were most strongly and positively associated with Intention to have a vegan diet were the beliefs that one would be happier, have more energy, spend less money on food, have a healthier diet and experience positive health consequences, feel less guilty and behave more ethically concerning animal treatment. Not getting enough protein and missing the taste of dairy and eggs were attitudinal beliefs that were most strongly—but only moderately—negatively related to Intention.

Netherlands

Attitudinal beliefs that were most strongly and positively associated with Intention were the beliefs that one would have more energy, feel better, experience positive health consequences, feel less

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TABLE 6 Regression results: intention regressed on attitudinal, normative, and control variables U.S.A. and Netherlands.

Explanatory variables	Vegetarian diet						Vegan diet					
	U.S.A.				Netherlands				U.S.A.		Netherlands	
	b	SE *b*	*β*	*p*	*b*	SE *b*	*β*	*p*	*b*	SE *b*	*b*	SE *b*
Instrumental attitude (IA)	0.36	0.09	0.35	0.000	0.25	0.08	0.20	0.003	0.18	0.08	0.28	0.13
Experiential attitude (EA)	0.33	0.09	0.32	0.000	0.45	0.09	0.33	0.000	0.48	0.09	0.21	0.03
Injunctive norm (IN)	0.08	0.06	0.08	0.192	0.08	0.05	0.09	0.127	0.04	0.06	0.00	0.03
Descriptive norm (DN)	−0.10	0.11	−0.06	0.365	0.42	0.12	0.20	0.000	−0.01	0.12	0.11	0.08
Perceived capacity (PC)	−0.03	0.04	−0.047	0.424	0.03	0.04	0.04	0.508	−0.05	0.04	0.01	0.02
Perceived autonomy (PA)	0.06	0.05	0.07	0.240	0.03	0.05	0.04	0.539	0.41	0.07	0.02	0.01
	$R^2 = 0.37$				$R^2 = 0.40$				$R^2 = 0.43$		$R^2 = 0.30$	

Explanatory variables	Vegan diet			
	Netherlands			
	β	*p*		
Instrumental attitude (IA)	0.09	0.165		
Experiential attitude (EA)	0.43	0.000		
Injunctive norm (IN)	0.00	0.990		
Descriptive norm (DN)	0.08	0.172		
Perceived capacity (PC)	0.02	0.713		
Perceived autonomy (PA)	0.08	0.174		
	$R^2 = 0.30$			

guilty, feel proud, contribute to a more sustainable environment, behave more ethical concerning animal treatment, improve one's self-discipline, save money on food, and save animal lives when adopting a vegan diet. Attitudinal beliefs that were most strongly negatively related to Intention to have a vegan diet were the beliefs that one would enjoy meals less, miss the taste of meat, have a one-sided diet, not get all the nutrients needed, spend more time and effort on meals, not get enough protein, have less energy, not get enough iron, and spend more money on food.

4.2.5.2. Normative beliefs

Table 8 shows how the normative beliefs (i.e., perceptions about social support from specific individuals in one's social network that underlie Perceived Norm) correlate with Intention to have a vegetarian and vegan diet for both the U.S. and Dutch sample.

4.2.5.2.1. Vegetarian diet

U.S.A.

Intention was associated with expected approval from one's friends and to a lesser degree from one's family. Doctor's approval was not statistically significant related to Intention. Expected future behavior of friends and family was moderately related to Intention.

Netherlands

Intention was associated with expected approval from one's friends and to a lesser degree from one's family, women in one's direct environment, and men in one's direct environment. Expected future behavior of friends and family was moderately related to Intention.

4.2.5.2.2. Vegan diet

U.S.A.

Expected approval of one's family, friends and doctor were associated with Intention, as was the expectation that one's family members and friends would adopt a vegan diet in the near future.

Netherlands

Intention was associated with expected approval from one's family (r = 0.32), one's friends and women in one's direct environment. Expected future behavior of family and friends was moderately related to Intention.

4.2.5.3. Control beliefs

Tables 9A, B shows how the control beliefs (i.e., perceptions of environmental contexts that facilitate or hamper the ability of changing one's consumption patterns underlying Perceived Control) correlate with Intention to have a vegetarian and vegan diet for both the U.S. and Dutch sample.

