



# Planetary Health Diet

## Promoting a sustainable plant-based diet among adolescents and young adults (part 1)

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### Introduction

Our current global production, processing, and distribution of food have a considerable impact on climate change, loss of biodiversity, changes in land use, and the nutrient cycles in the soil, water, and atmosphere [1, 2]. As a result, the resources for future food production are reduced [2], whilst at the same time the demand for food is increasing due to the growing global population [3]. This means that dietary patterns not only influence health [4], but also have environmental and social effects [5].

As a framework for developing more sustainable dietary patterns and future-proofing food production, in 2019 the EAT Lancet Commission published the planetary health diet (PHD). Compared to the current dietary habits of the German population, this envisages a greater consumption of fruit, vegetables and nuts, wholegrain cereals, and unsaturated fatty acids. At the same time it encourages reducing the amounts of meat, milk products, saturated fatty acids, and sugars [5].

Aside from small changes, such as pulses as a separate food group recommended explicitly as a source of protein [5], the PHD corresponds widely to the 10 rules of the German Nutrition Society (DGE) [6] (■■■ DGE statement on “The Planetary Health Diet in contrast to the food-based dietary guidelines of the German Nutrition Society [DGE]” on the preceding pages). However, with its focus on the environment and food security, the PHD brings forward partially different arguments for dietary changes and therefore provides additional approaches for nutrition communication. German dietary studies [7–10] show deviations from the PHD particularly among young people and those from lower educational backgrounds. These groups, for instance, consume the lowest quantities of fruit, vegetables [7, 8], and fiber [7] within the samples. Young men and persons with low socio-economic status are also shown to consume particularly large quantities of meat [7, 10].

### Abstract

The dietary patterns of young people from lower educational backgrounds, which are rich in animal products and low-fiber foods, facilitate the development of nutrition-related diseases and environmental damage. For this reason, campaign strategies should be developed to communicate specifically to this target group and promote plant-based nutrition along the lines of the planetary health diet (PHD). To this end, the eating habits of the target group were examined for correspondence with the PHD and an investigation was made to determine the factors which can positively and negatively influence the corresponding behavioral changes. A total of 215 participants between the ages of 16 and 29 were surveyed using an online questionnaire (part 1) on the basis of which strategies were developed for possible campaigns (part 2).

**Keywords:** planetary health diet, nutrition communication, behavioral change, adolescents, young adults, sustainability, public health nutrition, plant-based diet

### Citation

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#### Items to ascertain outcome expectations:

“If you eat fruit, vegetables, pulses, and wholegrain products every day and don’t eat meat or fish every day ...

- ... you feel healthier.“
- ... you can be healthy for longer in later life.“
- ... there is a lower risk of developing cardiovascular diseases, cancer, or diabetes in later life.“
- ... you can help combat climate change.“
- ... less water is needed to produce your food.“
- ... it helps ensure that less animals are kept in poor conditions.“
- ... it helps ensure that more people in the world can be provided with food.“
- “I enjoy eating lots of fruit, vegetables, pulses, and wholegrain products rather than eating meat or fish every day.“

#### Items to ascertain the motives for changing dietary patterns:

“I would change my eating habits, ...

- ... if it made me feel more comfortable in my body.“
- ... if it meant I could lose weight.“
- ... if it would help me get more active.“
- ... if it would help me develop muscles.“
- ... if it would improve my health.“
- ... if I could be healthy for longer in later life.“
- ... if this reduced the risk of developing cardiovascular diseases, cancer, or diabetes in later life.“
- ... if it meant I could help protect the environment.“
- ... if it meant I was doing something to combat climate change.“
- ... if it meant that fewer animal and plant species would become extinct.“
- ... if it meant that less water was used.“
- ... if it meant that I could do something to ensure that everyone in the world had enough to eat.“

#### Items to ascertain social norms:

“Who would like it if you ate a lot of fruit, vegetables, pulses, and wholegrain products and didn’t eat meat or fish every day?”

- “My friends”
- “My family”
- “My schoolmates”
- “My colleagues”
- “My partner”

Fig. 1: Summary of the items included in the questionnaire to ascertain outcome expectations, attitudes to reasons for changing dietary patterns, and social norms (own presentation)

Agreement was ascertained using a 5-point rating scale (“agree”, “partly agree”, “neither agree nor disagree”, “partly disagree”, “disagree”, and “don’t know” as an evasive alternative).

## Research question

A plant-based diet along the lines of the PHD should be promoted among adolescents and young adults from low-educational backgrounds. Since, among other things, existing data on food consumption [7–10] does not differentiate between vegetables and pulses or wholegrain and other cereal products, an initial step should determine the changes needed in eating habits. Due to the limited data available, an investigation should also be carried out to identify the factors which encourage or obstruct these behavioral changes. This should enable the identification of arguments for the PHD which are relevant to this target group and establish the obstacles to its implementation in their daily lives.

