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Investigates the Action-Value Gap on Diet.

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Не спи! замерзнешь

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Abstract

Food is life and as crucial as stable climate conditions for the well-being of humanity. Even though about a quarter of worldwide greenhouse gas is caused by diet, food and climate change are poorly linked. The thesis aims to identify the role of knowledge on food decisions and the acceptance of political decisions concerning environmental impact. Within the RC study, a treatment group (TG) gets two letters, which inform and motivate for a more plant-based diet for the sake of limiting climate change. From this TG, a subgroup called Unconsciousness Rejecter is further identified. Characterized by poor previous knowledge, they supplement the four types of the Action Value Gap by a group unknowing of their value contradicting behavior. Against the hypothesis, the UR does not react stronger on the knowledge, but even less than the TG. Therefore, the conclusion is that the more knowledge an individual has, the stronger they act on it. This perspective opens a new criterion on which the potential successes of awareness campaigns can be evaluated. The results need further investigation because none of the results were significant.

Abstrakt

Essen ist Leben und ebenso essenziell für das Wohlergehen der Menschheit wie stabile Klimabedingungen. Obwohl mindestens ein Viertel der weltweiten Treibhausgase durch Landwirtschaft verursacht wird, werden Lebensmittelproduktion und Klimawandel kaum assoziiert. Ziel der Arbeit ist es, die Rolle von Wissen über Umweltauswirkungen im Kontext von Lebensmittelentscheidungen sowie Akzeptanz von politischen Interventionen zu untersuchen. Im Rahmen der randomisierten kontrollierten Studie erhält eine Treatmentgruppe (TG) zwei Briefe, die über CO₂-hohe und niedrige Ernährung informieren und motivieren, einen nachhaltigeren Lebensstil bei der Ernährung fortzusetzen. Aus der TG wird eine Untergruppe, die Unconsciousness Rejecter genannt wird, definiert. Diese zeichnet sich durch geringes Vorwissen und hohes Verantwortungsbewusstsein für den Klimawandel aus. Dabei ergänzt sie die vier Typen des Action Value Gap um eine Gruppe, die sich ihres wertewidrigen Verhaltens nicht bewusst ist. Entgegen der Hypothese reagieren die UR weder stärker auf das Wissen noch sind sie offener für klimafreundliche, aber freiheitseinschränkende Gesetze. Die Akzeptanz liegt unter der generellen TG. Daraus ergibt sich die Schlussfolgerung, dass ein Individuum umso stärker auf Wissen reagiert, je mehr Vorwissen es hat. Diese Perspektive eröffnet ein neues Kriterium, anhand dessen die potenziellen Erfolge von Bewusstseinskampagnen bewertet werden können. Die Ergebnisse müssen weiter untersucht werden, da kaum Resultate signifikant waren.

1. Introduction: Environment and Diet

Food is life. Food is joy. Food is culture. With more than 200 daily thoughts, it is omnipresent. Something less present is the environmental impact of the food chain. The deeper I delved into the consequences of our diet for the health of our planet and ourselves, the more I wondered why we as a society do not act? The climate crisis seems more present than ever, and science agrees on the necessity to change diet to restrict global warming. Whereas everyone talks about clean energy, sustainable finance, and electric cars, nobody seems to consider carbon oxide emissions when choosing their lunch menu or family dinner – even though diet causes at least a quarter of all worldwide emissions!

If we earnestly seek to restrict global warming, the current consumption of animal-derived food from high-income countries cannot be maintained. To meet the greenhouse gas emission (GHGE) targets, a reduction of meat, fish, dairy, and eggs must occur, as Garnett et al. (2019) argue.

Bailey et al. (2014) calculate that about 15% of all greenhouse gases (GHG) come from livestock, making it more relevant than worldwide transport. Garnett et al. (2019) go further by claiming that livestock and aquaculture are responsible for about 57% of the food systems GHG when considering land use. Worldwide, livestock takes 83% of the farmland while contributing 18% of calories and 37% of protein. This disproportional share is due to the inefficient conversion of animal feed into dietary protein, as de Boer et al. (2014) explain.

Is it really that significant? As Carlsson-Kanyama (1998) calculated, the GHGE of meals with the same amount of calories and protein can vary by a factor of nine. Garnett (2019) explains that the meat from ruminants (sheep, goats, and cows) has average greenhouse gas emissions (GHGE) per kilogram 5-fold higher than pork, 7-fold higher than pork chicken, and 43-fold higher than legumes. Moreover, all those calculations do only consider direct emissions. The logged forests can no longer bind CO₂. On top of that, they release CO₂ through the clearing. Including indirect emissions leads to a contribution from the food sector of up to 50% of global emissions.

How would a more sustainable diet look? Confusion about environmentally friendly food choices seems a relevant issue, as Vos and Slabbinck (2021) confirmed empirically.

Besides the confusion, two other factors play a significant role in holding a diet change back: responsibility and awareness. A study by Macdarmid et al. (2016), examines avoidance of responsibility by identifying different attitude types of meat consumers. Some saw the increasing global demand from other countries' economic development combined with population growth as the core problem. The argumentation seems a strategy to reduce the mental discomfort by shifting responsibility to others. The unpleasant feeling is called cognitive dissonance and occurs whenever someone holds conflicting beliefs, attitudes, or values. Strategies to overcome dissonance are necessary to maintain the own positive perception even though the issue is known. The motivation behind this behavior and the consequences for diet choice will be discussed in chapter II in the section about the Action-Value Gap.

The second point, awareness, is not less critical. Among many, Vanhonacker et al. (2013) documented an underestimation of the ecological impact of animal production and meat consumption among study participants.

Further, global warming is not the only issue of our diet. As de Boer et al. (2014) points out, the rate of biodiversity loss, disruption of the nitrogen cycle, global freshwater availability, and land-use change are critical.

What are the reasons for not aiming towards a more environmentally friendly, sustainable diet? Is it lack of knowledge, ignorance, or laziness? To which extend does awareness impact our dietary choices and acceptance of political decisions? An experiment from chapter IIV onwards aims to investigate those questions. Before, the following chapter will present literature on how a more sustainable diet could look like, people's decision-making process, and the current state of research.

2. Literature

The following chapter forms the basis for the experiment. First, a sustainable diet will be defined, enabling the classification of foods into more and less environmentally friendly. In the experiment, a treatment and control group are investigated regarding their consumption and intention change. Second, different decision-making models will be introduced. Those approaches help to understand determinators of our behavior better. Third, studies about awareness in the food sector and others that target shifting food consumption towards a specific direction will be presented. The experiment uses those findings as orientation and is built on current insights.

Sustainable & Healthy Diet – It is a Match

Nowadays, sustainability seems to enter all different aspects of life. What sustainability means around diet will be explored in this section. Furthermore, health-related issues will be investigated to ensure that sustainability does not come at the price of health.

According to Pandey et al. (2021) *“a sustainable diet is defined as a diet that has a low environmental impact and contributes to food and nutrition security, thus protecting biodiversity and the ecosystem.”*

There is much about avoiding (plastic) packaging and buying regionally regarding sustainability in the food sector. This feeling is studied by Lea and Worsley (2008). They identified a general perception that a decrease in packaging by food manufacturers is seen as the most promising item to help the environment. On the other side, lower meat consumption was seen as least likely to help. Further, awareness of the impact on the environment of meat production, organic compared to conventional farming, and food packaging was low in general. These findings were independent of the degree to which people believe that food-related actions help the environment.

Are those perceptions correct and offer the most potential to lower environmental impact? Figure 1 presents where the GHGE arises along the food chain. The red block “livestock & fish farms” shows that what we eat matters the most. Together with the land use for livestock, it sums up to nearly half of all emissions.

As Ritchie and Roser (2020) put it, “Eating locally would only have a significant impact if transport was responsible for a large share of food’s final carbon footprint. For most foods, this is not the case. [What] you eat is far more important than where your food traveled from.” Food miles matter when the commodities come by plane.

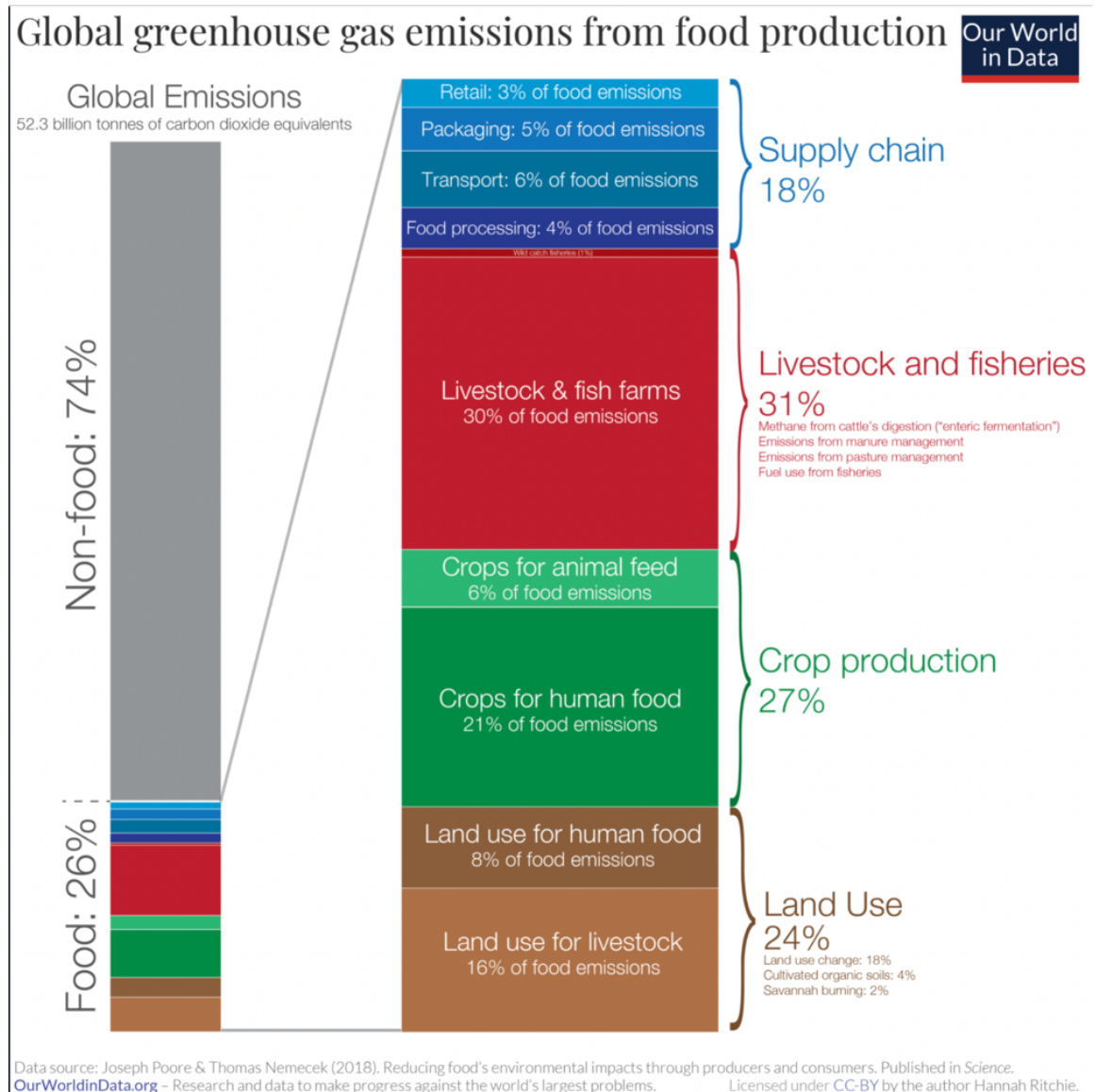


Figure 1: Global greenhouse gas emissions from food production.

Source: Ritchie and Roser (2020)

In all other cases, whether transported by truck or ship, the emissions caused by transport can be neglected compared to the production. Comparing the perception of promising areas with the numbers leads to the suggestion that widespread consciousness-raising is needed. This statement is shared by Tobler et al.(2011) who summarize the avoidance of air transport, preference for organic products, and reduction of meat consumption as most influential.

Whereas “reducing meat” is a direction, it still not quantifies any amounts. The EAT-Lancet Commission Planetary Health Diet agrees on the importance of more plant-based foods and fewer animal sources. Further, the commission, which aims for the planet’s health and humans, presented 2020 a resport. In this, Willett and Rockström (2019) make quantitative suggestions for a diet.

The recommendations include a doubling of healthy foods like fruits, vegetables, legumes, and nuts. On the other side, unhealthy food like added sugar and red meats should be reduced by 50%. Figure 2 visualizes a comparison between the current global and suggested diet. As the orange dotted line indicates, there is massive overconsumption of (red) meat and starchy vegetables. Cutting dairy products as well while increasing the healthy ones seems a

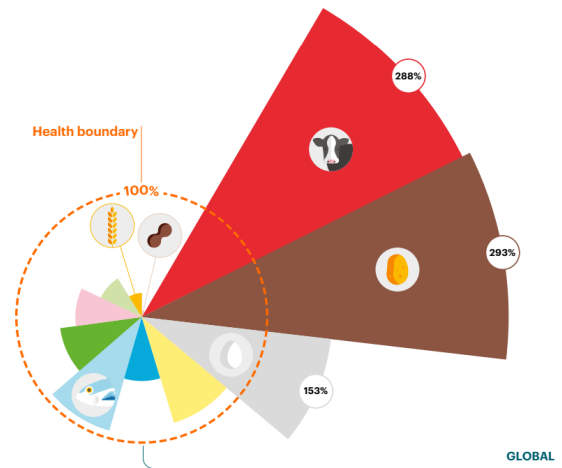


Figure 2 Boundary and Status Quo of Diet
Source: Willett and Rockström (2019)

necessary step. According to the report, following the presented diet would prevent 11 million deaths per year - representing about 19 to 24% of total deaths among adults.

As quoted earlier from Pandey, low environmental impact is the core of a sustainable diet. In an interview, Dr. Christian Reynolds, Senior Lecturer at the Centre of Food Policy from the University of London, ensured me that GHGE are the standard measurement for sustainability in food. To better understand which food contributes to what amount, GHGE of foods are presented in the following. Figure 3 by Ranganathan et al. (2011) gives an excellent overview of which foods contribute how much and why a cut in animal products offers the most potential. The Figure presents a ranking per million calories considers usage of water, land, and caused emissions. The further a food is on the right, the higher are the needs in water, land, and caused emissions.

PER MILLION KILOCALORIES CONSUMED

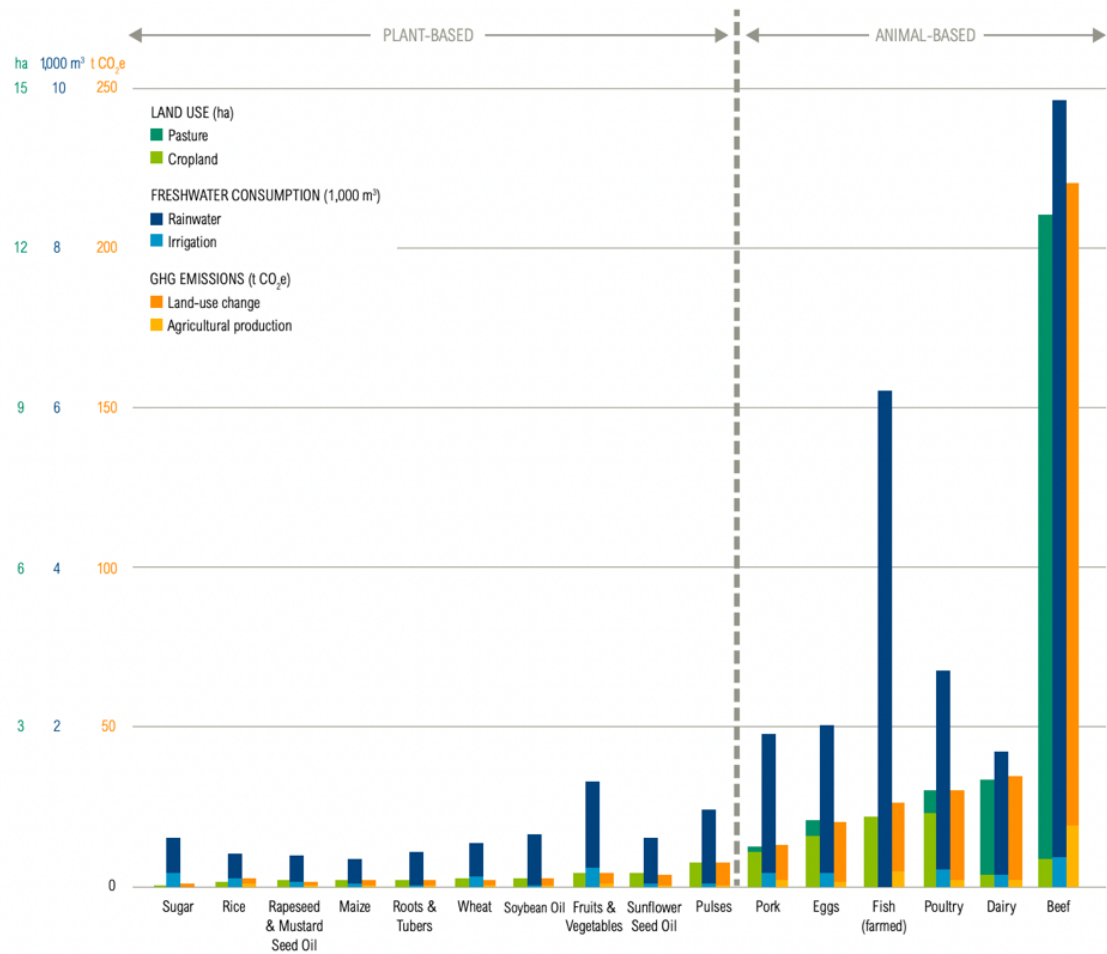


Figure 3: Land, Water and GHGE per Million Kilocalories
Source: Rangathan et al. (2011)

The dashed line divides plant- from animal-based foods. The separation is not on purpose but underlines the main point of this graphic: The products highest in water, land, and greenhouse gas emissions (GHG) are all animal-based.