4.2.5.3.1. Vegetarian diet

U.S.A.

Important facilitating control beliefs that were related to Intention were the beliefs that meat or fish would increase in price, vegetarian products would reduce in price and become more available, important referents would stop or decrease their meat and fish intake, learning how to prepare vegetarian meals just as easily as meals with meat or fish and learning how to maintain a fully nutritional vegetarian diet. Finally, only one obstructing control belief, that one would often not feel full enough having a vegetarian diet was moderately and negatively related to Intention.

TABLE 7A Positive attitudinal beliefs about having a vegetarian and having a vegan diet: means (M), standard deviations (SD), and correlation (r) with behavioral intention.

Perceived likelihood of having diet (1 = very unlikely−7 = very likely)	U.S.A. vegetarian diet			U.S.A. vegan diet			NL vegetarian diet			NL vegan diet		
	M	SD	*r*	*M*	SD	*r*	*M*	SD	*r*	*M*	SD	*r*
Improved mood (feel happier/feel better)	2.44	1.12	0.52**	2.44	1.17	0.49**	2.82	1.22	0.47**	2.57	1.25	0.34**
Feel less guilty	2.57	1.33	0.51**	2.59	1.22	0.32**	2.50	1.24	0.37**	2.40	1.23	0.32**
Experience positive health consequences	3.06	1.20	0.44**	2.93	1.20	0.32**	2.78	1.09	0.31**	2.54	1.13	0.33**
Have a healthier diet	3.07	1.24	0.43**	3.06	1.20	0.34**	N/A	N/A	N/A	N/A	N/A	N/A
Have more energy	2.58	1.17	0.41**	2.61	1.20	0.39**	2.41	0.97	0.33**	2.26	1.03	0.37**
Contribute to a more sustainable environment	3.41	1.24	0.40**	3.28	1.18	0.22**	3.91	1.01	0.29**	3.63	1.14	0.19**
Behave more ethical concerning animal treatment	3.14	1.27	0.39**	3.05	1.28	0.30**	3.29	1.24	0.25**	3.05	1.28	0.16**
Lose weight	3.16	1.20	0.31**	3.26	1.21	0.17*	3.05	1.16	0.10	3.27	1.29	0.04
Have a smoother skin	2.94	1.08	0.29**	3.04	1.12	0.22**	N/A	N/A	N/A	N/A	N/A	N/A
Lower my cholesterol	3.35	1.01	0.30**	3.32	1.08	0.19**	N/A	N/A	N/A	N/A	N/A	N/A
Save animal lives	3.36	1.33	0.27**	3.26	1.25	0.28**	3.47	1.27	0.19**	3.45	1.26	0.12*
Consume more vegetables	3.97	1.02	0.18**	3.77	1.11	0.03	4.05	1.03	0.06	4.06	1.06	−0.028
Save money on food	2.75	1.24	0.15*	2.34	1.14	0.39**	3.13	1.26	0.05	2.61	1.21	0.14*
Feel proud	N/A	N/A	N/A	N/A	N/A	N/A	2.88	1.25	0.30**	2.55	1.20	0.31**
Improve my self-discipline	N/A	N/A	N/A	N/A	N/A	N/A	3.20	1.24	0.24**	3.22	1.22	0.16*

*$p < 0.05$, **$p < 0.005$. N/A, not incorporated in survey.

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TABLE 7B Negative attitudinal beliefs about having a vegetarian and having a vegan diet: means (M), standard deviations (SD), and correlation (r) with behavioral intention.

