# Decision-making processes of children in the context of sustainable diets

## Part 2: The role of values in decision-making processes

Anke Stoll-Hertrampf, Federica Valsangiacomo, Ute Bender, Sharon Ross, Franziska Bertschy, Christine Künzli

## Abstract

Decisions in the context of sustainable diets are often associated with moral factors. The investigations carried out in the explorative research project presented in this article included the role that the value orientations and values play in the decisions of children (11–12 years old). Based on individual interviews about a realistic decision-making situation (using the thinking aloud method, n = 27), it was found that the previously recorded value orientations of the children did not affect the sequence or quality of their decision-making steps, but drawing on their values, particularly hedonism and universalism with a focus on ecology, played a major role in the processes. Here, knowledge is used in a supporting capacity and is also used once a certain level of expertise has been developed. In terms of lessons, what this means is that we need to design learning-teaching arrangements that make clear how diverse people's values can be with regard to sustainable development and we need to encourage the combining of knowledge with values.

**Keywords:** sustainable diet, decision-making skills, values, children and adolescents, sustainable development, nutrition education

## Introduction

The guiding principle of sustainable development (SD) is inextricably linked to a global concept of ethics, especially since the 1992 Rio conference [44]. The current aims of the 2030 Agenda also imply moral goals such as global adherence to justice and equality [45]. In connection with sustainable diets, at the start of 2019, there was an intense public discussion about the introduction of an "animal welfare label". This label would allow consumers to identify how animals had been raised and therefore allow them to make their purchases while taking animal welfare and the related moral aspects into account [46].

However, a sustainable diet also implies various other values, and raises ethical and moral questions such as the extent to which we must take responsibility for the consequences that our current way of eating may have for people in developing countries or for subsequent generations [27–49].

Hedonistic values, and especially enjoyment of eating, of course play a key role for consumers [48]. It therefore follows that decisions in the context of sustainable diets are influenced by values, and that any concept of Education for Sustainable Development (ESD) that aims to build decision-making skills in the context of nutrition also needs to consider how learners can be familiarized with moral questions and values in class [50].

**Citation**
Stoll-Hertrampf A, Valsangiacomo F, Bender U, Ross S, Bertschy F, Künzli C (2019) Decision-making processes of children in the context of sustainable diets. Part 2: The role of values in decision-making processes. Ernahrungs Umschau 66(9): 160–168
This article is available online:
DOI: 10.4455/eu.2019.031

**Peer-reviewed**
Manuscript (original contribution) received: July 31, 2018
Revision accepted: February 07, 2019

## Current state of research and research questions

As outlined in the first part of this article, empirical research on the development of decision-making skills in pupils within the framework of ESD has been carried out primarily with science lessons in mind. Learners are often required to make decisions about "socioecological issues".

| Phase | Process steps (PS) |
|---|---|
| **Value type: Openness to change (OtC)** | Self-direction I: Freedom to act<br>Self-direction II: Freedom of thought<br>Stimulation: Open to new things |
| | Hedonism*: Enjoyment and sensory satisfaction |
| **Value type: Self-enhancement (SE)** | Power I: Exercising control over others (attitude: egoistic)<br>Power II: Control of material or social resources (attitude: egoistic)<br>Achievement: Being successful (attitude: egoistic) |
| | Saving face* |
| **Value type: Conservation (C)** | Security I: Security in one's immediate surroundings<br>Security II: Security in the overall social environment,<br>Tradition: Preservation of cultural, religious, and family traditions<br>Conformity I: People adjusting to each other<br>Conformity II: Adhering to rules and laws |
| | Humility* |
| **Value type: Self-transcendence (ST)** | Benevolence I: Being reliable and trustworthy towards others (attitude: social-altruistic)<br>Benevolence II: Focus on the well-being of others (attitude: social-altruistic)<br>Universalism with a focus on justice: Equality and protection of all people (attitude: social-altruistic)<br>Universalism with a focus on tolerance: Acceptance and understanding of 'being different' (attitude: social-altruistic)<br>Universalism with a focus on ecology: Protection of nature (attitude: biosphere-focused) |

Fig. 1: **Value types and value orientations according to Schwartz et al.** [own presentation in accordance with (24)]
*These values have been allocated in accordance with the rules in the coding guide for the PVQ [24].

The fact that "underlying values" significantly influence the decision-making behavior of adolescents in lessons has been established by researchers including Gresch [51], who established this in the context of a quantitative study with pupils attending a Gymnasium (secondary school allowing access to higher education) (school years 11–13). According to Gresch, values and social norms should be explicitly taken into account in future studies. Strong use of values in decision-making processes among individual learners appears to have affected decision-making processes in the study in question to the extent that the adolescents made decisions based on their values and no longer weighed up the arguments for and against thoroughly [52].
Conversely, in a quantitative study with 256 pupils of various ages (starting from school year 5), Eggert [18] posits that the values the study subjects held are the reason why some of them came up with arguments for and against, but were unable to come to a decision.
In studies in which groups of school pupils were observed during lessons, it was found that values flowed into group discussions that preceded decisions made as a group [31, 53]. However, in the case of Ratcliffe and Grace [53], these discussions were initiated through the actual task that the pupils were set. A qualitative study by Kolstø [31] with Norwegian school pupils that investigated such discussions found that pupils used knowledge and values together in an intermeshed manner. The study also pointed out that the question of prioritization in the sense of "what is more important when making decisions" is not useful. The research found that it was much more useful to investigate how pupils mesh knowledge and values together.