This insight strengthens Garnett et al.'s (2019) statement that shifting towards a more plant-based diet is one of the most effective ways to reduce food's environmental footprint. Consenting, Laestadius et al. (2014) claim that we will not avoid global warming of fewer than 2 degrees Celsius without reducing meat and dairy consumption.

How is a plant-based diet considered concerning health? Hallström (2014) claims that adopting plant-based diets is environmentally more friendly and improves public health alike. This claim is investigated by van Dooren et al. (2014), who ranked different types of diet. As presented on Figure 4, the average Dutch diet scored worse with 75 points in health. A diet based on the Dutch Dietary Guideline, semi-vegetarian one, and vegetarian diet scored about the same with 100 to 105 points. The highest scoring got the vegan (118) and Mediterranean diet (122). On the sustainability scale, the vegan one had the lead. Furthermore, the team proved a clear correlation between sustainability and the healthiness of diet. The correlation can be seen since diets further on the right tend to be ranked higher, too.

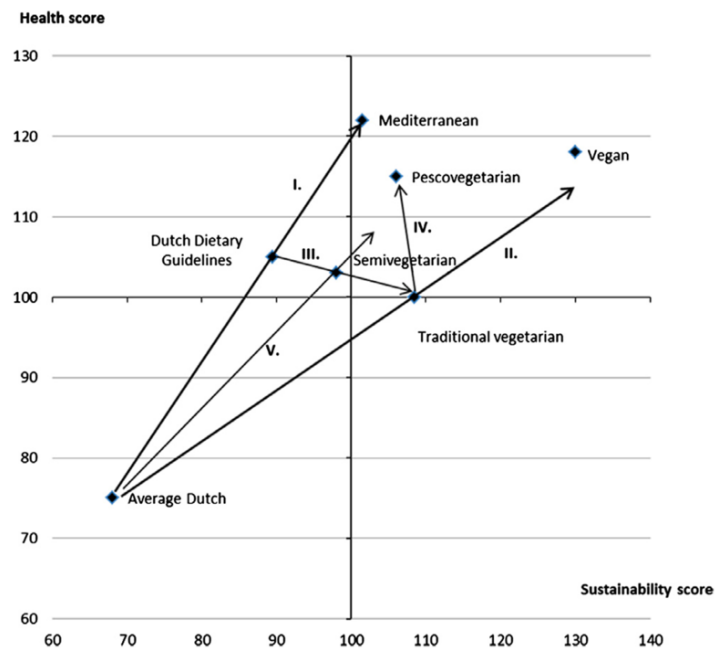


Figure 4: Health and Sustainability Score of Different Diets
Source: Van Dooren et al.(2014)

To gain a feeling of quantities behind the scoring, Bailey et al. (2014) published a study that estimates the GHGE of meat-eaters to be twice as high as those of vegans. Regarding the health benefits, increased consumption of plant-based foods is becoming a strategy to reduce the high rates of some chronic diseases. Among them are cardiovascular disease and certain cancers, as Joyce et al. (2012) declare.

Bucher et al. (2016) agree about the direct impact of diet on the mortality risk. Garnett et al. (2019) add indirect benefits like lower use of antibiotics and improved water quality through decreased nitrates. A further advantage is the diminished suffering of animals, which is often a core driver to become vegetarians, as Graca et al. (2014) determined.

Tukker et al. summarized the reason not to pursue the very healthy Mediterranean Diet. The team states that no diet change would have a significant environmental advantage without cutting meat and dairy. Since the experiment will investigate people's adjustment towards a more sustainable diet, promoting a Mediterranean diet would be purposeless.

To further underline the consensus and seriousness, I would like to refer to Vanhonacker et al. (2013), who suggest that a better balance between meat consumption and livestock production's environmental impact will be essential. The suggestion agrees with Sedova et al. (2016), who further states that meat consumption changes will inevitably lower food-related GHGE. Aiking (2011) finds even stronger words for the same message by saying that it is not strongly recommended to shift towards more plant- instead of animal-protein, but inevitable.

Since promoting and aligning towards a more plant-based diet as society seems to be a great challenge, one could ask if it is worth the effort. Compared to other sectors, as Bailey et al. (2014) note, pursuing a reduction of carbon in the field of diet is still highly cost-effective and easier to achieve.

Decision making

Introduction

Nobel Prize winner Richard Thaler contributed much to the general understanding of why we act the way we do by spreading the idea of a dual cognitive system. What spends behind it and the Theory of Reasoned Action and Theory of Planned Behavior will be presented in the chapter. Those models aim to consider all factors which impact behavior – which also includes our diet. Lastly, the ISM Model presents more aspects that impact our food decisions.

Dual Cognitive System: Automatic and Reflective

When it comes to making decisions, we have two parallel systems of mental activity as Thaler and Sunstein (2008) describe. On one side, the Reflective System decides controlled, rational, self-aware, and works accurately. Those attributes come to the price of energy and time. Since humans seek to save both, many decisions are made by the Automatic System. Here, we get

Automatic System	Reflective System
Uncontrolled	Controlled
Effortless	Effortful
Associative	Deductive
Fast	Slow
Unconscious	Self aware
Skilled	Rule Following

Figure 5: Features of the two Cognitive Systems

Source: Own Illustration based on Thaler and Sunstein (2008)

effortless answers - quick. Based on skills, emotions, and habits, decision-making works intuitively.

One further contributor is heuristics, which Tversky (1974) explains as mental shortcuts. While they help to make quick decisions, the downside is systematic and predictable errors. Heuristics can be classified into three groups:

- A comparison to something similar, often used for estimations about the likelihood.
- Availability of instances and scenarios generally applied in the context of frequencies.
- Numerical predictions, used for benchmarks or starting points.

When a decision is too complex for the automatic system, the reflective system takes over. As O'Brien (2012) explains further, the reflective system does not start from scratch. It uses the impressions of the automatic system as a benchmark. Therefore, the result might be biased by the heuristics of the automatic system, even if we use our more reliable, energy costly system. Whereas we could remove the bias, we often do not because we are lazy.

When it comes to making decisions, the research identified several behavior patterns. Kahneman (2011) presents, among others, 'choose the middle option', 'stick with the default & familiar unless there is a strong reason to risk the unknown,' and 'do what most people like me appear to be doing.' Those are all techniques that help to make easier, quicker decisions. They come at the price of accuracy, which prevents us frequently from making the optimal decision.

Most people are not aware that our intuitive system makes most decisions throughout the day. Especially when it comes to food, we tend to act automatically, stuck in our habits and rely on heuristics. Thereby, we stick with familiar food, buy brands we know, or eat what everyone else is eating. Those predictable choices make us vulnerable to the environment's influence, cognitive biases and make personal change more difficult. Park (2020) suggests harnessing that power by building environments in which non-consciousness and low-effort strategies create a more healthy or more sustainable option that bears plenty of potentials. By designing environments where a low-effort approach leads to better outcomes, changes of, e.g., diet can be simplified and enabled.

Theory of Reasoned Action (TRA) and Planned Behavior (TPB)

Whereas the two parallel systems explain how our brain makes decisions; it does not generally explain which factors are considered. This question is aimed to be explained by Fischbein and Ajzen's Theory of Reasoned Action (TRA) from 1975. This Theory got further developed into the Theory of Planned Behavior (TPB). The insights and implications for dietary choices are investigated in this section.

Godin and Kok (1996) see behavioral intention as a core driver of behavior in the TRA and TPB. In the TRA, the behavior intention is determined by the attitude and norms, as Figure 6 shows.

An **attitude** is a form of reaction towards the performance of the behavior, as Macovei (2015) explains. Hale et al. (2002) add that the attitude is formed by an individual's belief and represents the extent to which the person feels positive or negative about performing a specific behavior. A strong belief in a positive outcome, therefore, results in a positive attitude. Nevertheless, Kollmuss and Agyeman (2002) point out that attitude alone does not determine behavior directly. Better said, they influence behavior intentions which in the next step led to the behavior. The other factor which influences behavior is social pressure – something one receives as Subjective Norms.

Individual normative beliefs define subjective Norms. These determine a belief to which degree others feel that oneself should act a particular way and how others think about that behavior in general. If someone thinks their relatives expect them to act in a particular manner and it is essential to match expectations, they will be motivated. A case could be to eat traditional family dishes or unhealthy desserts served by loved ones. If the subject thinks about the environment and cares about matching expectations, the motivation to perform the behavior is negative. A neutral norm arises if the individual does not care about matching expectations, as Godin & Kok (1996) describe.

A weakness of the model is the assumption that people act rationally. Nevertheless, Kollmuss and Agyeman (2002) justify the use due to a more accessible understanding. This claim is supported by Vos et al. (2021), who successfully applied the model to

eating behavior. Their study proved that social norms impact consumers' attitudes and intentions. They could empirically demonstrate the relevance when it comes to reducing the amount of meat eaten.

The Theory of Planned Behavior builds on the TRA. Staats (2004) uses the model with the added variable perceived behavioral control. It consists out of two sub-concepts: beliefs and perceived power.

- Beliefs: the estimated likelihood of different factors, which individually will facilitate or impede behavior execution. An example of a control belief is, "After work, I can go to the farmers market given the distance from the event to my office."
- Perceived Power: represents how each control belief seems to facilitate or impact behavior. It can be impacted by resources like knowledge, time, and money. To build on the previous example, it might be "the distance from my office to the market makes a shopping tour after work easy or difficult."

There were plenty of studies in the field of pro-environmental and conservation behavior, where the TPB helped explain the behavior reliably, as Macovei (2015) ensures. Pandey et al. (2021) talk about studies of food-related behavior, which investigate healthy eating, dietary behavior, or functional foods' adaption. Dagher and Itani (2014) suspect the consideration of cultural and personal elements as a success factor. These do supplement attitudes and conscious behavior control.

To sum the TRA and TPB up, they both consider attitudes and norms as determinants of behavior. The difference is that in the TPB, perceived behavior control gets considered, too. This can be seen at Figure 6 by Lee and Witruk (2016).

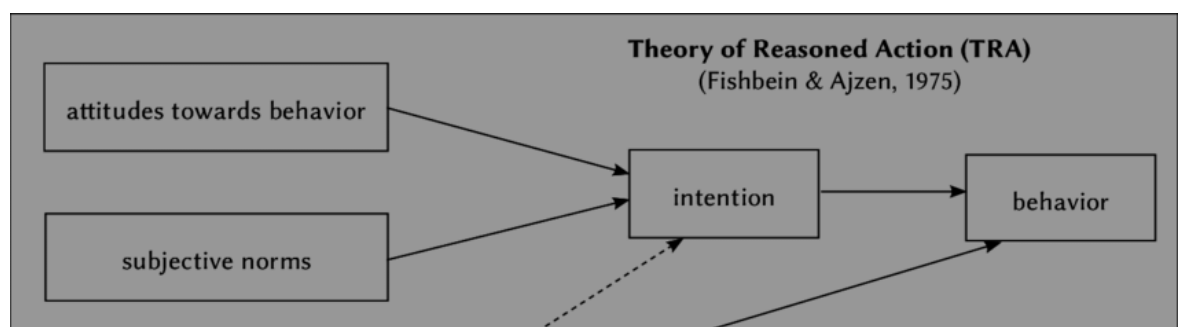


Figure 6: Characteristics of the TRA and TPB
Source: Lee and Witruk (2016)

Schwartz's (1977) norm activation theory (NAT)

With the TRA and TPB, a rational decision-making process is assumed where benefits and costs are the underlying patterns. In contrast, Harland et al. (2007) explain that Schwartz's Norm Activation Theory (NAT) focuses on moral obligation. Therefore, the NAT counts as a value-based decision-making model. Since values drive behavior, a change in values leads to a change in behavior, as Schwarz & Howard remark.

The explanatory power of rational models in pro-environmental behavior is limited because it often comes with higher personal costs. Value-based models are popular due to the assumption that pro-environmental behavior is driven by morality. This morality focusing approach is made by taking activators, personal norms, and behavior into account. Thereby, the norms are self-constructed, prosocial, and faced oneself with a feeling of moral obligation.

All factors can be clustered into two sub-groups which form personal norms.

First, we do have the **situational factors**:

- Awareness of need: The other must be in a situation of need, and one has to understand this. A spontaneous occasion like spotting a situation works as if someone gets confronted with a person in need. Further, Schwarz and Howard (1982) explain that the closer the person is to the one in need, the more likely one helps.
- Situational responsibility is a condition if someone feels responsible for the need of others. Responsibility is higher if one causes the situation of the other, for example, through an accident.
- Efficacy explains the degree to which one can help the other.
- Ability is the possibility to help, including required resources and capabilities.

The second cluster consists out of **personality traits**:

- Awareness of consequences refers to a person's receptivity to situational cues of need.
- Denial of responsibility refers to people's inclination to deny responsibility for the consequences of their behavioral choices for the welfare of others, as Harland et al. (2007) claim.

Figure 7 presents an overview by Laes et al. (2013), which presents the factors of the Norm Activation Model (NAT). In the NAT, those are the only factors that determine the behavior.

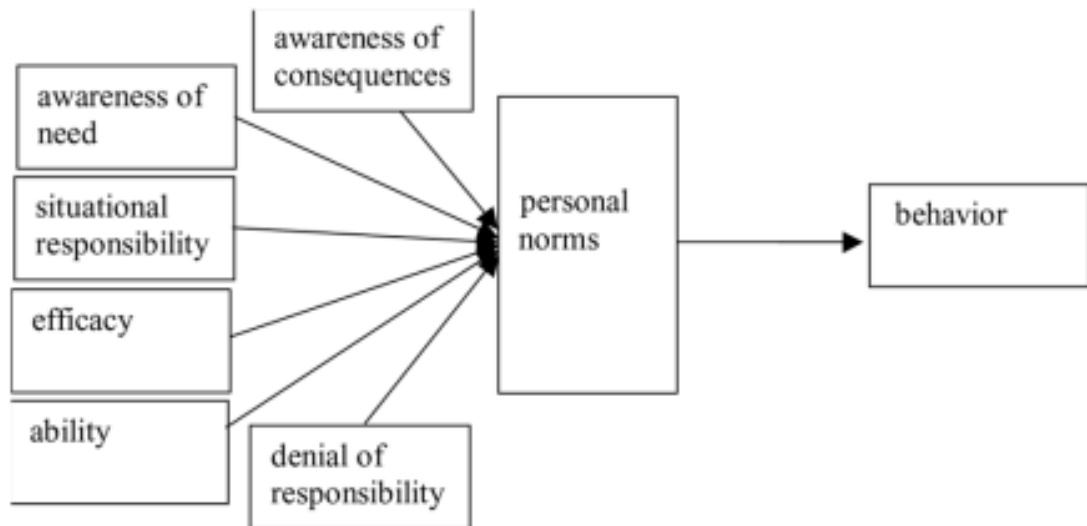


Figure 7: Overview of the Norm Activation Model
Source: Laes et al. (2013)

The presented models served to understand a decision-making process and the determinants involved in such processes. All those models consider internal (attitude, preferences) and external factors (situation, norms, or environment). Whereas the dual system explains the relevance of unconscious decisions, the TRA & TPB presents a rational model for making our decisions. To explain costly, pro-environmental behavior, the NAT delivers a way that emphasis on moral obligation.