Perceived likelihood of having diet (1 = very unlikely−7 = very likely)	U.S.A. vegetarian diet			U.S.A. vegan diet			NL vegetarian diet			NL vegan diet		
	M	SD	*r*	*M*	SD	*r*	*M*	SD	*r*	*M*	SD	*r*
Miss the taste of meat and/or fish	4.15	1.00	−0.39**	4.09	0.94	−0.24**	4.15	1.00	−0.43**	4.16	1.01	−0.36**
Enjoy my meals less	3.53	1.10	−0.37**	3.93	1.02	−0.24**	3.49	1.17	−0.50**	3.87	1.08	−0.38**
Have less energy	3.39	1.08	−0.34**	3.60	3.60	−0.22**	3.10	1.06	−0.21**	3.51	1.07	−0.24**
Not get all the nutrients my body needs	3.61	1.06	−0.28**	3.88	0.98	−0.23**	3.57	1.05	−0.36**	3.94	0.94	−0.31**
Not get enough protein	3.86	1.06	−0.26**	3.97	0.99	−0.29**	3.52	1.05	−0.25**	3.94	0.98	−0.25**
Not get enough iron	3.89	0.87	−0.26**	3.79	0.94	−0.26**	3.49	0.98	−30**	3.77	0.96	−0.19**
Feel hungry more often	3.78	1.06	−0.24**	3.90	0.96	−0.25**	N/A	N/A	N/A	N/A	N/A	N/A
Have more difficulty building muscles	3.61	0.99	−0.21*	3.74	1.00	−0.25**	N/A	N/A	N/A	N/A	N/A	N/A
Experience negative health consequences	2.93	1.01	−0.16*	3.19	1.05	−0.06	2.76	0.95	−0.23**	3.23	1.04	−0.18**
Spend more time and effort on meals	3.81	1.11	−0.12	3.92	1.03	−0.20**	3.74	1.15	−0.16*	4.18	0.94	−0.27**
Spend more money on food	3.38	1.16	−0.05	3.74	1.03	−0.11	2.93	1.16	0.03	3.53	1.07	−0.15**
Lose too much weight	2.49	1.11	−0.083	2.90	1.11	0.03	N/A	N/A	N/A	N/A	N/A	N/A
Miss the taste of dairy and eggs	N/A	N/A	N/A	4.17	0.96	−0.27**	N/A	N/A	N/A	N/A	N/A	N/A
Have a one-sided diet	N/A	N/A	N/A	N/A	N/A	N/A	3.41	1.05	−0.30**	3.80	1.03	−0.31**

*$p < 0.05$, **$p < 0.005$. N/A, not incorporated in survey.

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TABLE 8 Normative beliefs about having a vegetarian and having a vegan diet: means (M), standard deviations (SD), and correlation (r) with behavioral intention.

Perceived approval for having diet (1 = strongly disapprove−7 = strongly approve)	U.S.A. vegetarian diet			U.S.A. vegan diet			NL vegetarian diet			NL vegan diet		
	M	SD	*r*	*M*	SD	*r*	*M*	SD	*r*	*M*	SD	*r*
Friends	3.92	1.36	0.31**	3.24	1.38	0.36**	3.78	1.54	0.37**	2.86	1.48	0.27**
Family	3.18	1.42	0.20**	2.70	1.49	0.40**	3.77	1.55	0.28**	2.76	1.52	0.32**
Doctor	3.77	1.33	0.14	3.23	1.48	0.39**	N/A	N/A	N/A	N/A	N/A	N/A
Men	N/A	N/A	N/A	N/A	N/A	N/A	3.24	1.44	0.18**	2.49	1.33	0.11
Women	N/A	N/A	N/A	N/A	N/A	N/A	4.69	1.21	0.24**	3.72	1.13	0.27**
Perceived expectation about having diet in the future (1 = none−5 = all)												
Friends	1.60	0.68	0.27**	1.35	0.62	0.46**	1.49	0.65	0.36**	1.29	0.57	0.21**
Family	1.30	0.60	0.22**	1.22	0.57	0.46**	1.27	0.55	0.20**	1.12	0.43	0.22**

** $p < 0.005$. N/A, not incorporated in survey.

TABLE 9A Facilitating control beliefs about having a vegetarian and having a vegan diet: means (M), standard deviations (SD), and correlation (r) with behavioral intention.