The research design of EKoN-E (*Entscheidungsprozesse von Kindern im Kontext einer Nachhaltigen Entwicklung mit dem Fokus Ernährung* [Decision-making processes of children in the context of sustainable development with a focus on diet]) makes this type of investigation possible. In order to do this, the types of value orientations (i.e. permanent dispositions) that the school pupils shared were recorded and the values that actually played a role in a concrete fictional decision-making situation were also recorded. The study also investigated the extent to which hedonistic values (particularly with regard to food) or the enjoyment of food were dominant and to what extent other values played a role [12, 13, 54].
When this project refers to "value orientations" and "values", this is a theoretical reference to the concept of Schwartz and Schwartz et al., which deals with "basic human values" and their subordinate human "values". This concept has been the subject of empirical research worldwide [24, 55, 56]. Based on these findings, Schwartz and colleagues posit that there are 4 value types and 19 values assigned to these types ("Methodology" section).
The overarching question of this project is: How do 11- and 12-year-old school pupils carry out the selectional phase of an individual decision-making process in the context of

sustainable development with a focus on diet? This second part of the article focuses on the question of the extent to which value orientations and values play a role in such processes in children. The scope of this study initially included all of the value orientations and values from the concept of Schwartz and colleagues [24] without being limited to specific value orientations and values in advance. However, unlike other studies [57], the aim of the EKoN-E project is not to influence or change these value orientations and values.

## Methodology

This research project, which had an explorative study design, proceeded in various steps and took place from October 2016 to December 2017. Following the pilot and sampling (n = 97), pupils (5 classes) from school year 6 in German-speaking Swiss schools took part in a learning sequence (10 hours of lessons) with the aim of building knowledge about SD with a focus on diet and preparing to make a decision—without influencing this decision in advance.

The focus of the lesson content was the topic of "meat". The first data collection was done to determine the pupils' level of knowledge, value orientation, sex, social-economic status (SES) and location. Based on the results of the first data collection (n = 83), school pupils were selected for the second data collection (interview using the thinking aloud method) (n = 27). The aim of data collection 1 was to obtain the information needed to put together a sample for the second data collection that was as heterogeneous as possible, in which all of the categories mentioned above (level of knowledge, value orientation, etc.) were represented. This category-based sampling should ensure the theoretical representativeness of the study [25]. Therefore, all four value orientations were represented among the pupils in the second sample.

In the interview, the children were presented with the following realistic decision-making situation and were invited to think about it out loud: "*Imagine it's summer and you are going to a school camp for a whole week. The kitchen team there is very flexible and they want to take each child's individual decision into account when planning the menu for the week. The main thing that the kitchen team want to take care with is meat because they know that different children think very differently about eating meat. What do you think about the topic of meat? Decide for yourself what the kitchen team should be careful about for you personally when it comes to meat. Speak out loud everything that goes through your mind as you think about this.*"

The content analysis was done according to the Mayring method [29] using the MAXQDA software. A detailed description of the methodological procedure used is provided in the first part of this article [58].

The Portrait Values Questionnaire (PVQ) instrument was used to record the children's value orientations in data collection 1. This instrument is based on the values concept of Schwartz [24] (◆ Figure 1).

As stable value orientations, these values, which according to Schwartz and colleagues are motivational values, are the foundation of people's individual attitudes, individual behavior, and decision-making behavior. Therefore, they also provide a way to explain people's attitudes and behavior.

Thus, the value orientations that the school pupils hold and which guide their actions and are relevant to the topic can be diagnosed with the use of a PVQ and allocated to a "value type". Schwartz et al. posit that there are four basic value types/value orientations: openness to change, self-enhancement, conservation and self-transcendence. As shown in ◆ Figure 1, specific values are allocated to each of these four value types. The PVQ also allocates three fictional character descriptions to each of the 19 values, in order to allow the value orientations or value types of the study participants to be diagnosed. The study subjects were asked how similar each person was to them (for instance: "It is very important to her to form her own opinion" or "Taking care of nature is important to him"). They were able to enter their responses on a six-stage scale.

In tests, the value types often do not occur in "pure form", but rather in combinations. This means that it is very much possible for a child to have several value orientations allocated to them, but to varying degrees. In accordance with the PVQ coding rules, the most dominant value orientation is recorded in such cases.

The test takes approximately 45 minutes. It has been thoroughly tested for use in children.

## Results

When the data was evaluated, the following questions were found to be relevant:

1. To what extent were the children's previously recorded value types associated with the decision-making steps and values that could be identified from the interview?
2. Which value associations could be identified in the children's decision-making processes?
3. What form did the interplay of knowledge and values take in the decision-making process among the school pupils?