The following Individual Social Material (ISM) Model will present further contributors to personal behavior regarding diet. Starting with individual aspects, I will present social and material ones too.

Contributors of Food Decisions: the ISM Model

The choice of diet seems like something the individual decides based on taste, habits, and preference. Whereas that is not wrong, it would be naïve to assume that those are the only factors shaping diet decisions. Our social, cultural, and economic environment does contribute significantly - consciously as well as unconsciously. Before investigating the impact of knowledge and gathering the insights of previous studies, the following pages

present other relevant factors. The factors should help put the experimental results into perspective and infer the correct conclusions from the results. For a structured presentation, the ISM Model will serve as an orientation to consider all factors.

Individual Side

On the individual side, several factors contributing to decision-making. For food choices, consciousness factors as taste, availability, price, attitudes, and awareness are relevant. These are accompanied by non-consciousness like habits, emotions, heuristics, and cognitive biases.

Awareness

Knowledge is essential for conscious decisions. When it comes to good food choices, this is a relevant issue. Camilleri et al. (2019) explain that even though an environmental consciousness is rising, the impact of diet on the environment is highly underestimated. Especially the perception of GHGE differences between meat and non-meat items. Thereby, the impact of red meat gets underestimated the most. Vanhonack et al. (2013) and Truelove and Park (2012) agree with the misconception of meat's impact and see this as a possible explanation why environmental concerns are rarely present in changing meat consumption behavior.

When it comes to withdrawal behavior from knowledge, experience plays an important role, as described by Kollmuss and Agyeman (2002). A direct experience, seeing a dead fish in the river, for example, has a more substantial impact than indirect ones as learning in school about the topic.

Non-conscious decision-making

Equally crucial as conscious beliefs, attitudes, and intentions are a host of motivations and cognitive processes that sit beneath the surface of awareness. As the beginning of this chapter described, humans have an automatic, intuitive system that influences much of our behavior, despite our relative unawareness. Park and Barker (2020) emphasize the relevance in the context of food decisions. More precisely, this includes a consumption running automatic, habitual, and reliant on heuristics. In everyday life, this is reflected by 'eat what everyone else is eating,' 'pick the middle option,' 'stick with the familiar food,'

or ‘buy the brand I have heard of.’ These low-effort strategies tend to lead towards good choices while leaving us vulnerable to influence and cognitive bias. Fortunately, this can be used for the good. How exactly this would look like is part of the discussion.

Decision making of food

Environmental issues are poorly linked with food; it is also not a criteria people consider when doing groceries. As Tobler et al. (2011) explain, taste, price, variety, convenience, and health are the areas which get considered. Additionally, Bailey et al. (2014) identify cultural aspects, food safety, body image, and media. However, environmental concerns are not something mentioned – even not for vegetarians. Their motivation comes mainly from animal welfare, costs, and health.

The lack of environmental consideration regarding food choices might surprise considering that most people identify themselves as environmentalists. The discrepancy between our value awareness and our behavior is considered a gap. Why it occurs and possibilities to overcome this gap through, e.g., increasing the knowledge is described in the chapter IIV Experimental Design.

Social Side

While the individual plans their behavior and imagines how they will act, everything might be overturned when the situation occurs. This can be due to the environment in which decisions are made – a situation shaped by the people involved. Society plays a crucial role in behavior – as the previous models underlined. How come we are so concerned about others and tend to copy their behavior?

Evolutionally, copying behaviors of others might develop to reduce individual costs and risks of experiences, as Babutsidze and Chai (2018) suggest. Also, Park (2020) argues that humans are social creatures who value cooperation and try to avoid freeloaders. By copying the norm, we show in-group behavior and cooperation. The interpretation of situations made by other people impacts our response. This orientation is especially true for situations that are novel, ambiguous, or uncertain. Social norms, to Goldstein et al. (2008), can be used to develop prosocial behavior. On the other side, Kollmuss and Agyeman (2002) warn that pro-environmental behavior is less likely to occur if others do not show

conservative behavior. To use social norms for good, Babutsidze and Chai (2018) identified specific requirements. One threat is when others can overserve the positive, “green” behavior. The more people act, the more others will feel motivated to follow the same behavior. Here, group identification plays a role again, for instance, demographics. When people of the same age act pro-environmental, one is more likely to follow when they identify with this group. Social sanctions and feedback are also more powerful when coming from their peer group.

Social Identity & the Role of Stereotypes

Social identities are the extent to which we identify ourselves with social groups or categories like race, religion, or political beliefs. Park (2020) explains that those identities do impact our beliefs, values, and action. While we mimic and listen to people we identify with; we do the opposite with everyone else. By doing so, we stress not belonging to this group.

While growing up, culture, narratives, and social identities do shape the individual. These go along with stereotypes and associations, which also include the food we eat. More generally, everything we do, our attitude towards moral topics, and how we behave express identity with social groups.

There are foods more stressed with one sex. For instance, gender is the strongest demographic predictor of whether one eats meat or not. Further, meat is associated with “strong” and “masculine,” whereas vegetarians tend to be linked with “weakness” and “femininity.” Nevertheless, also females, which are more aware of the prevented animal harm of a plant-based diet, feel more attracted to burgers that are presented as “tasty” than “sustainable.” This finding by Joyce et al. (2012) underlines that sustainability is far away from being considered when choosing dishes.

Garnett et al. (2019) determine the eating behavior of people surrounded as the most influential predictor of meat consumption. Additionally, they point out a link between veganism and “seriousness, upper socioeconomic status, arrogance, virtue, and particular political leanings” while there are no prejudices for a meat-eater. Possibly, those prejudice slow down diet adjustment to prevent belonging in groups one does not identify.

A way to overcome social identity as a driver for behavior is intrinsic motivation. For this case, the individual's learning process is much more relevant than the behavior of others. Babutsidze and Chai (2018) identify knowledge and skill as factors that shape how consumers to action.

Other motivators for appropriate behavior and cooperation are obligation, guilt, pride, and empathy, as Bissing-Olson et al. (2016) list. Thereby, the need to conform to norms can be harnessed to promote pro-environmental behavior.

To follow good behavior, it is beneficial if we see that others make their bid—peer pressure increases which support prosocial behavior and form the social norm. Petrovich et al. (2018) showed the multiplicity of social impact by identifying an increased likelihood of installing solar panels if neighbors have such installed visibly.

Park (2020) suggests the following aspects to form new norms: make behavior more observable and accountable, less anonymous, improve communication, peer monitoring, and self-governance. Another option that uses the wish to conform and for reciprocity is to highlight the prevalence.

“The knowledge that others are contributing to a public good encourages us to do the same.”

The whole approach of social norms does have limitations. These occur when the target behavior is rare, as Camilleri et al. (2019) remark. A technique to overcome this is to present the desired behavior in a dynamic matter by focusing on trends rather than absolute numbers. So even if only a minority follows a plant-based diet, more and more people follow it. The latter is the message to send when we aim to promote such a diet.

When it comes to eating, social influence has a huge impact – in both directions. Šedová et al. (2016) investigated students eating behavior depending on their environment. The most significant impact on their eating behavior was not the knowledge but their friends and fellow students whom they perceive avoiding meat as a social norm. Here once more, the power of each individual as a role model for others gets underlined. When visiting their parents, the meat intake increases compared to their consumption at the university, surrounded by relatively low meat-eater. Changing behavior to confirm relatives, friends, or the family and match social norms is called **social diffusion**.

How much other people directly influence our decision shows an on-campus Study in Canada by Christie and Chen (2018). A lunchtime order tracking revealed that 72% of participants ordering the same type of dish (meat or vegetarian) as the person ahead. Based on chance, the model calculated a correlation of 61%.

This example underlines the role of each of us as role models. Whether consciously or not, just as we orientate ourselves on the behavior of others, we serve as orientation for others, too. Further, behavior patterns can be seen as a journey. Once a certain level of awareness is reached, people will get more and more into the behavior pattern. This journey metaphor is verified through Thøgersen and Ölander (2003), who examined several environmentally friendly behaviors among Danish consumers. In short, the behavior of some patterns like recycle trash will increase the likelihood of others in the future, like buying organic food. A possible reason offers Peter Earl, who argues that the purchasing routines of consumers are part of their lifestyle and social identity.

Culture

The Cambridge Dictionary (2021) determines culture as a way of life of a particular group for a particular time, including how we eat. Since we have different cultures worldwide, it is no wonder that we have different eating behaviors, and in each of them, the perception of normal is different. Whereas meat in Northern Europe is the central part of most dishes, meat is not included in Asian countries like India. Our perception to which extend meat belongs to a dish and even more precisely, if we need meat to “have a proper meal” depends on our culture.

Material Side

As noted earlier, price is the most relevant factor when it comes to food decisions. The price is determined by costs, demand, supply, and tax and by subsidies.

Media consumption takes some hours every week; several of them contain food content. Depending on the food presented, people not only get inspired but also perceive the

presented as usual. The presentation of dishes in which meat is the center further slows down recognition of meat-free dishes as fulfilling.

Choice Architecture is a powerful tool to impact people's decisions. Diet thereby can be impacted through smaller plates, less meat per dish, and a default menu. Some studies show that changing the environment tends to be more effective than interventions that target internal motivations such as values, awareness, or knowledge. The role of knowledge is controversial and will be explored in the experiment.

Previous Studies

How people make food decisions and why a sustainable diet is crucial to restricting global warming. This section will present insights from previous studies.

In a Meta-Study, Bucher et al. (2016) investigated factors that impact food choices. The team points out that information campaigns have successfully increased awareness in Europe. The effect of changing the lifestyle is limited, however. Nevertheless, the team counts the provision of information as a helpful nudge. The goal is to activate the rational, reflective system which considers facts and values before acting.

Another meta-study conducted by Cadario and Chandon (2020) identified three types of nudges and evaluated them according to their impact. With this, the behaviorally oriented nudges had the most potent effect - followed by affectively. Third-placed were cognitively oriented nudges, which still affected people's behavior.

One way to nudge cognitively is by offering easy-to-understand labels. How effective labeling can be – especially for climate - showed a study by Camilleri et al. (2019). The team identified a significant underestimation of how much GHGE and energy food causes in a first step. In a second step, they presented labels that inform about the knowledge gaps placed on the food. Given that information, people changed their consumption decision towards more sustainable options. The change was seen as very promising and underlines the effect of knowledge on decisions. Further, it affirmed that people seek to act according to their values if it is not too inconvenient.

Proper value-oriented behavior is not always easy, often due to great misconception. Especially the contribution of livestock to climate change is highly underestimated. This statement is backed by research by Tobler et al. (2011) and Bailey et al. (2014). In studies of the latter, 64% identified direct transport emissions as a significant contributor. In contrast, only 29% put this label on meat and dairy, even though the contribution to overall emissions is almost equal between the two sectors.

Furthermore, one-quarter of respondents stated that meat and dairy production contributes little to climate change. Results like that are similar to Macdiarmid et al.'s (2016) findings which identify a lack of awareness between personal meat consumption and global climate change. This misconception strengthens the potential for knowledge—an approach supported by Vos and Slabbinck (2021), who argue for knowledge interventions. One of the reasons is an RCT study they present, which Fehrenbach conducted in 2015. There, participants watched a seven-minute video about health outcomes concerning meat consumption. Afterward, the intended meat consumption in the test group dropped.

That such information videos can influence not only intentions but also consumption showed a study conducted in Sweden.

The Action Value Gap

Introduction

In the past years, many studies about dietary choices and how to influence them have been conducted. Nudges of different kinds, from informing labels to changes in the environment at the point of sale, have been tested. Most of those studies aimed to make people eat healthier and shifting food choices toward more healthy dishes.

Are those findings applicable to pro-environmental behavior? How much would information about emissions of certain foods lead to an adjustment of diet towards lower GHGE foods? Do people with minor knowledge change more when receiving information? Moreover, how does knowledge influence the acceptance of political decisions which promote diets beneficial for the climate?

The following experiment aims to answer those questions. The foundation is an evaluation to which extend participants care and feel responsible for climate change. The level

of responsibility is accompanied by knowledge questions about food's influence on the environment. Additionally, an evaluation of the current consumption and future intention of certain food groups are measured. With this, changes throughout the experiment are investigated.

The experiment involves two groups, of which one gets treatment, and the other is a control group. The treatment contains two letters about food's impact on the environment and how to eat more sustainably.

Two hypotheses are studied – both focusing on the impact of knowledge:

The first one is based on an extension of the Action-Value-Gap (AVG), also known as the Mind-, Intention- or Attitude-Behavior Gap. The concept considers the difference between *what we want and what we do*.

By ranking awareness and behavior respectively high or low, a 2x2 matrix leads to four different AVG-types. This approach is among others conducted by High in behavior means that the person is following behavior that agrees with their values. For instance, this could be a diet low in emissions to keep the carbon footprint small. Low behavior, on the other side, would be a behavior contradicting own values. In this case, it could be to eat somehow everything independently of environmental impact.

On the awareness side, which represents values and knowledge, low could not care about the environment or climate change. High would be represented by someone who is well educated about climate change and sympathizes with conservative actions.

The type which seems most promising for choice architecture and nudges is the Consciousness Rejecter (CR). Determined by high values but low behavior, the CR would like to act a certain way but does not do so. The arousing gap between actions and values is known as dissonance.

Knutti (2019) claims that the scientific understanding of climate change has increased a lot over the past decades. On the other side, actions did not take place at the same level. Therefore, it can be assumed that many people belong to this group.

Whereas the Consciousness Rejecter is tricky in general, climate change is particularly challenging for two reasons.

The first point is short-term personal interest, and as Park and Barker (2020) point out, people benefit from acting against their values- which explains why it is so common. It is easier to buy new things instead of fixing old ones. Flights are fast and often cheap, or as in the example of Monkhouse and Dibb (2011), enable beach holidays during the winter. A big part of the actual costs come in the future, borne from society and the environment. A strategy exists to cope with the unpleasant feeling of knowing better: do just enough to keep a positive self-image and compensate the guilt.

Second, long-held habits make the starting conditions challenging and are crucial reasons why action does not occur. As Chai et al. (2015) explain, the realization of the AVG can initiate a learning process where the behavior gets adjusted over time. Many of the routines performed today were developed when the awareness was not that big. In the case of climate change, this could be the way we generate energy. The researcher emphasizes awareness, sufficient financial resources, and self-confidence to align consumer lifestyle with climate change concerns.

From another point of view, those long-held habits can be seen as barriers, holding the CR back from acting according to values as barriers. Habits belong to the group of practical barriers, which psychological ones accompany.

Psychological barriers include a lack of willpower, forgetfulness, or limited know-how. In a study by Joyce et al. (2012), 42% admit a lack of knowledge on preparing plant-based dishes, making this point the most significant barrier to eating fewer animal products. Further, a lack of interest from family member hold people back as well as ingrained habits. According to the Eat4Change Report, eating meat is a barrier for both the intention to reduce meat consumption and the consumer attitude. Another point is the link to energy use, as Garnett et al. (2019) describe. In the case of energy consumption, burning fossil fuels and coal are linked to production. For food production and transport, on the other side, the energy needed is invisible. Invisibly also counts for the nitrous oxide from fertilizer and other emissions on the life cycle processes.

Practical barriers include laziness, insufficient availability, cost barriers, or hassle. In short: inconvenience and time. Garnett et al. (2019) explain that time-poor individuals adopt relatively more sustainable consumption practices that require little time. Further, the lack of time prevents individuals from developing behavior that reflects their

environmental concerns. Therefore, increasing time could be a valid strategy to help individuals develop more environmentally friendly behaviors. Among other, policies focusing on a healthy work-life balance is part of this approach.

To summarize, the Consciousness Rejecter: the person has high awareness, therefore knows about the consequences of their acts, but due to different kinds of barriers, does not act according to their values.

If everyone who is not acting according to their values knows about their behavior's consequences? Why are knowledge campaigns do succeed in some cases but do not have an impact in others? What are the necessary conditions for knowledge to impact behavior successfully?