Perceived behavioral control over having diet (1 = not at all sure−7 = completely sure)	U.S.A. vegetarian diet			U.S.A. vegan diet			Vegetarian diet			Vegan diet		
	M	SD	*r*	*M*	SD	*r*	*M*	SD	*r*	*M*	SD	*r*
Price reduction vegetarian (vegan) products	3.03	1.23	0.42**	2.77	1.24	0.30**	3.30	1.26	0.30**	3.03	1.21	0.17**
Important referents stop eating meat and fish (meat, fish, dairy, and eggs)	2.69	1.21	0.39**	2.49	1.14	0.44**	3.12	1.31	0.23**	2.82	1.24	0.17**
Enjoy vegetarian (vegan) food just as much as meat or fish (meat, fish, dairy, and eggs)	3.12	1.32	0.39**	2.93	1.32	0.30**	3.57	1.25	0.20**	3.27	1.34	0.10
Important referents decrease eating meat and fish (meat, fish, dairy, and eggs)	2.78	1.19	0.39**	2.53	1.11	0.46**	3.22	1.21	0.27**	2.81	1.20	0.17**
Price increase meat or fish (meat, fish, dairy, and eggs)	2.90	1.15	0.38**	2.57	1.16	0.35**	3.26	1.08	0.23**	2.77	1.10	0.07
Improvement availability vegetarian (vegan) options	3.28	1.17	0.37**	2.88	1.24	0.30**	3.57	1.17	0.33**	3.20	1.15	0.24**
Ease of cooking vegetarian (vegan) meals	3.21	1.24	0.35**	2.90	1.32	0.29**	3.32	1.24	0.32**	N/A	N/A	N/A
Learn to maintain a fully nutritional vegetarian (vegan) diet	3.26	1.25	0.34*	3.01	1.28	0.28**	3.42	1.20	0.32**	3.12	1.22	0.20**
Meat and fish (meat, fish, dairy, and eggs) become less available	2.98	1.22	0.28**	2.67	1.16	0.33**	3.32	1.05	0.20**	2.99	1.08	0.13**
Better indication of products being vegan	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	2.64	1.21	0.23**

* $p < 0.05$, ** $p < 0.005$. N/A, not incorporated in survey.

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TABLE 9B Hampering control beliefs about having a vegetarian and having a vegan diet: means (M), standard deviations (SD), and correlation (r) with behavioral intention.

Perceived behavioral control over having diet (1 = not at all sure—7 = completely sure)	U.S.A. vegetarian diet			U.S.A. vegan diet			NL vegetarian diet			NL vegan diet		
	M	SD	*r*	*M*	SD	*r*	*M*	SD	*r*	*M*	SD	*r*
Often not feel full (enough) if having a vegetarian (vegan) diet	3.70	1.05	−0.28**	3.73	1.07	−0.17*	N/A	N/A	N/A	N/A	N/A	N/A
Learn that eating meat and fish (meat, fish, dairy, and eggs) lead to negative health consequences	3.14	1.19	0.19**	2.84	1.19	0.39**	3.22	1.14	0.24**	3.04	1.16	0.12
Experience a lack of motivation	3.64	1.02	−0.23**	3.76	1.05	−0.23**	3.51	1.09	−0.29**	3.96	0.91	−0.35**
Experience a difficulty in changing habits	3.91	0.97	−0.20**	3.97	1.04	−0.14	3.73	1.10	−0.29*	4.08	0.94	−0.30**
Experience a lack of availability of vegetarian (vegan) options	3.51	1.07	−0.065	3.72	1.04	−0.21**	3.34	1.14	−0.15*	3.73	0.95	−0.16**
Experience a lack of time to put in a vegetarian (vegan) diet	3.59	1.10	−0.18*	3.79	1.08	−0.16*	N/A	N/A	N/A	N/A	N/A	N/A
Experience resistance from important referent	3.04	1.15	−0.07	3.32	1.12	−0.12	2.99	1.23	−0.058	3.42	1.02	−0.13**
Experience a lack of convenience	3.75	0.97	−0.12	3.83	1.14	−0.11	3.42	1.07	−0.17**	3.87	0.98	−0.26**
Experience health/nutritional concerns	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	3.22	1.02	−0.17**

*$p < 0.05$, **$p < 0.005$. N/A, not incorporated in survey.