## Association between value types and decision-making steps in the interview

In data collection 1 (n = 83), all value types were found among the participating school pupils. The most common were "openness to change" (OtC, n = 30) and self-transcendence (ST, n = 46; C, n = 4; SE, n = 3). The sample for the interviews was put together in accordance with the PVQ test in such a way that all four value types were represented among the participants (Otc, n = 12; ST, n = 10; C, n = 3; SE, n = 2).

As a diagnostic tool, the PVQ claims in principle to record the value types that actually guide the decisions and behavior of the individuals in question. Of course, there is no claim that this applies to every decision and every behavior. Therefore, our aim was not to investigate whether our study could also yield such correlations in the sense of a hypothesis testing procedure. The sample size was too small for this. Nevertheless, when evaluating the data, it was clear that we should focus on how the children that held each of the individual value types would express themselves in the interview.

The analysis showed no associations between the value types recorded in advance and the steps of the decision-making process that the children completed. For instance, it was not the case that children with the value type "openness to change" were particularly engaged when developing alternatives for action. In addition, values were drawn upon in all decision-making steps, which is to say that they were used throughout the decision-making process. Furthermore, it was found that the value types recorded in advance did not necessarily are in line with the value orientations and values that could be identified from the interview. For example, children who, according to the PVQ test, had the "self-transcendence" value type made statements that would be allocated to the value orientations "openness to change" and "self-enhancement". But statements that would be allocated to "self enhancement" would imply a more egocentric point of view, which would be in opposition to the value orientation of "self-transcendence". Likewise, it was for instance found that the previously recorded value type "conservation" did in fact occur in conjunction with the value type "openness to change" and the value of "stimulation" (in this case in the form of openness to trying new foods).

## Drawing upon one's own values in the decision-making process

The MAXQDA software also allows the recording of quantitative findings about the codings, although in the context of a qualitative procedure, these can only be considered indicative.

In the interview, the children mainly made value-related statements that would be allocated to the value of "hedonism" (n = 27; total number of coding evaluations = 168; number of codings for hedonism = 76). These statements mainly focused on enjoyment and taste experiences. The children expressed how they felt about meat in terms of the taste (*"I like all kinds of meat and I like to eat meat."* 0201VP11[1]; 70[2]); such statements sometimes also incorporated a reference to a particular way of preparing the meat (*"[…] they should make sure that it is not completely cooked through, that it's still a little bit bloody, I like that."* 0301VP05; 90).

When the value of "tradition" was drawn upon (number of codings = 15), the interviewees (n = 9) referred to eating habits within the family (*"Well at home I'm just used to meat like coming from Switzerland."* 0201VP11; 70) or they referred to eating habits based on religion (*"Well as for religion, I'm a Muslim. And in the religion of Mus- in Islam, you can't eat pork."* 0401VP15; 147).

The children's statements (n = 12) about protecting the environment ("universalism with a focus on ecology", number of codings = 30) were limited to animal welfare. In these cases, they referred to animal husbandry and/or to the fact that they like animals (*"[…] for the cows I'd say it's also important to me that (.) that the- that the animal had a good life beforehand […] as I said before, I really like animals."* 0201VP16; 106).

The well-being of classmates ("benevolence") was also touched upon in the decision-making processes of some of the children (n = 9; number of codings = 25). For example, one child said *"Of course I'd also like to take account of what the others eat, (.) that's obviously also important to me because I don't just want it to end up that I get to give my opinion and for example only my opinion is taken into account even though the others can't eat that or whatever."* 0201VP16; 106).

In addition, some children (n = 9) also exhibited openness to new experiences ("stimulation", number of codings = 16). However, this openness was limited to sensory experiences. For instance, one child said that they liked to try specialties from other countries (*"But when there's something from another country [...] a specialty that I haven't tried yet, then I do like to try it and then sometimes I actually like it and it becomes my favorite food."* 0101VP11; 99)

## The interplay of knowledge and values in the decision-making process

The quantitative-descriptive analysis of the number of codings shows that value-related statements (total number of codings of value-related statements = 168) occurred in the children's decision-making processes more frequently than knowledge-related

[1] The number corresponds to the identification code of the child who was taking part.
[2] The number corresponds to the line number of the quote in the MAXQDA 12 software.

statements (total number of codings of knowledge-related statements = 113). However, if we limit our analysis here to value-related statements that do not relate to the value of "hedonism" (number of codings = 92), then the frequency of knowledge-related and value-related statements in the children's decision-making processes is similar.

In addition, we can see how values and knowledge are drawn upon in association with each other. For example, the value of "universalism with a focus on ecology" was coupled with knowledge about ecology, and references to the values of "tradition" or "benevolence" were coupled with socio-cultural knowledge. For instance, one child highlighted the importance of fair animal production and drew upon their knowledge from the learning sequence when doing so: *"I also think it's important that like meat is produced fairly, and like the labeled feed that we learned about."* 0101VP01; 50. This child also took account of the well-being of their classmates whose choices when it comes to meat are more limited for religious reasons: *"(...) and like also for example not necessarily pork for the ones who aren't supposed to eat it, (...) so that they um have another like alternative for something they can eat."*

## Discussion

### The value type recorded in advance has no effect on the quality of the decision-making process

In part 1 of this article, it was pointed out that in the context of SD, steps 6 (developing alternatives for action and thinking through their consequences) and 7 (weighing up various options) of the decision-making process make a significant contribution to its "quality" [16, 17]. For example, this would suggest that individuals with a high degree of "self-transcendence" would come up with more numerous and varied options with different perspectives when making decisions than people whose value type is more focused on themselves. For this reason, as well as other reasons, the sample for the interview was put together in such a way as to be as "heterogeneous" as possible with regard to values. However, no such associations could be identified in our findings. The findings clearly show that the value types that we recorded for the school pupils using the PVQ *before* the investigation did not reliably correspond to the values that could be identified from the statements *in* the interviews.