Transferring the insights of the CR to the area of *climate change and food* only works to a limited extend. The reason is a substantially lower awareness about the connection between those two topics. As mapped on Figure 8, I suggest adding a fifth type to the AVG concept – an Unconsciousness Rejecter (UR). This type does not know about the extent to which the behavior contradicts their values. Therefore, my first hypothesis claims that *whereas knowledge has a limited impact on behavior in general, the change in intention and behavior for the Unconsciousness Rejecter is more considerable.*

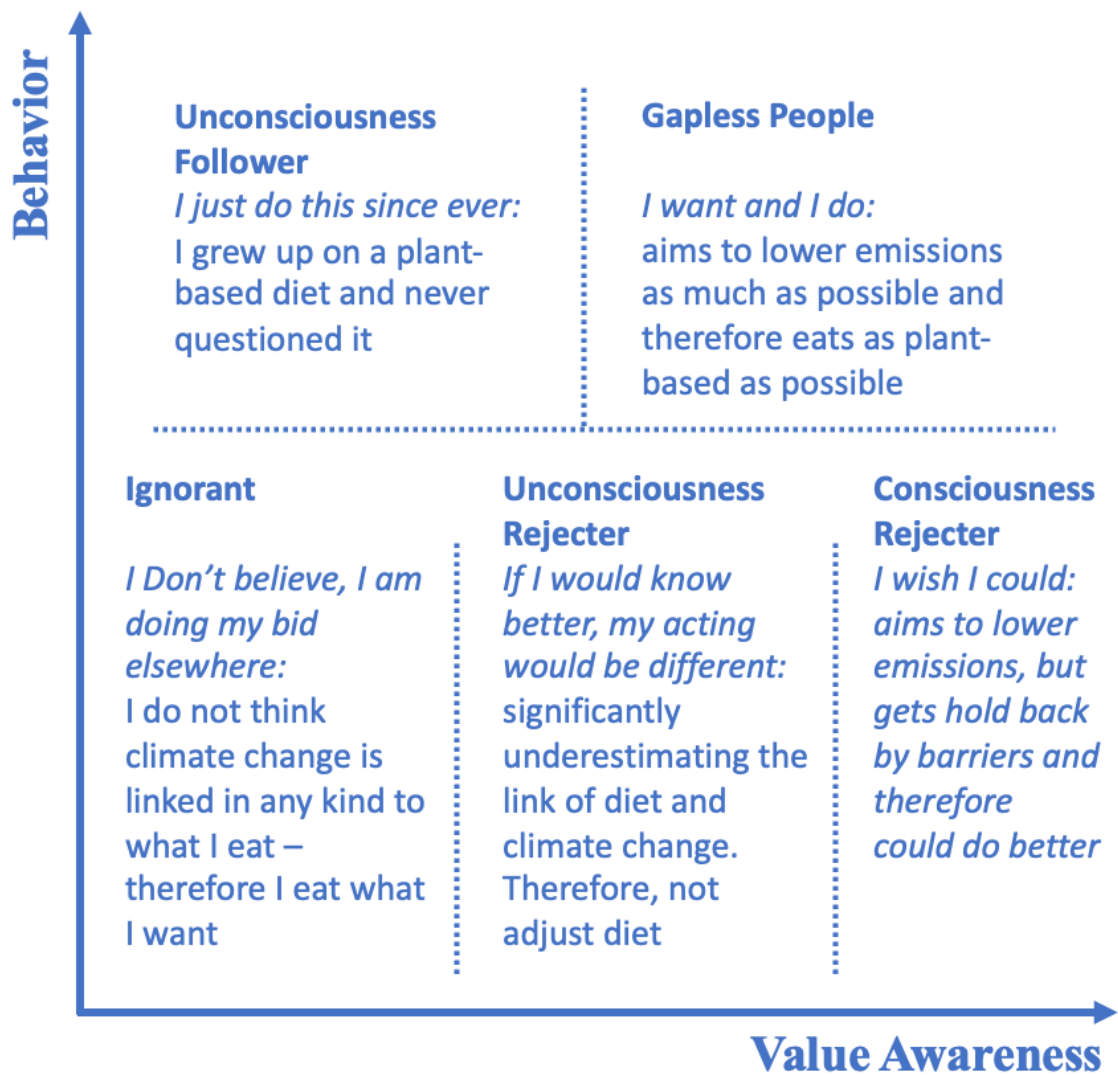


Figure 8: The AVG Model including the Unconsciousness Rejecter

Source: Own illustration inspired by the mind behavior gap by Karmasin Research and Insight Austria, <http://www.karmasin-research.at/MindBehaviourGap.pdf>

The experiment targets to study the effect of knowledge on the treatment group. The innovative part is that the knowledge focuses on a climate-friendly diet instead of the general goal of increasing healthy food. As presented earlier, this goes in line. Nevertheless, the focus will be on decreasing the amount of GHGE caused by diet by raising awareness for diet's environmental impact and presenting a solution in eating more plant-based. Eventually, this could open a new criterion to decide whether knowledge campaigns are a suitable tool to impact behavior or if other strategies should be considered.

The Transtheoretical Model of Behavior Change (TT) serves as an orientation to measure the behavior changes during the experiment. A for this experiment adjusted version of Tobler et (2011) models the different stages:

1. Precontemplation: There is no intention of changing diet. This can be due to a lack of knowledge.
2. Contemplation: a first intention arouses, and the consequences are weighted. The negative consequences of the behavior and the environmental implications become aware, and the individual sees a necessity for change to act more according to their conservation identity.
3. Preparation: A commitment is followed by a plan to execute. This can be seen through intentions towards a more plant-based diet.
4. Action: the diet includes not only intention toward a more plant-based diet but also the consumption changed.

To be considered a UR, people cannot have any diet change intentions at the beginning of the experiment and therefore count to the pre-contemplation stage of the TT model. A significant change had occurred when the subjects developed at least intentions for commitments at the end of the experiment. Set intentions would make them belong to the third group.

3. Experimental Design

In the following, the conduction of the experiment, the questionnaire, relevant variables, and lastly, the hypothesizes will be presented. The key variables are the gap between caring and acting for the environment and the shift of food consumption and intention throughout the experiment. Those variables serve to investigate the hypothesis claiming that knowledge has a higher impact on people's behavior the less they know. The second hypothesis investigates the effect of knowledge on acceptance of political decisions based on a *Knowledge Score*.

Study design and subjects

To experiment with a homogenous group, Bachelor students from a business class of the University of Vienna got offered to participate for extra points. Thirty-one students agreed by filling out the first questionnaire. They got assigned randomly into either a treatment or control group. To link the first to the second questionnaires, each student wrote the last digits of their student ID number of the questionnaire.

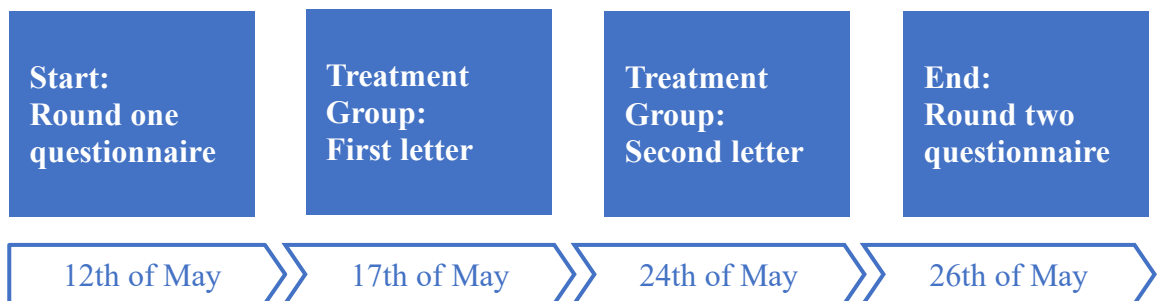


Figure 9: Rundown of the Experiment
Soucre: Own Illustration

The treatment consisted of a two and three-page PDF document (“letter”) in the second and third week, as presented in Figure 9. Both documents contained information about the environmental impact of food production. The first focused on the status quo by presenting numbers about carbon emission and freshwater usage. Additionally, it presents two articles about the land usage of livestock and plant-based protein sources. The second letter emphasized the most significant contributor along the food production chain. Thereby, it aimed to motivate for small steps toward a more sustainable diet by stressing that every meal matters. Information about how to recycle trash correctly was part of the

second letter, too. Further, diagrams presented where food emissions are caused and how much livestock there is. The letters are attached in the appendix.

Questionnaire

Participants of both groups were asked to fill out two questionnaires. One at the beginning of the experiment and a second three weeks later. Both questionnaires consisted of four parts. The first part aimed to identify the general attitude towards climate change. The feeling of personal responsibility for the environment got questioned next. The third part deals with knowledge about diet's impact. In the last part, the students were asked about their current food consumption and future intentions.

In the beginning, students were asked to share their agreement on a four stages scale from no to a solid agreement. All questions aimed to get an understanding of how far the student sees climate change as a threat. Thereby the first two investigate a general attitude about climate change. The third and fourth consider the roles of external "helpers" such as science, technology, and experts.

1. Environmental threats are a concern for me.
2. Environmental problems are generally exaggerated.
3. Science and technology can solve all environmental problems.
4. Environmental problems should be left to the experts.

The second part includes humanity and the unique role of the topic of climate change. It starts with a statement if, generally, humans should do more for the environment. This question is purposely descriptive and generally formulated to elicit the participant's perception of social norms. The following three questions ask about the individual role, starting with the power of oneself; they believe that everyone can make their bid and the willingness to sacrifice for the sake of the environment. This juxtaposition offers a comparison of how far demands on humanity are lived by oneself.

5. People should do more to protect the environment.
6. I can personally influence what happens to the environment.
7. I believe that everyone can make a significant contribution to environmental protection.
8. I am willing to accept personal restrictions for environmental protection.

The third part asks about the estimation of carbon emissions and environmental contributors along with food production. In the first questions, the five major carbon-emitting sectors are listed, and participants were asked to assign a number from 1 (greatest) to 5 (lowest) to the sector. The second question lists six features that one could take care of when shopping for groceries and asks for their environmental impact. Answers to those questions were presented in the letters. Therefore, those questions serve hiddenly as control questions if the participants worked with the material.

9. Sectors: Transportation, Industry / Production, Energy / Power, Food, Buildings

10. Environmental impact of the following contributors:

- a) Avoid products with a lot of packaging material
- b) Shop regionally
- c) Avoid foods that are transported by air
- d) Eat seasonal fruits and vegetables
- e) Buy organic food
- f) Eat less meat (maximum 1-2 times a week)

The fourth part asked about current and future intentions regarding the frequency of consumption for different food categories. At the heart of the experiment, the first and last questionnaires get compared and enable the identification of changes. The setup of this question is an adjustment of the “Diet History Questionnaire” from the American National Cancer Institute¹, a frequently used template in food studies.

The first matrix asking about consumption offered the following frequencies: several times a day, daily, 5-6/week, 3-4/week, 1-2/week, 1-3/month, less often, never. The second one about the intentions asked about the same food categories, and if the participant seeks to eat more, the same amount or less of this. The categories were the following:

- Vegetables
- Fruit
- Legumes
- Processed food / ready meals

¹ Accessed 15th of August 2021 <https://epi.grants.cancer.gov/dhq3/dhq3-past-year-with-serving-sizes-questionnaire.pdf>

- Regional food
- Meat
- Dairy products
- Oat, soy, or coconut drinks
- Meat substitutes
- Dairy substitutes (soy yogurt, etc.)

In the second round of the questionnaires, participants got also asked about their political acceptance of food regulations. The implementations of such decisions would partly limit freedom, but for the good from a conversation point of view.

- I would like to have more vegetarian and vegan options.
- I would like to have vegetarian days in public kitchens.
- I would like to have vegan days in public kitchens.
- I consider governmental support for plant-based diets for reasonable (e.g., through subsidies in public kitchens).

Statistical Analyze and Variables

Whereas the first questionnaire was conducted at the end of a class, the second was accessible through a link sent via e-mail. The results of both surveys got extracted into a .xlsx document. Through the student ID, the answers of both questionnaires could be linked to the individual, and individual changes could be identified.

The qualitative answers got quantified by numerical transformation. For instance, the four stages between no and strong agreement changed into numbers from one to four. Thereby, the following variables could be created:

Caring: To which extent are environmental threats the individual's concern and if environmental issues are generally exaggerated (Question 1,2, and 5).

Responsibility: Gathers the answers about personal behavior towards environmental protection (Question 6 to 8).

Gap-Size: Is the average agreement of Caring divided by the average of responsibility. The more significant the difference, the less in line are the values (caring score) with the personal behavior (responsibility) and the larger the gap.

Knowledge Score: I create a score to quantify people's knowledge. Based on questions 9 and 10, the deviation of individuals' answers and the correct one was summed. To link a higher number to more knowledge, all results will be subtracted from the highest score.

Knowledge Change: To see how the knowledge changes over time and through the treatment, the Knowledge Score of questionnaire one gets compared to the Knowledge Score of questionnaire 2. An increase means that the individual learned.

Low & High CO₂ Foods: All food categories get classified based on the CO₂ levels from chapter two to make changes measurable. To make things more transparent, I decided to distinguish between low, medium, and high CO₂ foods. Whereas the medium category contains fruits and vegetables, they are considered neutral and excluded from further analysis. Among low CO₂ food are legumes, regional foods, plant-based "dairy" products, and meat replacements. The high CO₂ food group consists of meat and dairy products.

Consumption Behavior: Thereby, the frequency of food got transferred into numbers. As presented in the fourth question block, participants could choose between eight levels, starting several times a day (=8) to never (=1). Therefore, the higher the number, the more of those food categories got eaten. To calculate the Consumption Behavior, an average frequency got calculated. Going from four to five is the equivalent of eating, e.g., legumes 3-4 times a week instead of 1-2.

Consumption Intention: In the experiment, the individuals get asked if they aim to eat less (=1), the same (=2), or more (=3) of a food category in the future. As a result, 2 means no change intentions, whereas everything below 2 is a cut and everything above an increase.

Determination of the Unconsciousness Rejector

Based on those variables, the Unconsciousness Rejector can be determined. Thereby, two criteria must be fulfilled:

I. Existence of a Gap

First, values got identified through the level of caring about the environment. Without caring about the environment, no behavior change for a healthier planet would be desirable. Second, a certain level of awareness regarding personal responsibility about climate change must exist to justify the personal effort. Based on those two criteria – caring & responsibility, a gap is measurable. Further, in both cases, a minimum score is necessary, plus there must be a gap. These requirements ensure the existence of dissonance, and based on the unpleasantness of this feeling, an interest in reducing it is reasonable.

II. Knowledge

The second crucial criterion for the fifth type is that no sufficient knowledge is already existent. Furthermore, the knowledge must increase over the course of the experiment, such that the individual gained a minimum level of knowledge during the experiment. The change is controlled through the variables *Knowledge Score* and *Knowledge Change*.

First Hypothesis

As argued and presented in the previous chapter, knowledge does have an impact on behavior. Whereas the degree is controversial and will be investigated in the experiment, it is crucial to act appropriately. The first hypothesis claims that the fewer people know, the more they react to information. The claim is justified through higher potential. If people deal with a topic for the first time, it can change their view and further change behavior. If already a solid body of knowledge exists, the letters are somewhat repetitive than educational.

The *Knowledge Score* will be tracked for the Control Group (CG), Treatment Group (TG), and the Unconsciousness Rejecter (UR) alike. Over time, no change is expected for the

CG. For the TG, I would separate over- and under-average knowledge. For those who already have over-average knowledge, I expect a moderate increase (about 10%). For instance, this could be an average increase from 15 to 16,5. For the under-average group, I expect a higher and more significant increase (about 25%) - meaning that a mean of 10 becomes 12,5. Since there are as many over- as under-average participants, the overall Knowledge Score increase should be circa 12,5% for the TG.

In a second step, consumption behavior and intentions get examined. Besides, I assumed that the more knowledge people gain, the more they will adjust their behavior. This effect should be especially true for the Unconsciousness Rejecter. The underlying assumption for this claim is that if you do not know about the consequences of your behavior, you cannot adjust your behavior towards your values. Humans perceive dissonance as unpleasant and therefore seek to reduce it, so an interest in value-oriented behavior is supposed. The hypothesis claims that participants with poor previous knowledge are more likely to build intentions and adjust behavior after receiving information. By setting intentions, they would no longer belong to the Precontemplation stage, the first group of the TT model, but the third, the Preparation. If they already started changing consumption behavior, they would even belong to the fourth, the Action stage. People with previous knowledge could already have been acted. If they knew before and did not behave accordingly, the letters will merely be a repetition or reminder, but not a gamechanger. Therefore, I expect the correlation between knowledge gain and behavior change.

In this context, I expect a moderate adjustment of TG. The consumption behavior of the should moderately change about 10% towards a more sustainable diet. This implies an increase of circa 10% for low CO₂ foods and a decrease of about 10% for foods high in CO₂. For the UR, I expect the same due to two reasons. On one side, there is more potential which supports a more substantial increase. On the other hand, behavior change is challenging, especially in a personal and routine-based field like a diet. Since diet adjustments can be complicated initially, I expect these effects (potential but harder) to balance each other out.