## Methodology

### Design of the questionnaire

#### *Need for change among the target group*

In order to collect the attitudes of as many respondents from the target group as possible, a quantitative survey of young people was carried out. In order to quantify current implementation of the PHD among the target group, a measurable target behavior was first defined. The focus was placed on three behavioral aspects where action is urgently required:

1. eating at least five portions of vegetables, pulses, and fruit per day,
2. eating one meal containing pulses instead of meat/fish on three days per week,
3. eating at least one portion of wholegrain cereal products per day.

This target behavior was defined on the basis of the PHD reference diet [5] and the 10 rules of the DGE [6] and presented in the questionnaire under the term “plant-based diet”. Although dietary studies also indicate the need to reduce meat consumption, it was assumed that increased consumption of plant-based foods would also achieve this.

In order to ascertain the need for change, the trans-theoretical model (TTM) [11] was used. Based on tried and tested questionnaires that had already used the TTM on eating habits, it was ascertained whether the respondents had already implemented each of the three behavioral aspects, whether they wanted to do so in the future, whether they could imagine doing so in the future or whether they had absolutely no intention of doing so. Allocation to

the model should enable the target group to be addressed on the individual behavioral levels and specific support to be offered to attain the next level.

### Influence factors on behavioral change

The direct influence factors on the development of behavioral intention identified in the theory of planned behavior [14] are attitudes to the target behavior and its consequences [15] and social norms [14]. Social-cognitive learning theory [16] also mentions expectations of self-efficacy and outcome – the expectation that the behavior will lead to the desired result [15].

In order to establish which of these factors encourage or obstruct a plant-based diet among the target group, data was collected on whether the respondents were confident they could adopt the target behavior and whether groups within their social environment would support this. As a basis for designing the questionnaire, sections of tried and tested questionnaires were simplified and adapted to the research question [17]. In addition, respondents were asked for their opinions on whether a plant-based diet would have positive effects on health, the environment, and global food security and for what reasons respondents would be prepared to change their behavior (♦ Figure 1).

In order to identify support needs, possible obstacles to and resources for the implementation of a plant-based diet were ascertained by way of two open questions. Then another open question gave the opportunity for comment. The questionnaire contained a total of 54 questions (49 closed or half-open and five open). The results of a preliminary survey with eight persons were also considered.

### Conduct of the survey

For the quantitative, written online survey of the target group, data was collected from adolescents and young adults in June and July 2020 using the program SoSci Survey.

The respondents were recruited through five vocational and training preparation schools, associations, as well as Facebook-groups related with a specific vocational training or town.

### Analysis

The statistical analysis of the data was performed using the software IBM SPSS Statistics, version 26. Since most of the quantitative data consisted of ordinal data, the Mann-Whitney U test was used predominantly to examine differences between subsamples and the Spearman correlation coefficient was used to calculate correlations. From the qualitative data inductive categories were established in accordance with qualitative content analysis [18]. Then the answers were converted into quantitative data by treating the categories as possible answers to closed multiple response questions.

Questionnaires which were incomplete and those of respondents over the age of 26 and University-students were excluded.

### Results

Overall 343 persons were surveyed and 215 respondents were included in the analysis. The respondents were between 15 and 26 years old ( $\bar{x} = 20.08$ , standard deviation [SD] = 2.39). 65.1% were female, 34.0% male, 81.4% were in vocational training. 51.2% had attained their Abitur (level 4 in the European Qualifications Framework, EQF) or qualification for higher education, 34.0% had attained a standard secondary school certificate (*Realschulabschluss*, level 3 in the EQF). 16.7% followed a special dietary plan, of which approx. half were vegetarian, vegan or flexitarian.