It should not be concluded from our study that the PVQ is not a valid instrument. Significant correlations were measured in international quantitative-empirical tests of the latest version of the PVQ (n = 6059) [24]. Furthermore, the PVQ has already been used in children. Instead, our study reflects the fact that findings from such extensive empirical-quantitative studies can likely only be associated with findings from empirical-qualitative studies to a limited extent. As already mentioned, the main aim of data collection 1 (including the PVQ) was to allow the sample for data collection 2 to be put together based on categories and in a heterogeneous manner. In addition to the fundamental considerations about research methodology mentioned above, in our case, the focus on nutrition may also have led to statements relating to the value of "hedonism" being relatively dominant in the interviews, even though this value does not consistently correspond to the value type of the individual children according to PVQ.

### Relative dominance of the value of "hedonism" and the aspect of "taste"

Food should taste good, and at the very beginning of this article, it was mentioned that "taste" is a highly relevant aspect when it comes to nutrition-related decisions [12, 13, 54]. The aspect of "taste" was also relatively dominant in our evaluation of the interviews in the study, as was the value of "hedonism" that could be identified here (value orientation: "self-enhancement").

In addition, the value of "stimulation" (value orientation: "openness to change") was found exclusively in statements relating to sensory aspects. However, even though the value of taste has a strong "influence" on the values in the interviews, it does not necessarily follow that all other aspects or other values disappear in its wake or are explicitly rejected by the speakers. If that were the case, the strong importance of the value of "hedonism" and the aspect of "taste" would significantly *hinder* the school pupils in developing other options by drawing upon other values during the decision-making process.

This exactly what Gresch and colleagues [52] suggest happens with regard to dominant values. A similar result was found in a qualitative survey on purchase motives among students with regard to chocolate [54]: The study conducted by Young and McCoy was not about the decision-making processes of school children, but nevertheless, with regard to the reasons for purchasing chocolate, the researchers found that younger students (18–22 years old) mainly emphasized taste-related perspectives as the reasons behind their purchases and that they tended to explicitly reject other perspectives based on moral considerations. Upon closer inspection, our investigation also yielded other findings. We identified a *relative* dominance of the value of "hedonism" and the aspect of "taste" in the statements of the school pupils regarding the meat selection at the camp and found that – unlike in the other studies mentioned – *other* values and aspects did indeed play a role alongside these factors, for instance "universalism with a focus

on ecology" and the aspect of animal welfare. Therefore, we are *not* suggesting that the value of "hedonism" suppressed or hindered other values in our study or that it impaired the development of alternatives for action in the decision-making process.

### Values and their connection with knowledge

One of the previous sections talked about the study conducted by Kolstø [31], which among other questions, looked into the question of the use of values and knowledge in combination. At first glance, the analysis above gives the impression that the children in our study mainly drew upon values and less upon knowledge and therefore hardly ever used them in combination.

However, upon closer inspection, it is clear that values are indeed used in combination with knowledge, and that this occurs in various ways. For example, the value of hedonism (with the aspect of taste) was not used in connection with knowledge, but other values and aspects were. The children did make such connections in the context of animal welfare as mentioned above. Elements of knowledge that they had obtained were used to further explain or reinforce the value in question. One of the previously cited statements is a good example of this: *"I also think it's important that like meat is produced fairly, and like the labeled feed that we learned about."* 0101VP01; 50.

Therefore, elements of knowledge can take on a *supporting role* in *service to values* in decision-making processes. In the children's view, the value of hedonism and the associated aspect of taste does not appear to require any further explanation or reinforcement (it is known that there is no accounting for taste) and therefore they did not feel the need to activate their knowledge with regard to this. Thus, the relative dominance of the value of "hedonism" (and the aspect of "taste") contributed to the fact that elements of knowledge were not consistently used in the decision-making process.

### Use of knowledge and values in the decision-making process

Part of the discussion in part 1 of this article was focused on the fact that the school pupils may not have used elements of knowledge in their decision-making processes because knowledge on the topic of SD is so complex. In addition, when we look at the aspect of "health" we see that children mainly use their knowledge in their decision-making processes when they feel that they have an "expert status" with regard to that aspect, meaning that they may feel more comfortable dealing with the relevant knowledge.

If we also bring in our findings on the role of values in decision-making processes, we see that there are *two modalities* in which the incorporation of elements of knowledge in the decision-making processes of children occurs: incorporation as expert knowledge and incorporation as knowledge used to support certain values. Furthermore, the school pupils' values can also be drawn upon in their decision-making processes without using specifically related knowledge. In the interviews the value of hedonism and the aspect of taste are drawn upon in this way.