Netherlands

Important facilitating control beliefs that were related to Intention were the beliefs that the availability of vegetarian options would improve, learning how to prepare vegetarian meals just as easily as meals with meat or fish, learning how to maintain a fully nutritional vegetarian diet, vegetarian options would decrease in price, important referents would stop or decrease their meat and fish intake, meat, or fish would increase in price and become less available. Finally, four obstructing control beliefs; a lack of motivation to maintain a vegetarian diet, difficulty of changing habits, lack of convenience, and a lack of food options were moderately and negatively related to Intention.

4.2.5.3.2. Vegan diet

U.S.A.

Control beliefs that were most strongly positively related to Intention were the facilitating beliefs that important referents would decrease or stop eating meat, fish, dairy, and eggs, learning that eating animal-based products would have serious negative consequences, animal-based products would increase in price and be less available and the availability of vegan products would improve while their price reduces. Finally, only two obstructing control beliefs, that one would experience a lack of motivation and vegan options were moderately and negatively related to Intention.

Netherlands

Control beliefs that were most strongly positively related to Intentions were the beliefs that the availability of vegan options would improve, better indications of products being vegan, learning how to maintain a fully nutritional vegetarian diet, important referents would stop or decrease their meat and fish intake, vegan options would decrease in price, meat or fish would become less available. Finally, six obstructing control beliefs, a lack of motivation to maintain a vegan diet difficulty of changing habits, experiencing a lack of convenience, health concerns, a lack of food options, and resistance from an important referent were moderately and negatively related to Intention.

4.3. Discussion regression study

In our regression study we investigated which beliefs, and which reasoned action concepts were important in predicting the Intention to have a vegetarian diet and a vegan diet. In addition, we explored the extent to which this pattern of prediction was different between the vegetarian vs. the vegan diet and we compared outcomes of the U.S. vs. the Dutch sample.

If we look at the predictive power of the concepts from the Reasoned Action Approach, the two samples showed quite similar patterns when it comes to adopting a vegetarian diet: in both samples Instrumental Attitude (i.e., positive behavioral attributes) and Experiential Attitude (i.e., positive affective behavioral experiences) were significant predictors of behavioral Intention. The fact that we found both Attitude components as important predictors for adopting a meatless diet is in line with previous research (e.g., (Zur and Klockner, 2014; Graça et al., 2015; Carfora et al., 2017). The only other RAA concept that was found to be predictive of Intention to have a vegetarian diet was Descriptive Norm (i.e., whether important referents have a vegetarian diet) for the Dutch

sample. Finding Descriptive Norm, and not Injunctive Norm (i.e., the extent to which one thinks important referents will approve of one having a vegetarian diet), as a significant predictor was unexpected, as the two components of Perceived Norm (i.e., have often been found to have equal predictive power with respect to behavioral Intention (see, e.g., the meta-analysis by McEachan et al., 2016). This apparently small role for Perceived Norm is remarkable, since we know from other research that these norms can play quite an important role in adopting vegetarian or vegan diets (e.g., Sharps et al., 2021; Bolderdijk and Cornelissen, 2022). It may be the case that there is not much variability in what our participants experience around them: most people in their nearest social environment do not engage in meat-free diets, nor do many peers or relatives approve of such diets. Thus, a lack of variability may have obscured the real influence of Perceived Norm on Intention. Such a methodological explanation is supported by the finding that Perceived Norm beliefs do correlate with Intention (see Table 8). So social norms play a role but it is of crucial importance how you measure them. This finding could also be due to the way in which Descriptive Norm was conceptualized in our research. We asked participants how many people important to them would adopt a vegetarian or vegan diet in the next 6 months. It may be that expecting a lot of important referents to adopt a vegetarian or vegan diet in the near future reflects the participants' own expectation to adopt a vegetarian or vegan diet (i.e., higher Descriptive Norms were associated with having higher Intentions). Likewise, expecting only few or none of one's important referents to adopt a vegetarian or vegan diet may have led to participants' own expectation not to adopt one of these diets (i.e., lower Descriptive Norms led to lower Intentions).