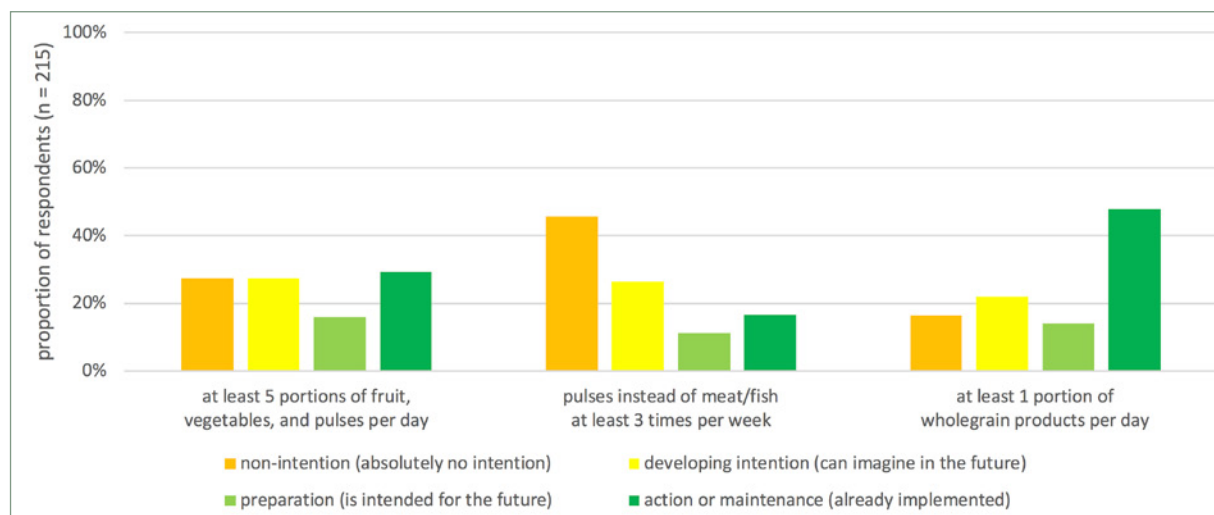


Fig. 2: Allocation of the respondents to the levels of the trans-theoretical model (own presentation)



### Need for behavioral change among the target group

54.8% had up to now displayed no intention to eat at least five portions of fruit, vegetables, and pulses per day and were allocated to the TTM level of non-intention or developing intention (♦ Figure 2). With regard to consumption of pulses instead of meat/fish for at least three meals per week, this applied to 72.1% of the respondents. Women were allocated significantly higher than men in the TTM with regard to the consumption of both fruit, vegetables, and pulses ( $p = 0.000$ ,  $N = 213$ ) and pulses as meat alternatives ( $p = 0.000$ ,  $N = 213$ ).

With regard to the daily consumption of at least one portion of wholegrain products, only 38.2% were allocated to the level of non-intention or intention formation. 47.9% stated that they already implemented this behavioral aspect.

### Factors influencing behavioral change

#### Self-efficacy

As ♦ Figure 3 shows, the respondents' expectation of self-efficacy belief was strongest with regard to consumption of wholegrain products: although 32.0% of respondents had not yet implemented this behavioral aspect, they agreed completely or partly that they could achieve this. As regards the consumption of fruit, vegetables, and pulses and the use of pulses as a meat substitute, the proportions were 22.8% and 23.2% respectively.

#### Attitudes and outcome expectations

The most common expectation among the respondents as to the effects of a plant-based diet was that this would lead to less animals

being kept in poor conditions. All the responses on result expectations are presented in ♦ Figure 4. There was a positive correlation between agreement that a plant-based diet would taste good and the level in the TTM as regards eating pulses instead of meat/fish ( $r = 0.545$ ,  $p = 0.000$ ,  $N = 204$ ).

Reasons for changing dietary patterns which most frequently elicited complete or partial agreement from respondents were health-related motives, prevention of species extinction (70.7%), and the wish that "all people in the world get enough to eat" (70.2%) (♦ Figure 5). Significantly more women than men agreed with the statements that a plant-based diet would taste good ( $p = 0.000$ ,  $N = 202$ ), that one would feel better as a result ( $p = 0.001$ ,  $N = 196$ ) and that less animals would be kept in poor conditions ( $p = 0.010$ ,  $N = 206$ ) and with all the suggested reasons for behavioral change.

#### Social norms

As can be seen in ♦ Figure 6, respondents named their own family as the group from which they most often expected a positive reaction to a plant-based diet. The opinions of the peer group were assessed somewhat less positively.