## Limitations

The individual interviews were conducted in a very supportive, friendly way. However, because values are very personal, it is possible that some individual children felt insecure and did not express everything that went through their minds when asked to think out loud.

## Conclusions

Our findings with regard to the significance of values in decision-making processes lead to conclusions that are similar to those that were drawn at the end of the first part of this article, which was about the significance of knowledge in the decision-making processes of children [58]. In connection with the role of knowledge, we determined that having more or less knowledge had no effect on which steps of the decision-making process the children completed. In connection with values, we also see that there is no discernible association between the measured value orientations of the children, the values that they explicitly drew upon in the interview, and the completion of the decision-making process.

Lesson plans that aim to help pupils acquire decision-making skills within the framework of ESD should be focused on supporting them in executing the key steps of a decision-making process according to the ESD concept (process steps 6 and 7). They should not rely on these steps being carried out "automatically" by children with well-developed knowledge or by children with certain value orientations.

Furthermore, careful consideration should be given to which everyday examples or foods should be used in these lessons. The topic of "meat" is highly relevant in the SD context and it invites discussions relating to values through connections with the aspect of "taste" and the aspect of "animal welfare". The relative dominance of the aspect of taste that was found in our study with regard to meat could expand into "absolute dominance" in the context of other foods, such as chocolate. This would then hinder the learning process.

The findings suggest that lessons within the framework of ESD should explicitly address the values that the pupils may hold and could draw upon when making a decision about a concrete question. This would accommodate the important role that values play and strengthen the diversity of values. One way to do this would be to work with a "values pool", which encourages the school pupils to recognize all of the values drawn upon in decision-making processes [59].

The school pupil's statements show that some children use the knowledge they have to support statements that draw upon their values. Therefore, lessons should help learners develop knowledge that supports them in combining knowledge and values. This would mean presenting elements of knowledge in a way that is not "value neutral", but rather allowing people to express opinions that draw upon the value-related elements of knowledge by way of a debate or using a journalistic method [60]. The same objective could be achieved through role play or a simulation game [61].

This could mean offering elements of knowledge that critique certain value-related statements. Furthermore, it seems sensible to focus on a few selected aspects when building up knowledge as an initial step and to strengthen "expert knowledge" as well as individual children's experience of knowledge-related skill through appropriate communicative teaching scenarios (such as debates or partner interviews) and to prevent overwhelm.

Methods such as concept mapping or simulation games that systematically promote the linking of different aspects could be useful as a way to do justice to the complexity of multidimensional knowledge when teaching about SD at a more advanced stage.

**Dr. Anke Stoll-Hertrampf**[1]
**M. A. Federica Valsangiacomo**[2]
**Prof. Dr. Ute Bender**[3]
**M. A. Sharon Ross**[4]
**Prof. Dr. Franziska Bertschy**[4]
**Prof. Dr. Christine Künzli**[2]

[1] Pädagogische Hochschule Fachhochschule Nordwestschweiz
Institut für Sekundarstufe I & II
Professur für Gesundheit, Haushalt, Wirtschaft
Hofackerstr. 30, 4132 Muttenz/Schweiz
anke.stoll-hertrampf@fhnw.ch

[2] Pädagogische Hochschule Fachhochschule Nordwestschweiz
Institut Kindergarten-/Unterstufe
Professur für Bildungstheorien und interdisziplinären Unterricht
Obere Sternengasse 7, 4502 Solothurn/Schweiz
federica.valsangiacomo@fhnw.ch

[3] Pädagogische Hochschule Freiburg
Institut für Alltagskultur, Bewegung und Gesundheit
Fachrichtung Ernährung und Konsum
Kunzenweg 21, 79117 Freiburg
ute.bender@ph-freiburg.de

[4] Pädagogische Hochschule Fachhochschule Nordwestschweiz
Institut Kindergarten-/Unterstufe
Professur Didaktik des Sachunterrichts
Obere Sternengasse 7, 4502 Solothurn/Schweiz