Equally unexpected, we did not find Perceived Control components to be significant predictors of participants' Intention. Earlier research did find that beliefs related to Perceived Capacity (i.e., one's perceived ability to have either diet), for instance a perceived lack of cooking skills, were important in explaining behavioral Intention (Corrin and Papadopoulos, 2017). In addition, Graça et al. (2019) found both Perceived Control components to explain Intentions in relation to vegetarian/vegan diets. The fact that we did not find evidence for the predictiveness of either of the Perceived Control concepts could be taken to mean that a change in attitude is necessary before Perceived Capacity or Perceived Autonomy (i.e., the perceived extent to which one thinks to be autonomous in changing one's diet) can play a role. On the other hand, it might be the operationalization of Perceived Capacity and Perceived Autonomy that stood in the way of finding significant correlations: The formulation of the open questions may have been too abstract for our participants (e.g.,: "There can be a variety of obstacles to you to stop eating meat and fish. Even in the face of such obstacles, how sure are you that if you really wanted to you can stop eating meat and fish anytime in the next 6 months?"). As with the Social Norms discussed above, this possible explanation is supported by the significant correlations we do find for Perceived Control beliefs with Intention (see Tables 9A, B).

When we look at the predictive power of RAA components for having a vegan diet we also only found subtle differences between the two samples. What the Dutch and U.S. sample had in common was that Attitude was a significant predictor of Intention, just as we saw for the vegetarian diet. However, Experiential Attitude was the only significant predictor for Intention in the Dutch sample while for the U.S. sample both Instrumental and Experiential Attitude predicted Intention. It is unclear what the reason is for this discrepancy. Possibly, the fact that the Netherlands has a long-standing "dairy culture," with nationwide campaigns that stress the importance of consuming dairy in Dutch culture (like "the Netherlands runs on dairy," De Nederlandse Zuivel Organisatie, 2021) has something to do with an enhanced emotional involvement (i.e., more experiential than instrumental), but the exact mechanism is as yet unknown.

The present research showed the usefulness of conceptualizing vegetarian and vegan dietary behaviors as separate behaviors, as well as the importance of measuring them as such. The strength of the beliefs' association with Intention to have a vegetarian/vegan diet varied widely. In addition, different sets of beliefs ultimately predict behavioral Intentions, which implies that vegetarian and vegan dietary behaviors are perceived to differ from one another.

In summary, the Reasoned Action Approach variables accounted for a sizable amount of the variance in Intention (i.e., the extent to which the variables were able to explain intentions)—respectively 37% (U.S. sample) and 40% (Dutch sample) for adopting a vegetarian diet and 43% (U.S. sample) and 30% (Dutch sample) for adopting a vegan diet.

5. General discussion

The aim of the present research was to explain Intention formation for adopting a vegetarian diet and adopting a vegan diet by applying a Reasoned Action Approach. A belief elicitation study was carried out to identify the most important attitudinal, normative and control beliefs. We then conducted a regression study to investigate to what extent the Intention to have a vegetarian and vegan diet was a function of these beliefs and the concepts of attitudes, perceived norms and perceived behavioral control.

A first important outcome of our study is that vegetarian and vegan dietary behavior should be seen as different, as they involved different belief sets and RAA concepts in the prediction of Intention. For instance, the attitudinal belief of having more energy appeared four times more often in the context of adopting a vegetarian diet than a vegan diet. And even though our U.S. and Dutch sample shared similarities in their norms and values, they did show differences in their motivations and cognitions. For example, the belief that a vegetarian and vegan diet would contribute to a more sustainable environment was mentioned about three times more often by the Dutch sample compared to the U.S. sample. Conversely, the belief that one would not get enough protein was mentioned around three times more often by the U.S. sample compared to the Dutch sample for both diets. This indicates the importance of making a custom analysis for each specific target group and each specific target behavior before designing interventions.