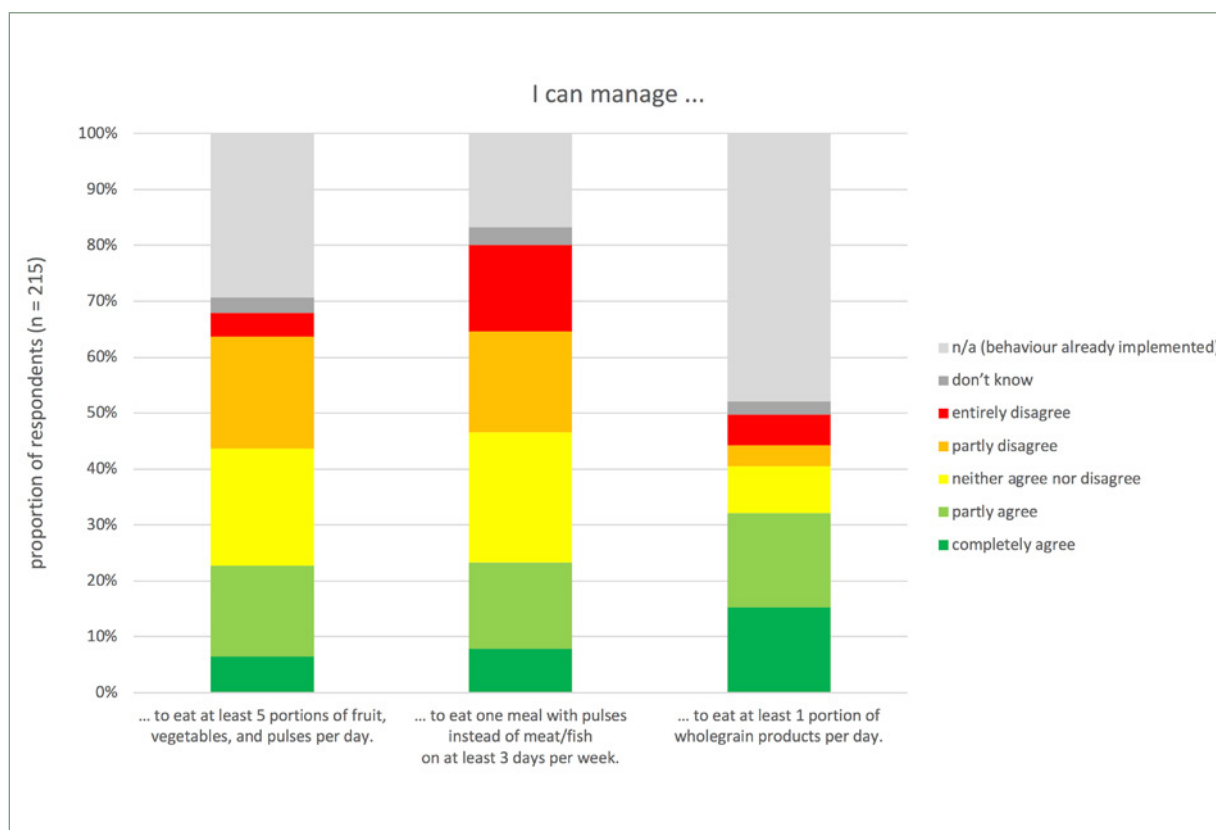


Fig. 3: Distribution of respondents' assessments of their self-efficacy (own presentation)

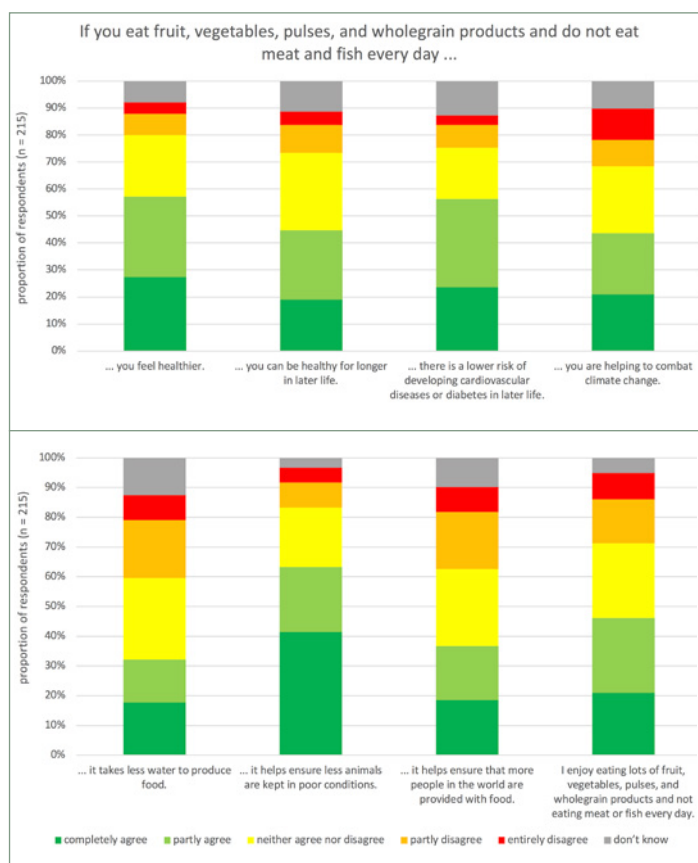


Fig. 4: Distribution of respondents' level of agreement with attitudes to the target behaviour (own presentation)

### Obstacles and resources

The obstacle to implementation of the target behavior that was mentioned most often by respondents was the increased work and time effort required, e.g. in meal planning, shopping, and food preparation (25.1%, ♦ Figure 7). 17.7% see taste as an obstacle, e.g. on account of disliking plant-based foods, a preference for animal products, and doubts about variety in a plant-based diet. Several respondents mentioned giving up meat, describing it as difficult or categorically rejecting the idea. The taste of pulses was also mentioned specifically as an obstacle – as well as the time needed for preparation and lack of knowledge about pulses.