**Conflict of Interest**
The authors declare no conflict of interest.

## Literatur

1. *Deutsche UNESCO-Kommission (DUK) (Hg). UNESCO-Roadmap zur Umsetzung des Weltaktionsprogramms "Bildung für nachhaltige Entwicklung", United Nations Educational, Scientific and Cultural Organization. (2014) URL: www.bne-portal.de/de/weltweit/weltaktionsprogramm-international Zugriff 22.07.18*
2. *Ständige Konferenz der Kultusminister der Länder in der Bundesrepublik Deutschland & Bundesministerium für wirtschaftliche Zusammenarbeit und Entwicklung (Hg). Orientierungsrahmen für den Lernbereich Globale Entwicklung im Rahmen einer Bildung für nachhaltige Entwicklung. Ein Beitrag zum Weltaktionsprogramm „Bildung für nachhaltige Entwicklung". Berlin (2016) URL: www.kmk.org/dokumentation-statistik/beschluesse-und-veroeffentlichungen/bildung-schule/allgemeine-bildung.html#c1452*
3. *de Haan G. Gestaltungskompetenz als Kompetenzkonzept der Bildung für nachhaltige Entwicklung. In: Bormann I, de Haan G (Hg). Kompetenzen der Bildung für nachhaltige Entwicklung: Operationalisierung, Messung, Rahmenbedingungen, Befunde. VS Verlag für Sozialwissenschaften, Wiesbaden (2008)*
4. *de Haan G, Harenberg D. Expertise: Förderprogramm Bildung für eine nachhaltige Entwicklung. BLK Materialien zur Bildungsplanung und Forschungsförderung. Im Auftrag des BBWFT. (1999) URL: www.blk-bonn.de/papers/heft72.pdf Zugriff 22.07.18*
5. *Künzli-David C, Bertschy F. Didaktisches Konzept Bildung für eine nachhaltige Entwicklung. Bern: IKAÖ (2008). URL: www.ikaoe.unibe.ch/forschung/bineu/Did. Konzept_3.Fassung_Feb08.pdf Zugriff 22.07.18*
6. *Hayn D, Eberle U, Stieß I et al.. Ernährung im Alltag. In: Eberle U, Hayn D, Rehaag DR, Simshäuser U (Hg). Ernährungswende. Eine Herausforderung für Politik, Unternehmen und Gesellschaft. oekom Verlag, München (2006)*
7. *Leitzmann C, Wirsam B (2011) Klimaeffiziente Ernährung. Ernährungs Umschau 58: 26-29*
8. *Fachgruppe Ernährung und Verbraucherbildung. Schlussbericht: REVIS Modellprojekt. 2003-2005, Universität Paderborn (2005). URL: www.evb-online.de/docs/schlussbericht/REVIS-Schlussbericht-mit_Anhang-mit.pdf Zugriff 12.11.18*
9. *Eggert S, Bögeholz S (2006) Göttinger Modell der Bewertungskompetenz - Teilkompetenz „Bewerten, Entscheiden und Reflektieren" für Gestaltungsaufgaben Nachhaltiger Entwicklung. Zeitschrift für Didaktik der Naturwissenschaften 12: 177–197*