Regarding the consumption intentions, I anticipate a significant change for the TG whereas the CG remains the same. Assumed that all groups have no intentions to change their diet initially, I expect the CG to stay at 2. The TG, as well as CG on the other side, could change their intentions about 20% towards a more environmentally friendly diet- so twice as strong as their behavior. In that case, an average of 1.6 in high CO₂ foods and 2.4 for

low CO2 foods is expected. I expect greater intentional change than real change because it is easier to set goals than fulfill them.

Second Hypothesis

The second hypothesis claims that knowledge positively affects the acceptance of political decisions as long as they are in line with the kind of knowledge. The hypothesis would be confirmed by identifying a positive correlation between knowledge and acceptance of pro-environmental restrictions. This can be done through a scatter plot, including a trendline. When plotting knowledge and agreement, the trendline should point towards the right top corner. This indicates that the more knowledge exists, the higher the agreement is. Since I assume higher knowledge of the TG – due to the letters, there should be a tendency to have a higher agreement of the TG. For the UR, the result is to be awaited. On the one side, the general knowledge is relatively low, which indicates lower agreement. On the other side, they could be even more into it due to the new knowledge and therefore compensate the lower knowledge with a higher acceptance for external restrictions. If the acceptance is determined by knowledge, the agreement level should be similar to the knowledge level. I assumed a knowledge difference around 10% for over average and circa 25% for below average. Therefore, the acceptance of the TG should be roughly 12.5% higher than the acceptance of the CG.²

² $10\% \cdot 0.5 + 25\% \cdot 0.5 = 12.5\%$

4. Results

In the following, the two hypotheses will be examined with the data gathered in the experiment. First, I will present the average agreement for the first eight statements and present the data used to determine the knowledge variables. Next, the UR-types will be identified. After setting up the foundation, the two hypotheses can be matched with the data to see if they hold.

Starting with evaluating the first eight questions, Figure 10 presents the agreement to the given statements. The four bars which belong to each question present the average agreement over the statement below. Thereby, the treatment group (TG) and Control Group (CG) results are examined. For each group, the results for both time points are presented – Round 1 (R1) at the beginning of the experiment and Round 2 (R2) at the end. There were 31 participants, where 16 got randomly assigned to the TG and 15 to the CG.

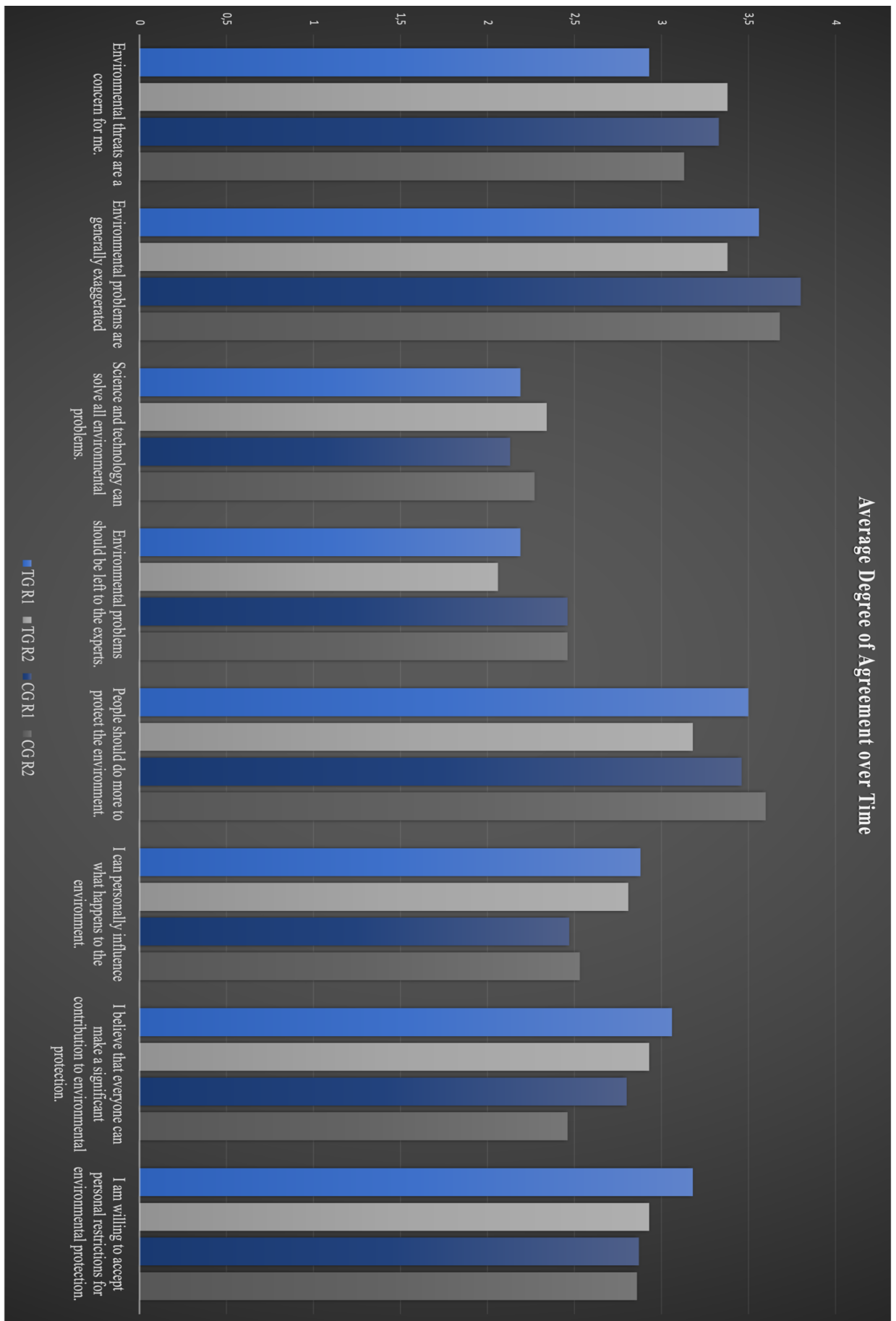


Figure 10: Average Degree of Agreement for Question 1-8 of TG and CG
Source: Own Illustration

To see the agreement change more precisely, Figure 11 shows a line for the TG and CG alike. As expected, the blue TG line lays above the grey CG line, which shows that their agreement increased more throughout the experiment. At the second question, the blue line undermines the grey, which aligns with a pro-environmental trend. The way the question was asked leads to more personal responsibility the less one agrees. What is more, the TG has on average only neutral or pro-environmental changes, whereas the CG decreases personal responsibility and willingness to scarify. The last two questions point out the decreasing responsibility, “I think everyone can do their bit,” and “I am willing to scarify for the environment.”

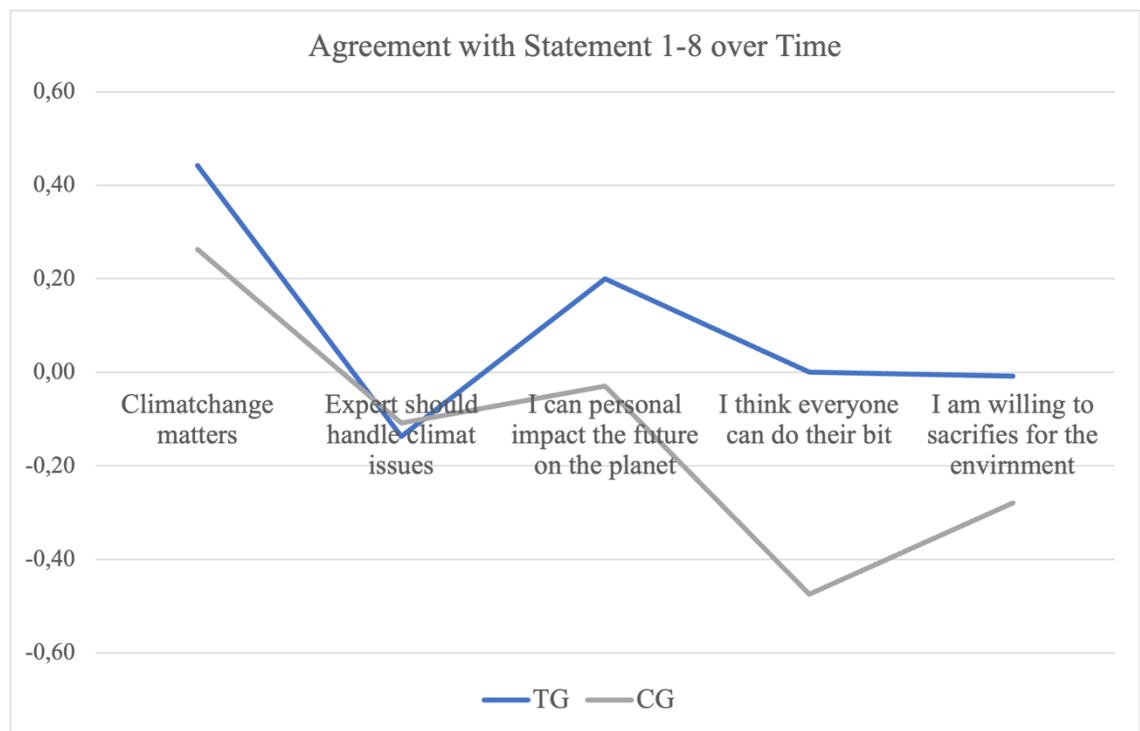


Figure 11: Change of Agreement over Time
Source: Own Illustraition

The next pillar needed for the analysis of the hypotheses is the Knowledge Score and Change. The scores of both rounds, based on questions 9 and 10, are presented in Figure 12. Furthermore, Figure 12 contains a forecast based on the expectation described in the previous chapter.

Knowledge Score				
	Sample Size t	Round 1	Round 2 Expectation	Runde 2
All	31	10,54	11,31	10,97
TG	16	10,25	11,79	10,31
CG	15	10,80	10,80	11,66

Figure 12: Knowledge Score throughout the Experiment
Source: Own Illustration

Whereas the knowledge indeed increased, it did so for both groups. To my surprise, it increased even more for the CG, which is not plausible. When comparing the expectations with the actual results, it is clear that the expected average 12.5% does not hold. For the TG, it is a mere increase of a half percent, which is so tiny that it could be random.

To investigate this possibility, I conducted a two-sample t-test which assumes unequal variance. I used the CG data to test non-randomness for the TG. Thereby, the H0 hypothesis claims no difference in the results. If the H0 can be rejected, e.g., through a P-Value smaller than the significance level of 0,05, the H1 holds. A true H1 indicated a difference between TG and CG, which is not due to randomness. The test reveals a P-Value of 0,9633, which is very high. Hence, inferences can barely be made.

When analyzing only the results of question 9, the numbers applied to the context seem less random. In the first round, diet got ranked by both groups as the third most significant contributor of emissions. The TG ranked it first in the second round, whereas it dropped to rank four for the CG. Figure 13 shows the average ranking among the TG and CG for both rounds. For the TG, the rank goes from 2,93 to 2,33, which is the lowest number and, therefore, the highest rank. For the CG, it rises from 3,38 to 3,47. Nevertheless, a T-test with a P-Value of 0,9022 leaves no doubt of randomness again.

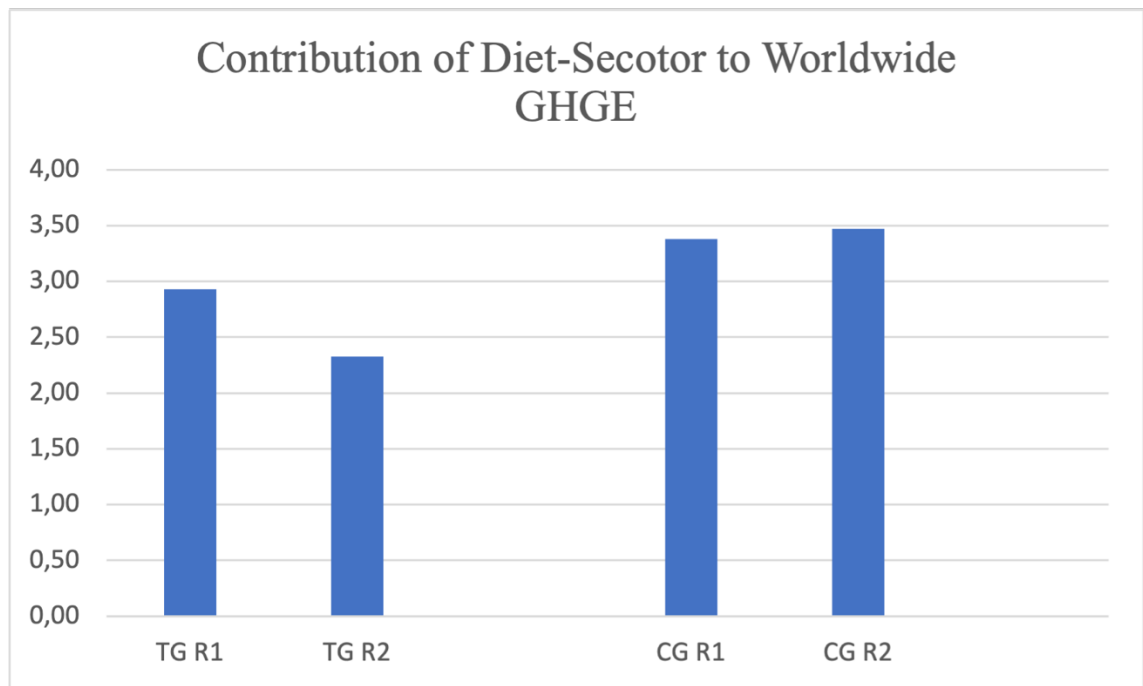


Figure 13: Estimation of Food Sector Contribution over Time
Source: Own Illustration

Fortunately, this was not the only investigation I could make with the data about knowledge. Figure 14 will help examine the statement that “the poorer the knowledge at the beginning, the more individuals learned.” A downward sloping trendline would confirm the statement by plotting the Knowledge Score of round 1 on the X-axis and the difference compared to round two on the Y-axis.

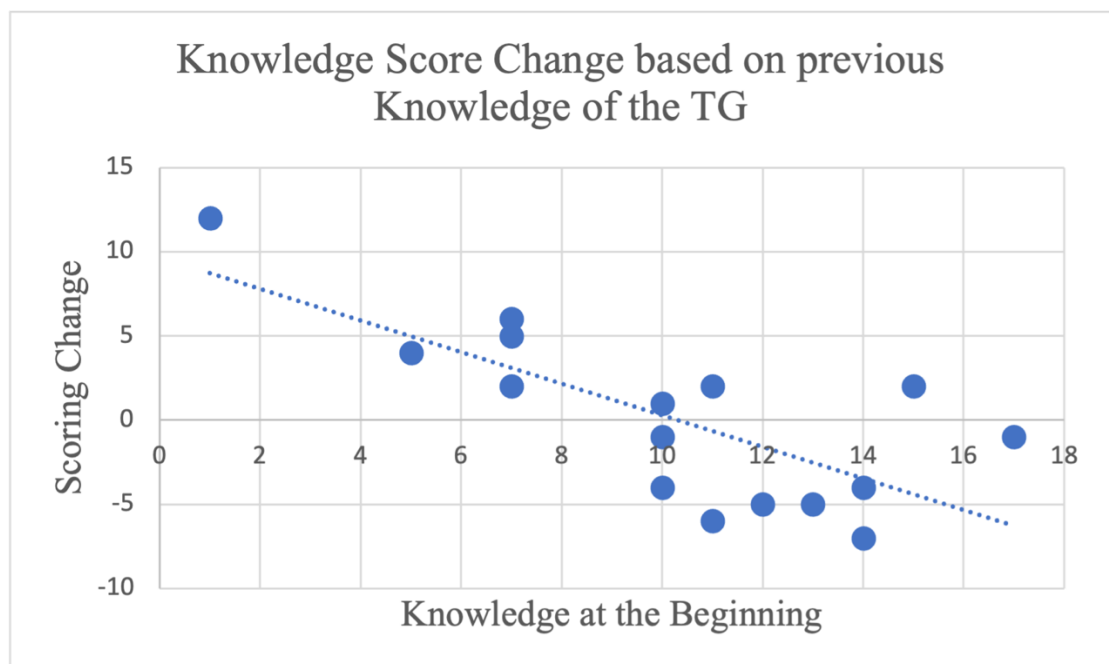


Figure 14: Knowledge Score Change of TG
Source: Own Illustration

As expected, the trendline is downward sloping which shows that the more one knew before, the less knowledge they gained during the experiment. I did not expect that the trendline would cross the X-axis, which means that people with relatively high knowledge at the beginning scored worse in round 2. This finding could be an example of regression towards the mean, a phenomenon that describes that outlier in other samples will be closer to the average. Before interpreting too much into the plot, I stress that the data is the same as the Knowledge Score. Hence, the same level of randomness applies, which limits inferences.