The resource respondents mentioned most often for the implementation of a plant-based diet was support from their social circle (24.7%, ♦ Figure 8). Other resources mentioned were online and print media (9.3%), recipes (6.0%), and a larger selection of reasonably-priced plant-based foods in shops (6.5%), such as meat substitutes and ready meals.

In responses to open questions some respondents displayed an undifferentiated view on nutrition and assessed foods solely on the basis of isolated criteria, such as energy or protein content. Several participants stated that they considered dietary information from selected bloggers or influencers.

## Discussion

This study indicates the need for changes in eating habits among young people from low-educational backgrounds and corresponding factors that encourage or obstruct such behavioral changes. The survey shows that the consumption of at least one portion of wholegrain products per day is a measure more respondents have already implemented than the regular consumption of vegetables, pulses, and fruit or use of pulses as a meat substitute. Reasons respondents gave for changing their eating patterns were, in particular, their own health, protecting biodiversity, and food security. However, they were only partly convinced by the positive effects of a plant-based diet.

### Composition of the sample

The extent to which the intended target group was reached is questionable. The relatively high school qualifications held by the majority of the respondents indicates that people from low-educational backgrounds are rather underrepresented. Although this means that the intended target group is only partly reflected, respondents with high educational qualifications were not excluded from the evaluation. This would have made the sample too small to be able to yield meaningful results. In addition, there were no significant differences to be seen in the characteristics studied between subsamples with different school qualifications. Respondents with a lower level of education did however tend to be less convinced of the positive effects of a plant-based diet and less willing to change their eating habits for health or environmental reasons. It can therefore be assumed that a sample with lower educational status would show less willingness to change and have less positive result expectations. However, even if the results of the survey only reflect “adolescents and young adults from low-educational backgrounds” to a limited extent, they still yield valuable information about the current implementation of the PHD among young people in Germany and the factors that must be considered to promote the PHD in this age group.

Another aspect to be considered is the unequal gender ratio in the sample, since – according to studies on eating habits [7–10] and the results of this survey – young men and persons from low-educational backgrounds have up to now been least likely to implement the target behavior of a “plant-based diet” and also