10. *Schneider K, Hoffmann I, Leitzmann C (2012) Ernährungsökologie. Komplexen Herausforderungen integrativ begegnen. Spiegel der Forschung 29: 44–53*
11. *von Koerber K (2014) Fünf Dimensionen der Nachhaltigen Ernährung und weiterentwickelte Grundsätze – Ein Update. Ernährung im Fokus 14: 260–266*
12. *Bartsch S. Jugendesskultur: Bedeutungen des Essens für Jugendliche im Kontext Familie und Peergroup (Forschung und Praxis der Gesundheitsförderung, Bd. 30. Bundeszentrale für gesundheitliche Aufklärung, Köln (2008)*
13. *Bender U (2013) Ernährung und Nachhaltigkeit – eine qualitative Studie zu Einstellungen von Jugendlichen im Kanton Basel-Stadt. Umweltpsychologie 17: 74–96*
14. *Kahneman D. Schnelles Denken, langsames Denken. Siedler, München (2014)*
15. *Horstmann N (2012) Intuition und Deliberation bei der Entscheidungsfindung. Eine Betrachtung der Prozessebene, Universität Mannheim. URL: https://ub-madoc.bib.uni-mannheim.de/32134/1/Dissertation_Horstmann.pdf Zugriff 25.07.18*
16. *Eggert S, Bögeholz S (2010) Students' use of decision-making strategies with regard to socioscientific issues. An application of the Rasch partial credit model. Science Education 94: 230–258*
17. *Sakschewski M, Eggert S, Schneider S et al. (2014) Students' socioscientific reasoning and decision-making on energy-related issues—development of a measurement instrument. IJSEd 36: 2291–2313*
18. *Eggert S. Bewertungskompetenz für den Biologieunterricht – Vom Modell zur empirischen Überprüfung. Dissertation. Georg-August-Universität, Göttingen (2008)*
19. *Gausmann E, Eggert S, Hasselhorn M et al. (2010) Wie verarbeiten Schüler/innen Sachinformationen in Problem- und Entscheidungssituationen Nachhaltiger Entwicklung? Ein Beitrag zur Bewertungskompetenz. Projekt Bewertungskompetenz. Zeitschrift für Pädagogik 56: 204–215*
20. *Michalos AC, Creech H, McDonald C et al. (2011) Knowledge, attitudes and behaviours. Concerning education for sustainable development: two exploratory studies. Social Indicators Research 100: 391–413*
21. *Ratcliffe M (1997) Pupil decision-making about socio-scientific issues within the science curriculum. IJSEd 19: 167–182*
22. *Wettstädt L, Asbrand B (2014) Handeln in der Weltgesellschaft. Zum Umgang mit Handlungsaufforderungen im Unterricht zu Themen des Lernbereichs Globale Entwicklung. Zeitschrift für internationale Bildungsforschung und Entwicklungspädagogik 37: 4–12*
23. *Max Rubner-Institut Bundesforschungsanstalt für Ernährung und Lebensmittel (Hg). Nationale Verzehrsstudie II. Ergebnisbericht, Teil 2. Die bundesweite Befragung zur Ernährung von Jugendlichen und Erwachsenen. (2008) URL: www.bmel.de/DE/Ernaehrung/GesundeErnaerung/_Texte/NationaleVerzehrsstudie_Zusammenfasung.html Zugriff 12.11.18*
24. *Schwartz SH, Cieciuch J, Vecchione M (2012) Refining the theory of basic individual values. Journal of Personality and Social Psychology 103: 663–688*
25. *Helfferich C. Die Qualität qualitativer Daten. Manual für die Durchführung qualitativer Interviews. 4. Aufl., VS Verlag für Sozialwissenschaften, Wiesbaden (2011)*
26. *Ericsson KA, Simon HA. Protocol analysis: verbal reports as data. MIT Press, Cambridge, Mass. (1993)*
27. *Konrad K. Lautes Denken. In: Mey G, Mruck K (Hg). Handbuch Qualitative Forschung in der Psychologie. 1. Aufl., VS Verlag für Sozialwissenschaften, Wiesbaden (2010)*
28. *Sandmann A. Lautes Denken – die Analyse von Denk-, Lern- und Problemlöseprozessen. In: Krüger D, Parchmann I, Schecker H (Hg). Methoden in der naturwissenschaftlichen Forschung. Springer Verlag, Berlin/Heidelberg (2014)*
29. *Mayring P. Qualitative Inhaltsanalyse. Grundlagen und Techniken. 12., überarb. Aufl., Beltz Verlag, Weinheim (2015)*
30. *Hertrampf A, Bender U (2016) What do prospective teachers know about sustainable nutrition? Ernährungs Umschau 63: 206–212*
31. *Kolstø SD (2006) Patterns in students' argumentation confronted with a risk-focused socio-scientific issue. IJSEd 28: 1689–1716*
32. *Renkl A. Träges Wissen. In: Rost DH (Hg). Handwörterbuch Pädagogische Psychologie. 4., überarb. und erw. Aufl., Beltz Verlag, Weinheim (2010)*
33. *Wüst L, Lischer C, Mulheim V et al. Bildung für eine Nachhaltige Entwicklung umsetzen. Rind und Fleisch. Umsetzungsheft 7 aus der Reihe 'Querblicke'. Ingold Verlag, Herzogenbuchsee (2016)*
34. *Funke J. "Wie soll man da durchblicken?". Psychologische Aspekte einer Nachhaltigkeitsbildung. In: Pyhel T (Hg). Zwischen Ohnmacht und Zuversicht? Vom Umgang mit Komplexität in der Nachhaltigkeitskommunikation. oekom Verlag, München (2018)*
35. *Ohl U. Herausforderungen und Wege eines systematischen Umgangs mit komplexen Themen in der schulischen Nachhaltigkeitsbildung. In: Pyhel T (Hg). Zwischen Ohnmacht und Zuversicht? Vom Umgang mit Komplexität in der Nachhaltigkeitskommunikation. oekom Verlag, München (2018)*
36. *Hertrampf A, Städeli R, Bender U (2014) Nachhaltige Ernährung – Weiterentwicklung fachwissenschaftlich-fachpraktischer Lehrveranstaltungen an der Hochschule. Haushalt in Bildung und Forschung 3: 48–59*
37. *Longo C, Shankar A, Nuttall P (2017) "It's Not Easy Living a Sustainable Lifestyle": How greater knowledge leads to dilemmas, tensions and paralysis. J Bus Ethics 147: 1–21*
38. *Renn O. Kommunikation über komplexe Zusammenhänge am Beispiel der systemischen Risiken. In: Pyhel T (Hg). Zwischen Ohnmacht und Zuversicht? Vom Umgang mit Komplexität in der Nachhaltigkeitskommunikation. oekom Verlag, München (2018)*
39. *Bertschy F (2008) Vernetztes Wissen in der Grundschule fördern. Umweltpsychologie 12: 71–90*
40. *Bertschy F. Vernetztes Denken in einer Bildung für eine nachhaltige Entwicklung: Interventionsstudie zur Förderung vernetzten Denkens bei Schülerinnen und Schülern der 1. und 2. Primarschulstufe. Südwestdeutscher Verlag für Hochschulschriften, Saarbrücken (2012)*
41. *Harms U (2012) Modellierung von Systemkompetenz – Untersuchung der Fähigkeit zur Modellbildung als Teil der Systemkompetenz bei Grundschülern. URL: http://gepris.dfg.de/gepris/projekt/78130573/ergebnisse Zugriff 25.07.18*
42. *Sommer C (2016) Untersuchung der Systemkompetenz von Grundschülern im Bereich Biologie. URL: https://macau.uni-kiel.de/receive/dissertation_diss_00001652 Zugriff 25.07.18*
43. *Sadler TD, Donnelly LA (2006) Socioscientific argumentation: the effects of content knowledge and morality. IJSEd 28: 1463–1488*