The following section is about the identification of the Unconsciousness Rejecter. The first step is to identify people from the TG who match the criteria. The identification was made through minimum scores of environmental caring and responsibility as described at the end of the previous chapter. Further mandatory is a gap between values and responsibility and an increased knowledge about the environmental impact of food production throughout the experiment.

Seven individuals pass the first criteria of a minimum Caring Score of 7, at least 9 for the Responsibility Score, and a Gap. To put the values into perspective, the overall average for caring is 6,80 and for Responsibility 8,65. Also, 80% of the people had a gap. Regarding the Knowledge Change, I had to lose the criteria. Whereas an overall change of 0,43 points occurred, the TG has only improved by 0,06 points. From this, the seven individuals who fulfill the criteria so far lost on average 2,125 points. This result is neither as expected nor as wished. However, in the further course of the study, I will keep the UR separately. One reason is that the overall results are not significant, and therefore, inferences have to be made very cautiously. Another reason is that the UR matches the first criteria, and therefore, a separate investigation might present different results later.

Hypothesis Check:

The first hypothesis claims that knowledge has an impact on people's behavior and intentions. To get more clarity, Figure 15 shows the average Consumption Behavior of all participants. Starting with round 1, it also reveals the numerical expectations based on the answers of round 1. Further, it includes the proper values for the second round.

After identifying the Knowledge Score, the next step is to analyze overall consumption change. To do so, for each group, an average of the quantities of consumption got measured twice. The difference allows the calculation of a change. Whereas the absolute numbers are presented in Figure 15, the change is explicitly shown in Figure 16.

Consumption Behavior						
	R1		R2 Expectation		R2	
	Low CO2	High CO2	Low CO2	High CO2	Low CO2	High CO2
All	3,35	4,87	3,52	4,61	3,43	4,889
TG	3,29	5,13	3,62	4,61	3,91	4,63
CG	3,41	4,60	3,41	4,60	2,96	5,13
UR	3,77	4,71	4,147	4,239	4,28	4,8

Figure 15: Consumption Behavior of Participants

Source: Own Illustration

Change		
	R2 - R1	
	Low CO2	High CO2
All	0,08	0,02
TG	0,62	-0,50
CG	-0,45	0,53
UR	0,51	0,09

Figure 16: Change of Consumption Behavior

Source: Own Illustration

For the CG, an increase in high CO2 products and a decrease in plant-based options got measured. Those changes cannot be explained since no treatment has been conducted. For the TG, it is the opposite. Especially the consumption of plant-based options increased much.

Both changes match the expected results, and it seems that the individuals acted on the information. It can be interpreted as knowledge's impact on the decision in favor of the climate. The UR follows the same trend as the TG but is less intense. This behavior does contradict the hypothesis, which claims a more substantial reaction for the UR. To test non-randomness, a T-test is conducted. For the low and high CO2 food, a P-Value reveals 0,0646 and 0,0620 respectively. Whereas this is too big to reject the H0, the randomness is much less intense compared to the previous values of 0,9 and more.

While those tables explained the overall Behavior Change, Figure 17 helps to make inferences about individual Behavior Change in the context of personal Knowledge Change. The individual behavior change was calculated by increasing low CO2 foods over time and decreasing high CO2 foods over time. As the trendline reveals, there is a

slight correlation between positive knowledge change and more sustainable diet consumption. Through a P-Value of 0,9796, it seems to be somewhat random.

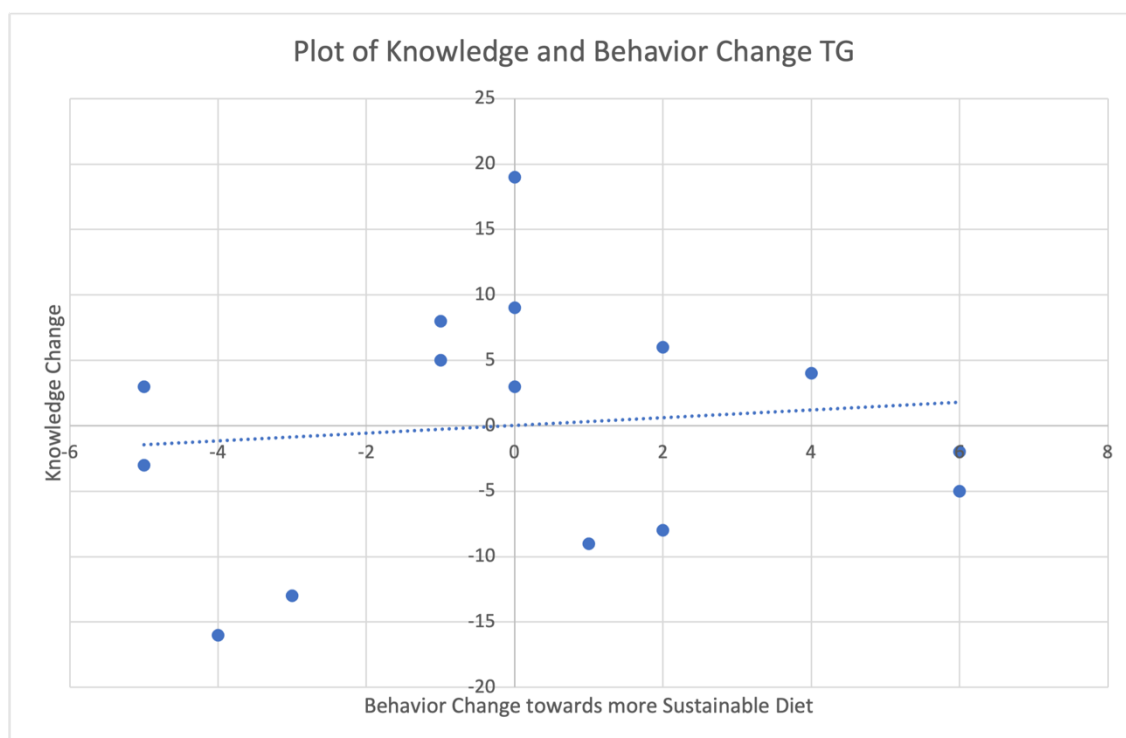


Figure 17: Knowledge and Behavior Change for the TG

Source: Own Illustration

The second part of the hypothesis focused on the intention change. For this, the participants got asked if they sought to eat more, the same amount, or less in the future. As described in the Experimental Design Chapter, I expect a shift of about 20% towards more environmentally friendly foods for the TG. This shift consists of a 20% increase for low CO₂ foods and a decrease of 20% for foods high in CO₂.

The results are presented by Figure 18 whereas the change is again separately expelled in Figure 19. From the beginning of the experiment, there is a trend of eating more sustainable – meaning more low CO₂ foods and less high. This trend remains but stays the same. The expectations of a 20% change were by far not matched. The highest chance is of the CG, which decreases their intention of high CO₂ food by 0,13. To put the numbers into context: a change of 0.1 arises when 1 out of 10 people change from, e.g., the same amount (2) to more (3). Therefore, an overall change of 0,13 can be neglected.

Still, an intentional increase in the high CO₂ food of the TG is a surprise. Due to a P-Value of 0,3051 for the TG and CG and 0,3897 for the UR with the CG, the nonrandom hypothesis cannot be rejected. Hence, inferences have to be made very cautious again.

Consumption Intention						
	R1		R2 Expectation		R2	
	Low CO2	High CO2	Low CO2	High CO2	Low CO2	High CO2
All	2,21	1,63	2,43	1,47	2,19	1,59
TG	2,15	1,56	2,58	1,25	2,14	1,59
CG	2,27	1,70	2,27	1,70	2,24	1,57
UR	2,31	1,57	2,77	1,26	2,18	1,5

Figure 18: Consumption Intention of Participants

Source: Own Illustration

Consumption Intention		
	R2 - R1	
	Low CO2	High CO2
All	0,02	0,04
TG	0,01	-0,03
CG	0,03	0,13
UR	0,13	0,07

Figure 19: Change of Consumption Intention

Source: Own Illustration

To summarize the results, there was overall much less change than expected. This is just as true for the actual behavior change as for the intentions. Further, the correlation between Knowledge Change and Behavior Change is minimal. All results must be interpreted carefully because non-randomness could not be verified.

The second hypothesis investigates the impact of knowledge on political decisions. It is motivated by research that indicates that even though knowledge does not necessarily lead to behavior change, it can increase the acceptance of governmental decisions. To investigate the agreement of four statements, the level of agreement got transferred into numbers. Thereby, the higher the number, the more people agreed. The results are presented in Figure 20.

Acceptance of ...				
	...more vegetarian and vegan options (1)	...more vegetarian days in public kitchens (2)	...more vegan days in public kitchens (3)	...subsidies of plant-based diets (4)
CG	2,18	2,26	1,6	1,9
TG	2,18	2,25	1,9	2,25
UR	2	2	1,71	2,14

Figure 20: Acceptance of Political Decisions.

Source: Own Illustration

Treatment vs. Control Group

Figure 21 shows that the TG always has at least the same level of acceptance as the CG. The level is similar for generally more plant-based options and nearly the same for vegetarian days in public kitchens. Further, it is higher for vegan days and subsidies of plant-based diets. The Unconsciousness Rejecter presents the biggest surprise. In two out of four cases, the UR's agreement is lower than the CG, but it is constantly lower than the TG.

To test how far those results are not based on randomness, I conducted again a t-Test with two-sample assuming unequal variances. The results express that in no case non-randomness could be proven since the H0 hypothesis could not be rejected once.

P Value for the four Statements of the second Hypotheses				
Statement	1	2	3	4
CG x TG	0,85	0,95	0,17	0,30
CG x UR	0,80	0,89	0,12	0,22

*Figure 21: Significance Test of Hypothesis Two.
Source: Own Illustration*

In a last plot, I investigated the correlation between knowledge and acceptance on an individual level. The X-axis shows the Knowledge Score of round 2, whereas the Y-axis presents the average agreement over the four statements. The blue dots are data from the CG, and the grey ones are from the TG. We can see through the trendline that for the TG, there seems to be a correlation between more knowledge and higher agreement. For the CG, this effect is minimal but existent as well. The expectations have been that the trendlines would go in the same angle since a correlation between acceptance and knowledge depends on overall knowledge. Regarding the knowledge, I have expected the grey line to be above the blue one due to the assumed higher knowledge through the treatment. Since the Knowledge Score was not higher, there is no reason to assume the grey line to be above the blue.

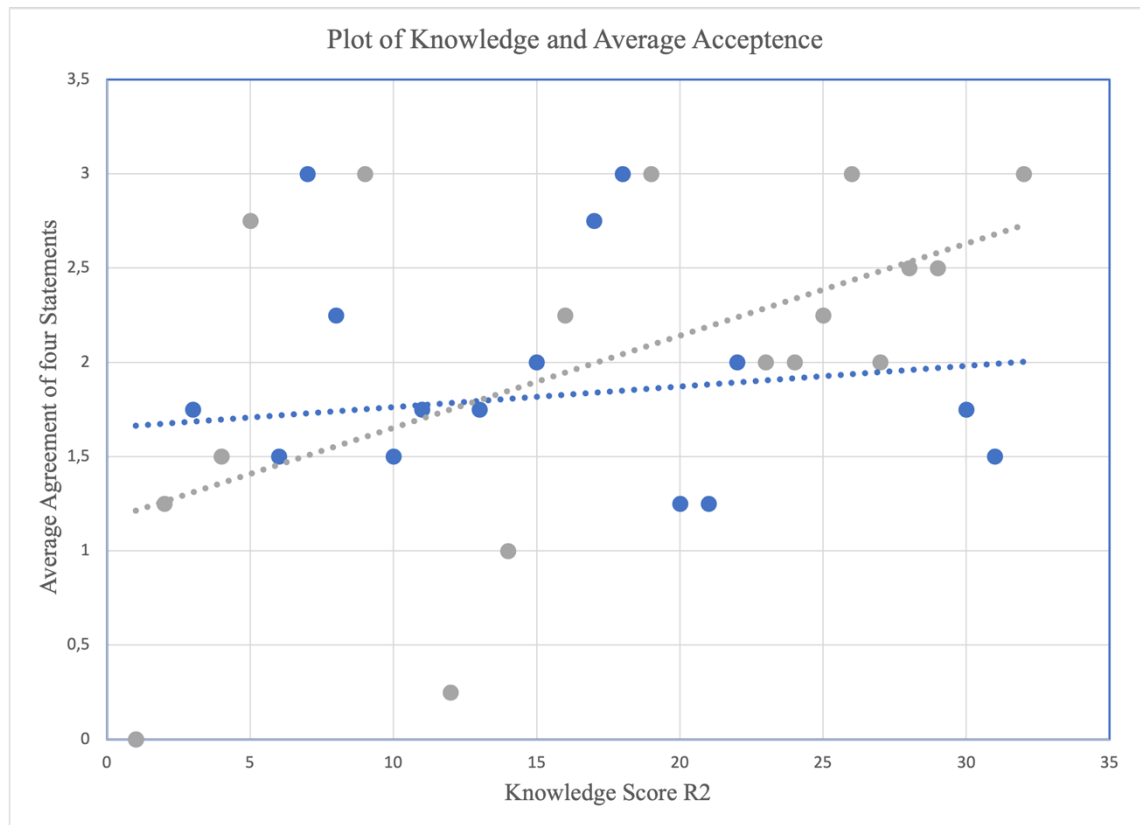


Figure 22: Individual Knowledge and Acceptance
Source: Own Illustration

Summary

All in all, this experiment could not prove that knowledge has a more substantial effect on people with high values and poor knowledge. Therefore, the first hypothesis cannot be confirmed. For the second hypothesis, a higher acceptance for a more sustainable diet in the group confronted with knowledge (TG) could be identified. Further, the individual plot reveals a clear positive correlation between knowledge and agreement. Still, inferences must be made with caution since none of the insights could be proven to hold on a significance level of 0.05.

Regarding the Unconsciousness Rejecter, there was a surprise. People belonging to the group seem to have less reaction than the general TG. In most cases, the tendency is towards the more sustainable options, but to a smaller extent. This is the opposite of the expectation.

5. Conclusion

The thesis had two central goals—first, the investigation of knowledge’s impact on food intentions and consumption, and second the correlation of knowledge and acceptance for reasonable restrictions. Further, a subgroup of the TG was derived and named the Unconsciousness Rejecter. I claimed that the four types of the AVG model that arise by a 2x2 matrix when mapping high and low values and behavior are insufficient. The incompleteness is due to the enormous discrepancy between food’s environmental impact and people’s perception. UR’s do not know about the scope of their behavior and therefore cannot behave according to their values. Therefore, the expectation was that this group would react particularly strongly to new knowledge.

To set up a proper experiment, I first explored literature about decision-making, emphasizing food decisions. Next, a sustainable diet that meets the criteria of a healthy diet got determined. After this, information about the environmental impact of certain food groups could be gathered in letters that served as treatment. The experiment was conducted as a random control study.

The results of the experiment showed a different behavior of all groups. A tendency of the TG towards foods lower in emission could be found. Surprisingly and contradicting the hypothesis, the UR acted not stronger on the new information but even smaller. This discovery counts for the second hypothesis, too. In this, the acceptance of political decisions, which would push environmentally friendly diets to the cost of free choice, got measured. Here the TG showed generally higher acceptance in all environmentally friendly suggestions. As in the first hypothesis, the UR’s pro-environmental consent was lower. In the case of political decisions, it was partly even lower than the acceptance of the CG.

On the one side, the UR did not behave as expected, and the claim that this group would act stronger could not be confirmed. On the other side, there was a difference to the general TG. This difference indicates that adding a fifth type in the AVG Model is reasonable, and more research could be done in this field – especially in areas with great misconceptions like the link between climate change and diet.

Before suggesting further research and interpreting too much into the behavior of the UR, I must point out the limitations of the result. First and foremost, none of the results were statistically significant. Some were close to the 0.05 significance level, e.g., the changes in high and low food consumption (TG to CG were 0.062 and 0.064 respectively), others were far off. For most of the TG results, an interpretation matching the hypothesis could be made. Nevertheless, the possibility that all values are pure coincidence could not be excluded.

Also, the TG includes the UR, which distorts the direct comparison. This approach was chosen to have an equal group size of the CG and TG. Furthermore, the experiment's methodology with only two informative touchpoints and no reliable control on how well the students studied the material limited the explanatory power. Given the relatively low number of participants and no proven significance, the result is quite astonishing. Indeed, an additional AVG type who does not know its extent is acting against its values seems reasonable. Against the expectations, this group seems to act even less on the information.