In a more general sense, if we only look at the RAA concepts, the Intention to change to a vegetarian or vegan diet seems to be guided primarily by the attitude of our participants: What they see as positive or negative consequences of this behavior (be it instrumental or experiential) is crucial for the Intention to change their existing eating behavior. None of the other concepts (with the exception of Descriptive Norm in the Dutch sample asked about vegetarianism) seems to have an added value. The reason is perhaps methodological—related to formulations being too abstract, or variability being too low—because the beliefs underlying the other concepts, Social Norms and Perceived Control, did show significant

correlations with Intention. One way to approach this problem would be to reformulate the questions used to measure the concepts of Social Norms and Perceived Control, for instance by distinguishing the various possible important others, or the various obstacles that people can encounter when changing their diets. However, one can also question the usefulness of measuring these global percepts separately. Perhaps it suffices to elicit beliefs in the categories prescribed by the concepts.

Hence, our study highlights the usefulness and importance of including a belief elicitation phase in the study of Intention formation. The great majority of studies that use a reasoned action approach does not at present use such elicitation methods (Yzer, 2013). Instead, researchers tend to rely on earlier research that uses different target groups (e.g., Bryant, 2019) or their own intuitions when formulating possibly relevant beliefs. This strategy can negatively impact outcomes. A case in point is that, through the years, it has often been found that health and ethical considerations are among the most important beliefs that are related to adopting a vegetarian and vegan diet (e.g., Ruby, 2012; Cooney, 2014; Rosenfeld, 2019). However, our research showed that other beliefs, such as those related to the behavior of important referents, are at least as influential. Without carrying out a belief elicitation study, these beliefs would perhaps not have been recognized and subsequently tested.

The outcomes also show which specific beliefs should be considered as candidates for interventions that encourage adopting a vegetarian diet and vegan diet for. That is, beliefs with the highest correlations with Intention and (relatively) low means (i.e., beliefs that have most room for improvement) are likely the best candidates as targets in intervention messages. Based on our study such beliefs were present for each reasoned action component. For instance, behavioral beliefs (e.g., "feel happier/better;" "feel less guilt") and (descriptive) normative beliefs (e.g., "friends are likely to adopt a vegetarian/vegan diet"), but also control beliefs (e.g., "price reduction of vegetarian/vegan products; "ease of cooking vegetarian/vegan meals") could be addressed in interventions. Other candidates are the "control beliefs" falling within the behavioral component (e.g., "enjoy vegetarian/vegan food just as much") and normative component (e.g., "important referents stop eating meat and fish"). In sum, for research that uses Reasoned Action Approach, we recommend to conduct elicitation studies in combination with a regression study and to avoid a singular reliance on a regression study that uses only the standardized Intention, Attitude, Norm, and Control component measures.

Another, point concerns the theoretical framework, the RAA itself. Some findings from the belief elicitation study point to a possible difficulty in the operationalization of components in the RAA approach. For instance, in response to the questions about Perceived Behavioral Control ("What factors or circumstances might make it easier/more difficult for you to stop eating meat and/or fish anytime in the next 6 months?"), participants reported beliefs that are indicative of Perceived Norms. For instance, the belief that it would help to commit to a vegetarian/vegan diet if "Important referents stop/decrease eating meat and fish (meat, fish, dairy, and eggs)" was mentioned by many respondents, especially in the Dutch sample (up to 30% of all control beliefs elicited). Likewise, the belief that it would hinder transitioning toward a meat-free diet if respondents would "Experience resistance from important referent" was also quite frequent (between 13 and 26% of all control beliefs elicited). The tendency of participants to mention normative beliefs in response to questions about attitude or perceived behavioral control has also been described in other studies and seems to pertain to behaviors that are highly social in nature. For instance, Donné et al. (2017) report a similar phenomenon in their study on when and why people talk to others about a health topic. This may indicate that where social behaviors such as talking to others, or behaviors which are subject to strong social norms such as adopting a vegetarian or vegan diet, are concerned, the three basic concepts of attitude, social norms, and behavioral control may become virtually indistinguishable. It is as yet unclear how the RAA can be adapted to incorporate these findings.