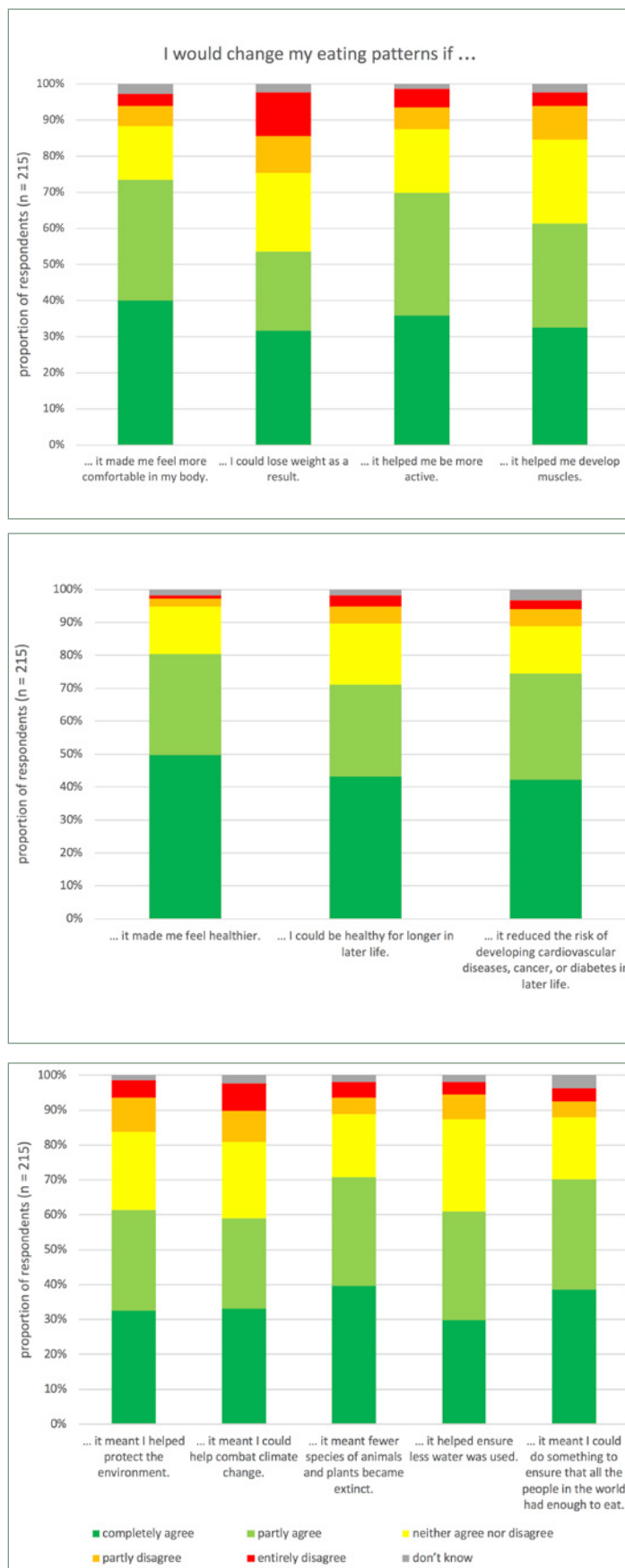


Fig. 5: Distribution of respondents' level of agreement with motives for dietary change (own presentation)

display the lowest levels of conducive outcome expectations. In order to promote adoption of the PHD effectively among this target group it is therefore particularly important to study more closely the influence factors relevant for corresponding behavioral changes among young men with low-educational status and to consider their needs as regards nutrition communication.

### Need for change among the target group

Consumption of one portion of wholegrain per day is already a relatively widespread behavior among the target group that they apparently do not perceive as unusual. Around half the respondents can be allocated to the level of action or maintenance and the self-efficacy expectation in this respect is comparatively high. Further increases would, however, be desirable since the PHD reference diet envisages exclusive use of wholegrain cereals. The consumption of fruit, vegetables, and pulses as envisaged in the target behavior is implemented less often. The predominant non-intention or developing intention in accordance with the TTM and the rather low self-efficacy expectation indicate that particularly the regular consumption of pulses as an alternative to meat is far from the everyday reality of this target group. This is also shown by the frequent mention of obstacles with regard to pulses, the perception that for a plant-based diet a larger and more reasonably-priced range of plant-based foods is needed, and the respondents' doubts as to the variety offered by this type of diet. Therefore, the action most urgently required is promotion of these two behavioral aspects.

### Factors influencing behavioral change

There were comparatively positive result expectations with regard to shorter-term and more specific health effects of a plant-based diet, such as its influence on the conditions in which animals are kept. On the other hand, however, a large part of the respondents were not convinced of the positive effects on climate, water consumption, global food security, or the risks of non-communicable diseases. Thus, the target group seems to have positive outcome expectations in particular as regards the effects of a plant-based diet which can be seen and felt directly in their own lives. Correspondingly, the reasons for behavioral change that seem particularly relevant are those which relate directly to them person-

ally, to mankind or animals and are therefore tangible: the maintenance of biodiversity, hunger, or food security and personal health. These motives should be used to promote development of behavioral intention.

In order to achieve behavioral change, helpful social norms and mutual support within the target group and thus the peer group, should also be promoted. The families of the target group should also be considered, since according to descriptions of possible obstacles, these play a key role in day-to-day dietary planning.

The descriptions of obstacles and resources often focused on giving up meat, whereby a plant-based diet was often interpreted as a vegetarian or vegan diet with strict limitations. This indicates a dichotomous categorization of dietary styles by the target group into “unlimited meat consumption” or “vegetarian/vegan”. A plant-based diet, which sits between these two categories and can be relatively flexible, seems to have no place in this categorization, which could cause some fundamental problems in communicating the PHD.

### Discussion of the methodology and limitations

The questionnaire proved an effective instrument, which was well-understood and largely completed as intended. The definition of the target behavior in the questionnaire was intended to make clear that a “plant-based diet” represents a balanced, varied diet that allows multiple individual eating patterns and does not necessarily have to be vegetarian/vegan. Even though this was not always perceived as such by the respondents, this undogmatic approach is one of the strengths of the instrument.

Distortion of the results due to the effects of social desirability cannot be excluded. This could have contributed to the fact that prevention of disease was given as a relevant motive for behavioral change. In addition, the availability of “don’t know” as an an-

swer could have caused distortions. This was included to identify a need for information. In the questions on outcome expectations, over 10% of respondents chose this answer for several items – possibly also to avoid having to engage with individual questions and to reduce the time spent on the questionnaire.