44. *Zimmermann FM. Was ist Nachhaltigkeit – eine Perspektivenfrage? In: Zimmermann FM (Hg). Nachhaltigkeit wofür? Von Chancen und Herausforderungen für eine nachhaltige Zukunft. Springer-Verlag GmbH, Berlin (2016)*
45. *Vereinte Nationen Generalversammlung (2015) Transformation unserer Welt: die Agenda 2030 für nachhaltige Entwicklung. URL: www.are.admin.ch/dam/are/de/dokumente/nachhaltige_entwicklung/dokumente/bericht/transformation_usererweltdieagenda2030fuernachhaltigeentwicklun.pdf.download.pdf/transformation_unsererweltdieagenda2030fuernachhaltigeentwicklun.pdf Zugriff 25.07.18*
46. *Wenz K. Label. Suche nach der Haltungsnote. In: Heinrich-Böll-Stiftung, Bund für Umwelt und Naturschutz Deutschland und Le Monde Diplomatique (Hg). Fleischatlas 2018. Daten und Fakten über Tiere als Nahrungsmittel. Bonifazius GmbH, Paderborn (2018)*
47. *Costa R. Teaching food ethics. In: Costa R, Pittia P (Hg). Food ethics education (integrating food science and engineering knowledge into the food chain). Springer International Publishing, Cham (2018)*
48. *Hirschfelder G, Wittmann B. „Was der Mensch essen darf" – Thematische Hinführung. In: Hirschfelder G, Ploeger A, Schönberger G et al. (Hg). Was der Mensch essen darf. Ökonomischer Zwang, ökologisches Gewissen und globale Konflikte. Springer Fachmedien, Wiesbaden (2015)*
49. *Lazarides HN, Goula AM. Sustainability and ethics along the food supply chain. In: Costa R, Pittia P (Hg). Food ethics education (integrating food science and engineering knowledge into the food chain). Springer International Publishing, Cham (2018)*
50. *Methfessel B. Welche Moral hätten Sie den gerne? – Essen im Konflikt zwischen unterschiedlichen Anforderungen an die Lebensführung. In: Hirschfelder G, Ploeger A,Schönberger G et al. (Hg). Was der Mensch essen darf. Ökonomischer Zwang, ökologisches Gewissen und globale Konflikte. Springer Fachmedien, Wiesbaden (2015)*
51. *Gresch H (2012) Decision-making strategies and self-regulated learning: fostering decision-making competence in education for sustainable development. URL: www.researchgate.net/profile/Helge_Gresch/publication/259573904_Decision-making_Strategies_and_Self-regulated_Learning_Fostering_Decision-making_Competence_in_Education_for_Sustainable_Development/links/0deec52caa2c94dbd8000000/Decision-making-Strategies-and-Self-regulated-Learning-Fostering-Decision-making-Competence-in-Education-for-Sustainable-Development.pdf Zugriff 25.07.18*
52. *Gresch H, Hasselhorn M, Bögeholz S (2013) Training in decision-making strategies. An approach to enhance students' competence to deal with socio-scientific issues. IJSEd 35: 2587–2607*
53. *Ratcliffe M, Grace MM. Science education for citizenship. Teaching socio-scientific issues. Open University Press, Maidenhead, Philadelphia (2003)*
54. *Young ME, McCoy AW (2016) Millennials and chocolate product ethics: saying one thing and doing another. Food Qual Prefer 49: 42–53*
55. *Schwartz SH (1994) Are there universal aspects in the structure and contents of human values? J Soc Issues 50: 19–45*
56. *Schwartz SH (2012). An overview of the Schwartz Theory of Basic Values. URL: http://dx.doi.org/10.9707/2307-0919.1116 Zugriff 28.11.18*
57. *Lee YC, Grace M (2010) Students' reasoning processes in making decisions about an authentic, local socio-scientific issue: bat conservation. J Biol Educ 44: 156–165*
58. *Stoll-Hertrampf A, Valsangiacomo V, Bender U, Ross S, Bertschy F, Künzli C (2019) Decision-making processes of children in the context of sustainable diets. Part 1: The role of knowledge in decision-making processes. Ernährungs Umschau 66(8): 136–144*
59. *Oelgeklaus H, Hößle C. Explizites Lernen über ethisches Bewerten durch Sechs-Schritt, Wertepool und Argumente-Schema. In: Eilks I, Feierabend T, Hößle C et al. (Hg). Der Klimawandel vor Gericht. Materialien für den Fach- und Projektunterricht. Aulis-Verlag, Köln (2011)*
60. *Eilks I, Feierabend T, Marks R. Die Vielschichtigkeit des Klimawandels reflektieren mit der Journalistenmethode. In: Eilks I, Feierabend T, Hößle C et al. (Hg). Der Klimawandel vor Gericht. Materialien für den Fach- und Projektunterricht. Aulis-Verlag, Köln (2011)*
61. *Höttecke, D. Rollen- und Planspiele zur Schulung von Bewertungskompetenz. In: Eilks I, Feierabend T, Hößle C et al. (Hg). Der Klimawandel vor Gericht. Materialien für den Fach- und Projektunterricht. Aulis-Verlag, Köln (2011)*

**DOI: 10.4455/eu.2019.031**