5.1. Future directions

This research suggests multiple directions for future research. First, as there were more female than male participants in our present study, we were unable to present a balanced view on gender differences in Intention formation, while gender is known to be an important background variable, especially in relation to vegetarian and vegan dietary behavior. That is, research consistently finds that men and women have different beliefs and show different behavior concerning the consumption of animal-based products (e.g., Lea and Worsley, 2002; Ruby, 2012; Graça et al., 2015). This should be taken into account in future research. In addition, we were unable to present a view on differences between intenders and non-intenders of adopting a vegetarian or vegan diet. Fishbein (2008) shows that it can be important to distinguish between these two groups as those groups may posit different beliefs, and different beliefs that are correlated to Intention. In our study, Intentions were mostly very low, and samples were relatively small. We were not able to compare participants with high Intentions to those who had low Intentions reliably. Future research that uses larger sample sizes might reach a sufficient number of intenders to expand the analysis and investigate potential differences between these groups. Another recommendation for future research is using a sample that is representative for the entire target group being investigated. Our sample was not representative as we used a convenience sample and we did not focus on the full target group (i.e., college students) as we only surveyed students from one background (i.e., students from communication/media studies).

From a societal perspective, the fact that Intentions were low shows there is a strong need for interventions if one wants to encourage behavior change in the field of vegetarianism and veganism for U.S. and Dutch college students. These low mean Intention scores are also interesting from the perspective of socially desirable responding: responding in such a manner as to provide a better image of oneself (van de Mortel, 2008). For instance, because the study was purely about adopting vegetarian and vegan diets, participants may have believed that the researcher viewed vegetarian and vegan diets positively. As a consequence, one would have expected participants to overreport on their Intentions—and other reasoned action components. However, because Intentions were extremely low and scores on other reasoned action components were for the most part also low, we do not expect participants to have had a high tendency to overreport. Perhaps participants felt a need to underreport their behavior and cognitions, as negative stereotypes on vegetarians and vegans widely exist (MacInnis and Hodson, 2017). As such, it may be more norm-compliant to self-report low Intentions and low scores on other reasoned action

components. In order to investigate whether participants are prone to provide socially desirable answers when answering questions on reasoned action components with regard to adopting vegetarian and vegan diets, one could include scales that measure socially desirable responding tendencies (cf: Perinelli and Gremigni, 2016).

Another point of consideration is while this study gathered critical information about which salient belief structures explain behavioral Intention, it leaves unclear how people exactly construe these beliefs (Middlestad, 2012). Expanding a belief elicitation study and regression study with a qualitative focus group study for instance can lead to deeper understanding about belief formation, which may have important implications for the design of interventions promoting (a change in) behavior (e.g., Yzer et al., 2015).

Importantly, the present study did not actually test the effectiveness of interventions promoting vegetarian and vegan diets. It would be extremely helpful, both from a practical but also from a theoretical standpoint if future studies could include an additional experimental phase that tests intervention messages within the same target group incorporating the most important candidate beliefs based on prior belief elicitation and regression studies. In this way, it is possible to validate or disprove the effectiveness of intervention messages based on the framework of the Reasoned Action Approach.

5.2. In closing

In closing, our results underscore that even between western countries and cultures, sharing similarities in their norms and values, similar sub-populations can differ in their motivations and cognitions—even if it is only in a subtle matter. In addition, different beliefs and reasoned action components were related to seemingly similar diets. This indicates the importance of employing a specific target group and target behavior analysis (i.e., by means of carrying out a belief elicitation study, regression study, and relating those beliefs to Intention) before designing interventions aimed at promoting vegetarian and vegan dietary behavior.

Data availability statement

The raw data supporting the conclusions of this article will be made available by the authors, without undue reservation.

Ethics statement

The studies involving human participants were reviewed and approved by Netherlands: Research Ethics Committee of Faculty of Arts (CETO) and U.S.A.: University of Minnesota Ethics Committee. The patients/participants provided their written informed consent to participate in this study.

Author contributions

EZ: design, preparation, and carrying out of study 1 and 2, data analysis study 1 and 2, and writing: abstract, introduction, method, results, discussion, and references. YO: writing: abstract, introduction, method, results, and discussion and data analysis study 2. JH: design and preparation of study 1 and 2, writing: abstract, introduction, method, results, and discussion, and data analysis study 2. All authors contributed to the article and approved the submitted version.

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Conflict of interest

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

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