### Conclusion

For both health and environmental reasons, sustainable, plant-based dietary patterns must be promoted among young people from low-educational backgrounds. As shown by allocation of the target group to the TTM, regular consumption of fruit, vegetables, and pulses and in particular of pulses as an alternative to meat should be encouraged. At the same time, consideration should be given to the influence factors which could be effective in developing intention to behavioral change according to the theory of planned behavior and social cognitive theory. The expectations of self-efficacy and the outcome expectation that a plant-based diet has positive effects on health and the environment should be intensified. In addition, social norms which encourage a plant-based diet and mutual support for behavioral change, particularly within the peer group, should be promoted. The obsta-

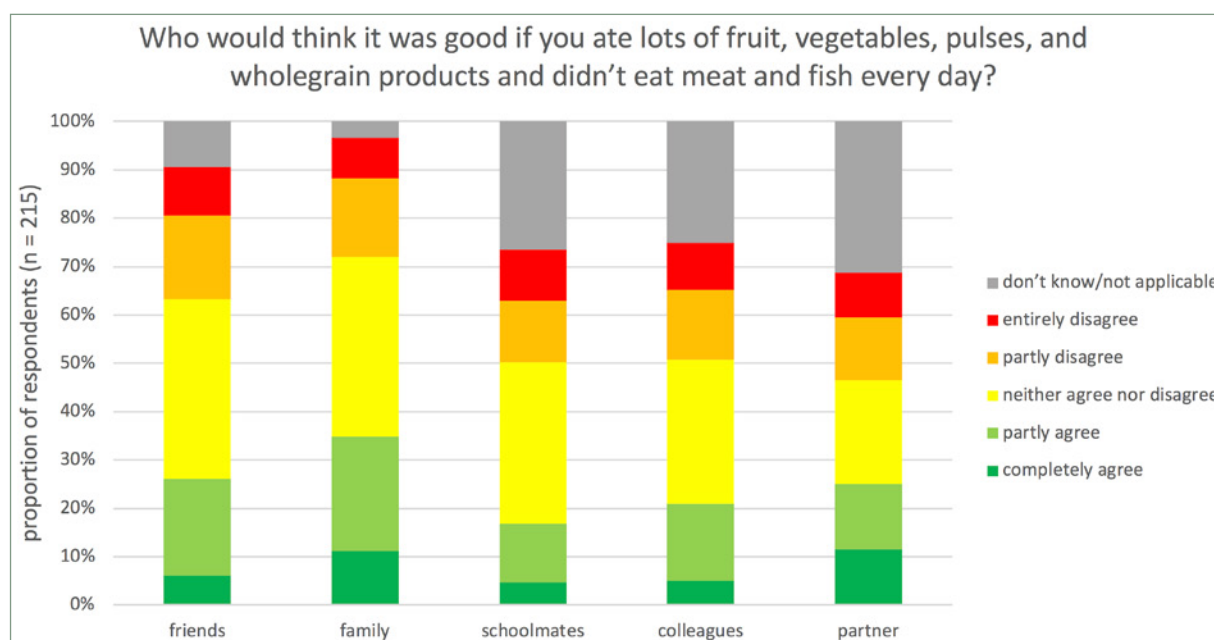


Fig. 6: Distribution of respondents' level of agreement on perceived social pressure for conversion to a plant-based diet (own presentation)