Those insights could lead to the hypothesis that the gathering and repetition of knowledge have a positive effect on acting on knowledge. Thereby, the more knowledge is accumulated, and the more often it is repeated, the stronger people act on it. All in all, inferences based on the results must be made carefully.

However, further investigation about the Unconsciousness Rejecters' existence and the limitation to climate issues is promising since a better understanding opens many possibilities. First, it is a criterion if knowledge campaigns should be considered for behavior adjustments. Second, a distinction of prior knowledge or no prior knowledge enables different strategies for various target groups – depending on their knowledge. For both cases, a break-even point of cost and effect could be identified. Thus, the contradictory results of the influence of knowledge on behavior could be viewed from a new perspective, enabling more successful nudges in the future. Insights would promote a sustainable diet for all topics where a public interest exists to improve current behavior.

Before testing the effect of knowledge on behavior, further research that confirms the UR's existents through significant results is needed. For this, larger sample sizes and more extended studies with more touchpoints would serve well. Additionally, it could be an option to include tests at the end of each informative touchpoint to ensure that the

participants studied the material. Tracking grocery shopping before and after the experiment would also enable a more detailed analysis of food consumption. At the beginning of the studies should be a test of existing knowledge.

The motivation of the thesis was to identify ways to win people for a diet, which is not only lower in emissions but also beneficial for their health. Previous studies determined three categories of nudges, where cognitive oriented is one of them.

Why is it necessary to identify efficient ways? Climate change is ranked as the most threatening risk by the Economic Forum Global Risk Report 2021 by McLennan et al. (2021).

Moreover, many experts agree that we cannot avoid dire consequences for future generations without changing our diet. Behavioral economics can contribute to the social threat which will affect all of us. Developing evidence-based strategies, which help to act more sustainably as a society, is a powerful tool. Building an environment in which the more sustainable (food) choices are the easiest and therefore becomes the new normal is in the highest interest of the planet and individuals.

6. References

- Aiking, Harry. 2011. “Future Protein Supply.” *Trends in Food Science & Technology* 22 (2–3): 112–20. <https://doi.org/10.1016/j.tifs.2010.04.005>.
- Babutsidze, Zakaria, and Andreas Chai. 2018. “Look at Me Saving the Planet! The Imitation of Visible Green Behavior and Its Impact on the Climate Value-Action Gap.” *Ecological Economics* 146 (April): 290–303. <https://doi.org/10.1016/j.ecolecon.2017.10.017>.
- Bailey, Rob, Antony Froggatt, and Laura Wellesley. 2014. “Livestock – Climate Change’s Forgotten Sector.” *Climate Change*, December, 30.
- Bissing-Olson, Megan J., Kelly S. Fielding, and Aarti Iyer. 2016. “Experiences of Pride, Not Guilt, Predict pro-Environmental Behavior When pro-Environmental Descriptive Norms Are More Positive.” *Journal of Environmental Psychology* 45 (March): 145–53. <https://doi.org/10.1016/j.jenvp.2016.01.001>.
- Boer, Joop de, Hanna Schösler, and Harry Aiking. 2014. “‘Meatless Days’ or ‘Less but Better’? Exploring Strategies to Adapt Western Meat Consumption to Health and Sustainability Challenges.” *Appetite* 76 (May): 120–28. <https://doi.org/10.1016/j.appet.2014.02.002>.
- Bucher, Tamara, Clare Collins, Megan E. Rollo, Tracy A. McCaffrey, Nienke De Vlieger, Daphne Van der Bend, Helen Truby, and Federico J. A. Perez-Cueto. 2016. “Nudging Consumers towards Healthier Choices: A Systematic Review of Positional Influences on Food Choice.” *British Journal of Nutrition* 115 (12): 2252–63. <https://doi.org/10.1017/S0007114516001653>.
- Cadario, Romain, and Pierre Chandon. 2020. “Which Healthy Eating Nudges Work Best? A Meta-Analysis of Field Experiments.” *Marketing Science* 39 (3): 465–86. <https://doi.org/10.1287/mksc.2018.1128>.
- Cambridge Dictionary. 2021. “culture.” January 1, 2021. <https://dictionary.cambridge.org/de/worterbuch/englisch/culture>.
- Camilleri, Adrian R., Richard P. Larrick, Shajuti Hossain, and Dalia Patino-Echeverri. 2019. “Consumers Underestimate the Emissions Associated with Food but Are Aided by Labels.” *Nature Climate Change* 9 (1): 53–58. <https://doi.org/10.1038/s41558-018-0354-z>.
- Carlsson-Kanyama, Annika. 1998. “Climate Change and Dietary Choices — How Can Emissions of Greenhouse Gases from Food Consumption Be Reduced?” *Food Policy* 23 (3–4): 277–93. [https://doi.org/10.1016/S0306-9192\(98\)00037-2](https://doi.org/10.1016/S0306-9192(98)00037-2).
- Chai, Andreas, Graham Bradley, Alex Lo, and Joseph Reser. 2015. “What Time to Adapt? The Role of Discretionary Time in Sustaining the Climate Change Value-Action Gap.” *Ecological Economics* 116 (August): 95–107. <https://doi.org/10.1016/j.ecolecon.2015.04.013>.
- Christie, Chelsea D., and Frances S. Chen. 2018. “Vegetarian or Meat? Food Choice Modeling of Main Dishes Occurs Outside of Awareness.” *Appetite* 121 (February): 50–54. <https://doi.org/10.1016/j.appet.2017.10.036>.
- Dagher, Grace K., and Omar Itani. 2014. “Factors Influencing Green Purchasing Behaviour: Empirical Evidence from the Lebanese Consumers: Lebanese Consumers’ Green Purchasing Behaviour.” *Journal of Consumer Behaviour* 13 (3): 188–95. <https://doi.org/10.1002/cb.1482>.
- Dooren, C. van, Mari Marinussen, Hans Blonk, Harry Aiking, and Pier Vellinga. 2014. “Exploring Dietary Guidelines Based on Ecological and Nutritional Values: A

- Comparison of Six Dietary Patterns.” *Food Policy* 44 (February): 36–46. <https://doi.org/10.1016/j.foodpol.2013.11.002>.
- Garnett, Emma E., Andrew Balmford, Chris Sandbrook, Mark A. Pilling, and Theresa M. Marteau. 2019. “Impact of Increasing Vegetarian Availability on Meal Selection and Sales in Cafeterias.” *Proceedings of the National Academy of Sciences* 116 (42): 20923–29. <https://doi.org/10.1073/pnas.1907207116>.
- Godin, Gaston, and Gerjo Kok. 1996. “The Theory of Planned Behavior: A Review of Its Applications to Health-Related Behaviors.” *American Journal of Health Promotion* 11 (2): 87–98. <https://doi.org/10.4278/0890-1171-11.2.87>.
- Goldstein, Noah J., Robert B. Cialdini, and Vladas Griskevicius. 2008. “A Room with a Viewpoint: Using Social Norms to Motivate Environmental Conservation in Hotels.” *Journal of Consumer Research* 35 (3): 472–82. <https://doi.org/10.1086/586910>.
- Graça, João, Maria Manuela Calheiros, and Abílio Oliveira. 2014. “Moral Disengagement in Harmful but Cherished Food Practices? An Exploration into the Case of Meat.” *Journal of Agricultural and Environmental Ethics* 27 (5): 749–65. <https://doi.org/10.1007/s10806-014-9488-9>.
- Hale, Jerold L., Brian J. Householder, and Kathryn L. Greene. 2002. “The Theory of Reasoned Action.” In *The Persuasion Handbook: Developments in Theory and Practice*, 259–86. 2455 Teller Road, Thousand Oaks California 91320 United States: SAGE Publications, Inc. <https://doi.org/10.4135/9781412976046.n14>.
- Hallström, E., E. Röö, and P. Börjesson. 2014. “Sustainable Meat Consumption: A Quantitative Analysis of Nutritional Intake, Greenhouse Gas Emissions and Land Use from a Swedish Perspective.” *Food Policy* 47 (August): 81–90. <https://doi.org/10.1016/j.foodpol.2014.04.002>.
- Harland, Paul, Henk Staats, and Henk A. M. Wilke. 2007. “Situational and Personality Factors as Direct or Personal Norm Mediated Predictors of Pro-Environmental Behavior: Questions Derived From Norm-Activation Theory.” *Basic and Applied Social Psychology* 29 (4): 323–34. <https://doi.org/10.1080/01973530701665058>.
- Joyce, Andrew, Sarah Dixon, Jude Comfort, and Jonathan Hallett. 2012. “Reducing the Environmental Impact of Dietary Choice: Perspectives from a Behavioural and Social Change Approach.” *Journal of Environmental and Public Health* 2012: 1–7. <https://doi.org/10.1155/2012/978672>.
- Kahneman, Daniel. 2011. *Thinking, Fast and Slow*. 1st ed. New York: Farrar, Straus and Giroux.
- Knutti, Reto. 2019. “Closing the Knowledge-Action Gap in Climate Change.” *One Earth* 1 (1): 21–23. <https://doi.org/10.1016/j.oneear.2019.09.001>.
- Kollmuss, Anja, and Julian Agyeman. 2002. “Mind the Gap: Why Do People Act Environmentally and What Are the Barriers to pro-Environmental Behavior?” *Environmental Education Research* 8 (3): 239–60. <https://doi.org/10.1080/13504620220145401>.
- Laes, Erik, Pieter Valkering, Kris Kessels, Virginia Gómez Oñate, Enrique Rivero, Koen Straver, Matthijs Uyterlinde, et al. 2013. *Report on State-of-the-Art and Theoretical Framework for End-User Behaviour and Market Roles in Smart Grid Projects*. <https://doi.org/10.13140/2.1.3109.6008>.
- Laestadius, Linnea I., Roni A. Neff, Colleen L. Barry, and Shannon Frattaroli. 2014. “‘We Don’t Tell People What to Do’: An Examination of the Factors Influencing NGO Decisions to Campaign for Reduced Meat Consumption in Light of Climate Change.” *Global Environmental Change* 29 (November): 32–40. <https://doi.org/10.1016/j.gloenvcha.2014.08.001>.

- Lea, Emma, and Anthony Worsley. 2008. "Australian Consumers' Food-Related Environmental Beliefs and Behaviours." *Appetite* 50 (2–3): 207–14. <https://doi.org/10.1016/j.appet.2005.07.012>.
- Lee, Yumi, and Evelin Witruk. 2016. "Teachers' Intended Classroom Management Strategies for Students with ADHD: A Cross-Cultural Study between South Korea and Germany." *Current Issues in Personality Psychology* 2: 106–17. <https://doi.org/10.5114/cipp.2016.60171>.
- Macdiarmid, Jennie I., Flora Douglas, and Jonina Campbell. 2016. "Eating like There's No Tomorrow: Public Awareness of the Environmental Impact of Food and Reluctance to Eat Less Meat as Part of a Sustainable Diet." *Appetite* 96 (January): 487–93. <https://doi.org/10.1016/j.appet.2015.10.011>.
- Macovei, Octav-Ionuț. 2015. "Applying the Theory of Planned Behavior in Predicting Pro- Environmental Behaviour: The Case of Energy Conservation" 11 (4): 19.
- McLennan, Marsh, and SK Group. 2021. "The Global Risks Report 2021 16th Edition," 97.
- Monkhouse, Claire, and Sue Dibb. 2011. "Making Sustainable Lives Easier," January, 43.
- O'Brien, Karen. 2012. "Global Environmental Change II: From Adaptation to Deliberate Transformation." *Progress in Human Geography* 36 (5): 667–76. <https://doi.org/10.1177/0309132511425767>.
- Pandey, Sujita, Christian Ritz, and Federico Jose Armando Perez-Cueto. 2021. "An Application of the Theory of Planned Behaviour to Predict Intention to Consume Plant-Based Yogurt Alternatives." *Foods* 10 (1): 148. <https://doi.org/10.3390/foods10010148>.
- Park, Toby. 2020. "Behavioural Insights for Conservation and Sustainability." In *Conservation Research, Policy and Practice*, edited by William J. Sutherland, Peter N. M. Brotherton, Zoe G. Davies, Nancy Ockendon, Nathalie Pettorelli, and Juliet A. Vickery, 1st ed., 293–308. Cambridge University Press. <https://doi.org/10.1017/9781108638210.018>.
- Petrovich, Beatrice, Stefanie Lena Hille, and Rolf Wüstenhagen. 2018. "WORKING PAPER SUBMITTED AND PRESENTED AT WCERE 2018," January, 28.
- Ranganathan, Janet, Daniel Vennard, Richard Waite, Patrice Dumas, Brian Lipinski, and Tim Searchinger. 2011. "SHIFTING DIETS FOR A SUSTAINABLE FOOD FUTURE," 90.
- Ritchie, Hannah, and Max Roser. 2020. "Environmental Impacts of Food Production - Our World in Data." January 1, 2020. <https://ourworldindata.org/environmental-impacts-of-food>.
- Schwartz, SHALOM H., and JUDITH A. Howard. 1982. "Chapter 14 - Helping and Cooperation: A Self-Based Motivational Model" Preparation of This Manuscript Was Supported by NSF Grant BNS 77–23287 to the First Author." In *Cooperation and Helping Behavior*, edited by Valerian J. Derlega and Janusz Grzelak, 327–53. Academic Press. <https://doi.org/10.1016/B978-0-12-210820-4.50019-8>.
- Šedová, Iveta, Ľuboš Slovák, and Ivana Ježková. 2016. "Coping with Unpleasant Knowledge: Meat Eating among Students of Environmental Studies." *Appetite* 107 (December): 415–24. <https://doi.org/10.1016/j.appet.2016.08.102>.
- Staats, Henk. 2004. "Pro-Environmental Attitudes and Behavioral Change." In *Encyclopedia of Applied Psychology*, edited by Charles D. Spielberger, 127–35. New York: Elsevier. <https://doi.org/10.1016/B0-12-657410-3/00817-5>.
- Thaler, Richard H., and Cass R. Sunstein. 2008. *Nudge: Improving Decisions about Health, Wealth, and Happiness*. New Haven: Yale University Press.

- Thøgersen, John, and Folke Ölander. 2003. "Spillover of Environment-Friendly Consumer Behaviour." *Journal of Environmental Psychology* 23 (3): 225–36. [https://doi.org/10.1016/S0272-4944\(03\)00018-5](https://doi.org/10.1016/S0272-4944(03)00018-5).
- Tobler, Christina, Vivianne H.M. Visschers, and Michael Siegrist. 2011. "Eating Green. Consumers' Willingness to Adopt Ecological Food Consumption Behaviors." *Appetite* 57 (3): 674–82. <https://doi.org/10.1016/j.appet.2011.08.010>.
- Truelove, Heather Barnes, and Craig Parks. 2012. "Perceptions of Behaviors That Cause and Mitigate Global Warming and Intentions to Perform These Behaviors." *Journal of Environmental Psychology* 32 (3): 246–59. <https://doi.org/10.1016/j.jenvp.2012.04.002>.
- Tversky, Amos. 1974. "JUDGMENT UNDER UNCERTAINTY: HEURISTICS AND BIASES," January, 37.
- Vanhonacker, Filiep, Ellen J. Van Loo, Xavier Gellynck, and Wim Verbeke. 2013. "Flemish Consumer Attitudes towards More Sustainable Food Choices." *Appetite* 62 (March): 7–16. <https://doi.org/10.1016/j.appet.2012.11.003>.
- Vos, Marjolijn, and Dr Hendrik Slabbinck. 2021. "A Systematic Review Investigating Successful Behavior Change Methods and Strategies to Reduce Animal-Based Protein Consumption," January, 68.
- Willett, Prof. Walter, and Prof. Johan Rockström. 2019. "EAT-Lancet Commission Brief for Everyone." EAT. 2019. <https://eatforum.org/lancet-commission/eating-healthyandsustainable/>.

Beim Kauf von Lebensmitteln achte ich auf....