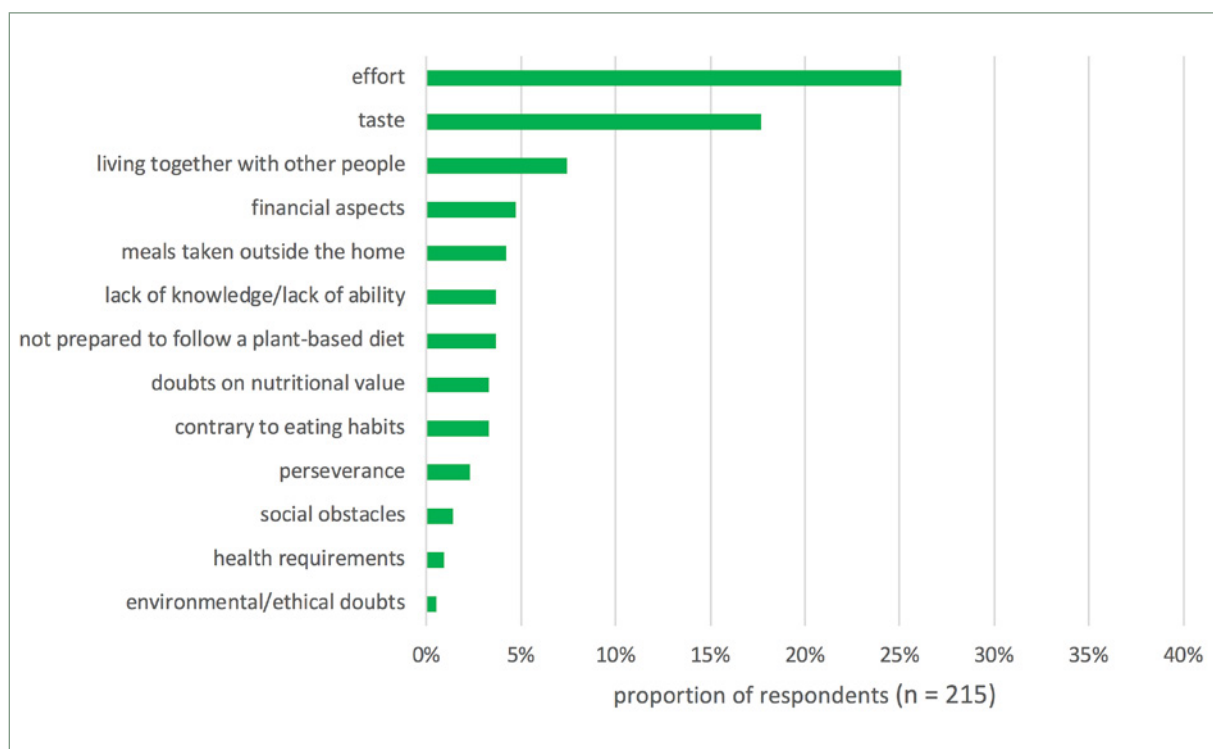


Fig. 7: Frequencies with which obstacles to conversion to the target behavior were mentioned within the scope of an open question (own presentation)  
One response was excluded because it did not relate to the topic. The other 154 responses were allocated to categories to enable multiple mentions to be represented.

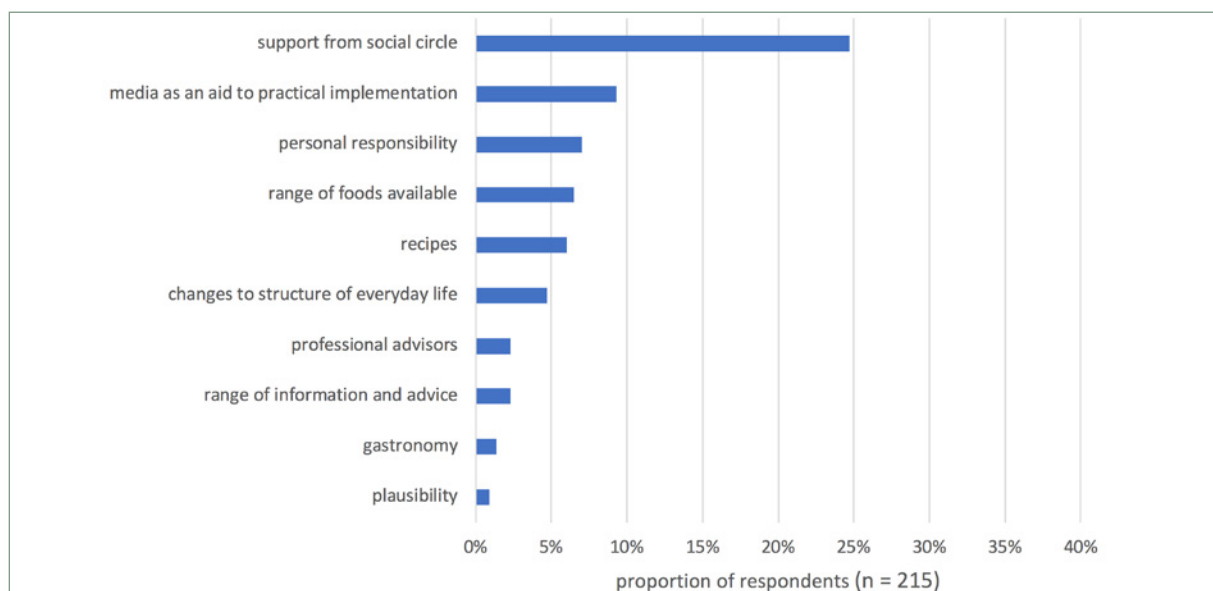


Fig. 8: Frequencies with which resources to support conversion to the target behavior were mentioned within the scope of an open question (own presentation)  
The 149 responses were allocated to categories to enable multiple mentions to be represented.

cles perceived by the target group should be examined and taken seriously, and support provided to overcome them.

In order to fully understand the attitudes, obstacles, and resources of young people – particularly young men of low-educational status – and to be able to effectively promote a change of behavior, further research is needed.





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#### Conflict of Interest

The authors declare no conflict of interest.

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▶▶ You can read about the conception of strategies for possible campaigns in part 2 of the paper in the next issue of ERNÄHRUNGS UMSCHAU.

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