- ☐ Regionalität
- ☐ Saisonalität
- ☐ Biologischen Anbau
- ☐ Vegetarisch
- ☐ Vegan
- ☐ Tierwohl
- ☐ Preis
- ☐ Qualität
- ☐ Umweltfreundlichkeit

Ich esse....

	mehrfach täglich	täglich	5-6x / Woche	3-4x / Woche	1-2x / Woche	1-3x / Monat	seltener	ni
Gemüse	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Obst	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Hülsenfrüchte	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Verarbeitet Lebensmittel & Fertiggerichte	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Bewusst regionale Lebensmittel	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Fleisch	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Milchprodukte	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Hafer-, Soja- & Kokosnussdrinke ("Milch")	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Fleischersatzprodukte	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Milchersatzprodukte (z.B. Soja Joghurt)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

In Zukunft möchte ich ... essen

	weniger	gleich viel	mehr
Gemüse	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Obst	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Hülsenfrüchte	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Verarbeitet Lebensmittel & Fertiggerichte	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Bewusst regionale Lebensmittel	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Fleisch	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Milchprodukte	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Hafer-, Soja- & Kokosnussdrinke ("Milch")	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Fleischersatzprodukte	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Milchersatzprodukte (z.B. Soja Joghurt)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Bitte geben Sie ihre Zustimmung an: Wenn sich jeder so wie ich ernähren würde, ginge es dem Planeten besser

Please Select

Bitte geben Sie ihre Zustimmung an: Mit meiner Ernährung bin ich zufrieden

Please Select

Bitte wählen Sie Ihre Zustimmung:

	keine Zustimmung	wenig Zustimmung	Zustimmung	viel Zustimmung
mehr Vegetarische und Vegane Essensoptionen fände ich gut	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Vegetarische Tage in öffentlichen Küchen fände ich gut	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Vegane Tage in öffentlichen Küchen fände ich gut	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
staatliche Förderung von pflanzenbasierter Ernährung halte ich für sinnvoll (z.B. durch Subventionen in öffentlichen Küchen)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Wie stark hast du dich mit dem zugesendeten Material auseinander gesetzt? Diese Abfrage dient lediglich um die Aussagekraft der Studie besser einzuschätzen und NICHT der Punktevergabe für den Kurs - Punkte bekommen Sie. Sollten Sie keine Materialien erhalten haben, wählen Sie bitte die erste Antwortmöglichkeit aus.

- ☐ Ich habe keine Materialien bekommen
- ☐ Sehr ausführlich
- ☐ ausführlich
- ☐ normal
- ☐ oberflächlich
- ☐ wenig
- ☐ gar nicht

The Treatment: Letters for Participants

First Treatment

LETTER

NR. 01

Grüne-News

- dein Input für eine Veränderung -



Its all a big cycle

Herzlich Willkommen zum ersten Input. In diesem Brief wollen wir auf unsere Welt eingehen. Besser gesagt darauf, wie wir diese aufgebaut haben um unsere aktuelle Lebensmittelversorgung zu gewährleisten - und zu welchem Preis diese besteht.

Wie allgemein bekannt ist, treibt unser Handeln durch Treibhausgase das Klima zu einer Erwärmung, welche schneller voranschreitet als es ohne uns der Fall wäre. Die Folgen sind unter anderem extreme Wetterereignisse, versauerte Ozeane, der regionale Zusammenbruch der biologischen Vielfalt und die Störung etablierter landwirtschaftlicher Systeme, von denen unser heute überbevölkerter Planet abhängt. Nahrungsmittelkonsum macht global etwa 26%(!) der Treibhausgasemissionen aus. Allein die Rinderzucht ist verantwortlich für 65% des globalen NO₂-Erzeugung, 9% des gesamten globalen Treibhausgasausstoßes und 70% Frischwasserverbrauch. Außerdem reserviert die Tierzucht knapp ein Drittel der Landfläche der Erde, produziert allerdings nur 18% unserer Kalorien. Wer hätte das gedacht?

Neben diesen ökologischen Symptomen erzeugt unsere Ernährungsweise auch gesundheitliche Probleme: 2018 waren die häufigsten Todesursachen in Österreich Herz-Kreislauferkrankungen (38,9%) und Krebs (24,5%) (!).

Je pflanzenbasierter die Ernährungsform, desto geringer sind nicht nur die durch Ernährung verursachten Emissionen, sondern auch das Risiko, unter einer Zivilisationskrankheit zu leiden. Dabei ist sich die Wissenschaft so einig wie bei wenigen anderen Themen. Der europäische Spitzenwert von 106kg, den jeder Österreicher:in im Jahr als Bruttofleischverbrauch (2) zeichnet, zeigt, dass wie viel Potential hier schlummert.

Puh, das klingt ja erstmal nicht so schön - doch es gibt für alles eine Lösung. Denn Fakt ist: Zusammen mit der Energieerzeugung, Industrie und Verkehr ist die Landwirtschaft der CO₂ Sektor mit den meisten Emissionen. Das übrigens nur solange man die direkten Emissionen berücksichtigt. Inkludiert man die Bindungspotentiale von z.B. Regenwäldern, welche für Futter abgeholzt werden, kommt man auf einen Beitrag von bis zu 50% - das den Sektor zum klaren Spitzenreiter macht. Wieso das eine gute Nachricht ist?

Es handelt sich um den Sektor, wo man ohne Investitionen etwas machen kann, und zwar jeder von uns, jeden Tag - auch mit kleinen Schritten.

Bleibt nur noch die Frage: Wie genau? Wo sind die Schrauben, an denen wir drehen können, ohne uns zu sehr einzuschränken?

Dazu gibt es nächste Woche mehr!

01

MORE NEWS

Flächenverbrauch durch Nutztiere

2012 leben 7 Milliarden Menschen auf der Erde. Dass der Platz knapp wird, scheint bei dieser unglaublichen Zahl logisch. Aber diese Menschen leben nur auf 12,8 Mio. km², also nur ca. 2,5% der 510,1 Mio. km², die die Erde an Landfläche zu bieten hat. Woher also kommen die Behauptungen, wir würden den Wildtieren ihren Lebensraum wegnehmen? Wozu wird denn nun der Regenwald abgeholzt, wenn Menschen mehr als genug Platz für ihre Städte haben? Warum beträgt die weltweite Fläche an Naturschutzgebieten nur 16,4 Mio. km² bzw. knapp über 3% der Gesamtfläche? Wo sind die anderen 94% der Erdoberfläche abgeblieben?

Die Antwort: Der größte Teil der Fläche wird durch die Landwirtschaft eingenommen, mit 37% bzw. 188,7 Mio. km². Würden Tiere vom Speiseplan gestrichen werden, würde sich diese Fläche um 33 Mio. km² reduzieren - oder um den gesamten afrikanischen Kontinent!

Woher kriegst du deine Proteine?

Schon als Kind lernt jeder, dass Fleisch viele Proteine enthält und daher wichtig ist, um groß und stark zu werden. Das stimmt auch, denn als sogenannte vollständige Proteinquelle enthält Fleisch alle 8 essentiellen Aminosäuren. Auch wenn pflanzliche Proteinquellen oft nicht vollständig sind, gibt es schier unendliches Angebot an tierfreien Lebensmitteln, die Massen an Proteinen enthalten - allen voran die Brunnenkresse mit sattem 84% Eiweiß! Wer lieber auf andere Lebensmitteln zurückgreift, kann auch mit Kidneybohnen, Champignons, Spinat, Pistazien oder Erbsen seinen Eiweißbedarf decken - auch Saaten und Kerne sind wahre pflanzliche Eiweißbomben, die ihr unbedingt mal ausprobieren solltet. „Aber OMAD-Team, gibt es auch Pflanzen, die vollständige Proteinquellen sind?“ Zwar können auch unvollständige Proteinquellen bei einer abwechslungsreichen, pflanzenbasierten Ernährung alle essentiellen Aminosäuren liefern, aber es ist auch möglich alle 8 auf einmal zu bekommen: nämlich unter anderem mit Sojaprodukten, Chia-Samen, Buchweizen oder Quinoa.

02



QUOTE OF THE DAY

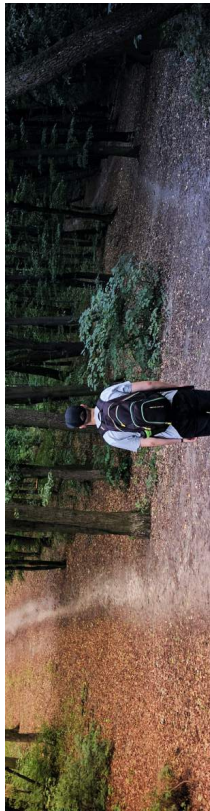
“Progress is without change, and those who cannot change cannot change anything.”

GEORGE BERNARD SHAW



Grüne-News

- dein Input für eine Veränderung -



Wie kann ich etwas machen?

Was wir in den letzten Jahren sehen, ist ein Trend hin zu bewussterem Essen. Dabei ist nicht nur die Gegenbewegung zum Fast-Food (Slow-Food) gemeint, sondern auch das Hinterfragen der Lebensmittel. Von den Anbaubedingungen, über die Herkunft bis hin zum Umwelteinfluss. Wenn man diese Trends, welche in eine gesündere Richtung für sowohl Umwelt als auch die Menschen gehen, mit den wissenschaftlichen Fakten vergleicht, fällt aber oft eines auf: es wird nicht an den Schrauben gedreht, die den größten Einfluss haben. Welche diese sind, werden wir im folgenden ein wenig erläutern.

Plastik-Verpackungen und Regionale Lebensmittel

Wo wir als Gesellschaft in den letzten Jahren erfolgreich ein Umdenken erreicht haben, ist Plastik. Dies sieht man am Beispiel des Sackerts oder Strohalms. Vor nicht allzu langer Zeit noch gängige Gegenstände werden heute – wenn überhaupt noch – nur gegen Aufpreis zur Verfügung gestellt. Dies zeigt, dass Veränderungen gezielt herbeigeführt werden können.

Während Plastik definitiv ein Problem darstellt, vor allem wenn es in den Meeren schwimmt, verbessert es bei Lebensmitteln unter Umständen die Haltbarkeit. Vor allem der Transport kann dadurch effizienter werden. Nichtsdestotrotz ist weniger Plastik grundsätzlich gut. Was nur oft überschätzt wird, ist der Einfluss von Plastik auf den CO₂-Fußabdruck von Lebensmitteln.

Wie man auf der Grafik auf Seite zwei sieht, machen Verpackung nur 5% der Emissionen aus. Ähnliche Überschätzungen gibt es im Transport-Sektor.

Natürlich ist es besser, wenn die Gurke aus der Region und nicht von weit weg kommt. Oft nicht nur wegen der Emissionen, sondern auch wegen der Qualität des Lebensmittels, da es länger wachsen kann und nicht schon vor der Reifung geerntet wird.

Solange die Lebensmittel aber nicht geflogen werden, sind die damit verbundenen Emissionen allerdings weniger relevant als gemeinhin geschätzt. Selbst der Transport von anderen Kontinenten ist weniger relevant als was man ist – solange dieser auf dem Seeweg erfolgt.

Schaut man sich die Lebensmittel an, welche am meisten CO₂ pro KG erzeugen, so fällt schnell auf, dass die Spitzenreiter Tierprodukte sind. Es geht sogar so weit, dass eine pflanzenbasierte Ernährung bis zu 9x weniger Emissionen hat, als aktuell praktizierte Ernährungsformen.

Das bedeutet nicht, dass wir alle pflanzenbasiert werden müssen. Es geht nicht darum von heute auf morgen eine 180 Grad Wende zu machen. Aber wenn einem etwas am Klima und der Erhaltung eines bewohnbaren Planeten liegt, lohnt es sich auch die Ernährung mit zu berücksichtigen. Dabei ist das Schlüsselwort Reduktion, nicht Restriktion. Was dieses Umdenken umso schöner macht: man schließt sich nicht nur einer Bewegung von bewussten Essern an, sondern betritt auch eine Welt mit vielen kostlichen Gerichten.

Das ganze geht dann noch zum eigenen Wohlbefinden sowie zum Wohle des Planeten. Wenn das mal kein Win-Win ist!

GOODNEWS

Emissionsstarke Lebensmittel

Während auf der Grafik rechts oben zu sehen ist, wo genau die Treibhausgase (THG) bei Lebensmitteln herkommen, sieht man bei der Grafik unten rechts welche Lebensmittel wie viel CO₂ ausstoßen.

Bei genauerer Betrachtung fällt auf, dass Fleisch und Käse Spitzenreiter sind. Das ist naheliegend, weil Tiermischprodukte jede Kalorie, welche sie gefüttert bekommen, in essbare Produkte umwandeln – sie leben ja auch. Je nach Tier benötigt man 5-25 kg Futter um ein KG "Tier zu produzieren". Da dieses Futter angebaut, bewässert und idR gedüngt wird, entstehen hier viel größere Energie- & Umwelteingriffe, als wenn man das Futter (Mais, Soja, Getreide) direkt verarbeiten würde.

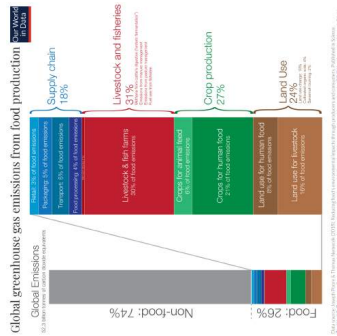
Was man in beiden Grafiken sieht ist, dass die oft thematisierten Bereiche wie Transport & Verpackung durchaus eine Rolle spielen. Im Vergleich zu dem Lebensmittel selber und ggf. noch der Verarbeitung, ist dies aber wenig. Was man bei solchen Darstellungen (pro KG) aber nie vergessen darf, sind die absoluten Mengen des Verzehrs. Während ein Espresso etwa 15g Bohnen benötigt und auch bei Schokolade oder Öl tendenziell kleinere Mengen genutzt werden, ist man bei Steak oder einem Glas Milch schnell bei über 200g bzw. Milliliter – wobei man das natürlich individuell anpassen kann.

Die Erde ist (kein) Bauernhof

Würde man sich unsere Erde als Außenstehender anschauen, könnte man den Eindruck erhalten, dass es sich um eine große Tierzucht handelt.

- Auf jeden Menschen kommen etwa 30 Nutztiere.
- Ein Drittel des Frischwassers, das der Mensch verbraucht, geht an das Vieh, während nur etwa ein Dreifünftel im Haushalt verbraucht wird.

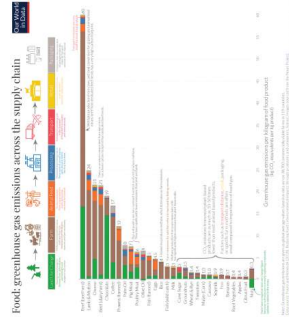
Second Treatment



QUOTE OF THE DAY

“Like music and art, love of nature is a common language that can transcend political or social boundaries.”

JIMMY CARTER



KOCH & ERNÄHRUNGSTIPP

- Weltweit nutzen die Menschen 59 % aller Flächen, auf denen Nutzpflanzen angebaut werden können, für den Anbau von Nahrungsmitteln für die Viehzucht.
- 70% der weltweit produzierten Antibiotika werden für Nutztiere verwendet, was die Wirksamkeit von Antibiotika zur Behandlung menschlicher Krankheiten schwächt.
- Nach der Klimarahmenkonvention der Vereinten Nationen würden Kühe, wenn sie ein Land wären, bei den Treibhausgasemissionen nach China und den Vereinigten Staaten an dritter Stelle stehen.
- 60% aller Säugetiere auf der Erde sind Tiere, die zur Ernährung aufgezogen werden.



Mülltrennung 101

Richtige Mülltrennung ist nicht immer einfach aber so wichtig! Damit das in Zukunft leichter wird, hier ein paar Tipps und Tricks:

- Gewürzte und gekochte Essensreste kommen immer in den Restmüll. Reste, die während des Kochens entstehen hängen in den Biomüll
- Fleisch, Knochen, Eier gehören immer in den Restmüll
- Katzenstreu muss auch im Restmüll entsorgt werden
- Schraubverschlüsse und Korken von Gläsern und Glasflaschen werden separat entsorgt, und zwar auch in den Restmüll
- Styropor kommt in die Gelbe Tonne, genau wie Tetrapacks und Konserven- und andere Metall Dosen
- Küchenrolle und verschmutztes Papier müssen auch im Restmüll entsorgt werden
- Keramik gilt nicht als Glas (auch nicht als Buntglas) und kann im Restmüll entsorgt werden und nicht bei der Altglassammelstelle
- Alle Hartplastikverpackungen (Verpackungen von Kosmetik und Hygienemittel im Alltag) zählen zu den Plastikverpackung und müssen daher auch in der Gelben Tonne entsorgt werden

Quellen:
 (1) <https://www.quarks.de/umwelt/klimawandel/was-du-ueber-die-erwärmung-der-meere-wissen-sollst/>
 (2) <https://wiki.bildungsserver.de/klimawandel/index.php/Treibhausgas>
 (3) <https://skriptscience.com/transition.php?a=107&b6>
 (4) <https://www.wien.gv.at/umwelt/m448/beratung/muelltrennung/biogene-r-abfall/>
 (5) <https://www.wien.gv.at/umwelt/m448/beratung/muelltrennung/estmuel.html>
 (7) <https://ourworldindata.org/environmental-impacts-of-fooditeco2-and-greenhouse-gas-emissions>

