AN ODD BITE

EXPERIMENT ON HOW WESTERN SOCIETY FEELS ABOUT EATING INSECTS, USING AND EVALUATING THE IMPLICIT ASSOCIATION TEST

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1. INTRODUCTION

1.1 INSECTS AS FOOD

The world is growing. Where there are 7 billion people inhabiting the world today, it is expected that in the year 2050 planet earth has around 9 billion inhabitants. Not only is the world growing in numbers, the economic welfare of 2 billion people in countries such as India and China is rising. This leads to an even more increasing demand for protein. The estimation is that in 2050, there will be an increased demand for protein rich foods of 2 times the demand we face today (Lutz et al., 2001). Where growth brings lots of possibilities and new opportunities, it also brings challenges. Land available for agricultural use is limited. The land is not only used to feed the world's inhabitants, but also to feed the animals that feed them. Valuable land gets increasingly pressured and more intensively used in order to fill the demand (William et al., 1992). Various studies have shown that growth has its limits, and that, in order to make sure the world remains' fed, alternatives have to be found (William et al., 1992; Jensen, 1978; Bouma et al., 1995). Eating insects is one of them!

Insects are eaten in most parts of the world (Bodenheimer, 1951). Africa, Asia and even South-America all have their own traditions regarding insects for human consumption. In total 2 billion consumers world-wide eat or have eaten insects on a regular base (Van 't Huis et al., 2013). Countless studies have proven that insects are fit for human consumption. They showed that the protein in the animals is very well capable of satisfying the needs for a human being (Hardy et Right, 1993; Gourou, 1947). In addition, it's said that insects are among one of the cleanest animals, even cleaner than some other animals we consume, contradicting arguments of consumers labelling insects as "dirty and therefor unfit for consumption" (Bodenheimer, 1951). Especially in the tropics, where the environment for insects is such that they can survive almost all through the year, insects are available and a well-used source of protein for humans.

Though insects are consumed in a big part of the world, entomophagy (consumption of insects) is far from popular in most Western countries. It is said that Western people see entomophagy as something primitive and look at it with disgust, therefore neglecting it's pros for consumption and not being convinced by research done on the insect for consumption (Van 't Huis et al., 2013). So where does this neglect come from? It is said that the first time Western society came in touch with entomophagy, was at the times of the great conquests. The Dutch, French and British travelled the world looking for new routes to expansion, but in their aspirations encountered various different indigenous people around the globe. These people were used to consuming insects, but were seen as primitive and dirty by the Westerners (Bodenheimer, 1951). Can it be that Western society resented entomophagy for this reason and that, centuries after, this disgust is still fixed in our brain? Does the Western society still see the insect as primitive and disgusting, limiting the social-economic prospects and agricultural advantages of eating insects as of yet in Western society? In other words, does Western society have an implicit negative association regarding insects as consumption? Establishing whether this is indeed the case is the first aim of this research.

1.2 IMPLICIT ATTITUDE

To determine whether Western Society has an implicit negative association, I use a construct called *implicit attitude*. It can be described as an attitude that is "automatically activated from memory and influences perceptions, decisions and behaviour" (Goodall, 2011). This implicit attitude is an attitude people have, but are not able or don't want to express this to others. An example of comparable problems in human behaviour is clarified by Harvard in the following quote (2014):

> "if asked "How much do you smoke?" a smoker who smokes 4 packs a day may purposely report smoking only 2 packs a day because they are embarrassed to admit the correct number. Or, the smoker may simply not answer the question, regarding it as a private matter. These are examples of being UNWILLING to report a known answer. But it is also possible that a smoker who smokes 4 packs a day may report smoking only 2 packs because they honestly believe they only smoke about 2 packs a day"

Though people may not or cannot report their implicit attitudes, there are various ways developed over the years that try to find them nonetheless. The 3 main types of implicit measures of attitudes are: (a) Evaluative Priming Paradigm where people are first shown a target or non-word (word with no meaning) and are then asked to respond to a positive or negative word (Fazio et al., 1995), (b) the Implicit Association Test where people are asked to categorise target and evaluative words on the same response key (IAT, Greenwald, McGhee & Schwarz, 1998) and (c) the Affect Misattribution Procedure where participants are shown a target word and are then asked to rate a non-word. (AMP, Payne et al., 2005) (Goodall, 2011). Fazio et al. (1995) proved that people deliberately trying to answer in a certain desired direction (i.e. having no negative attitude regarding black people whilst having so) are found to have negatively scored on the implicit measurement measures. Their aims to hide their prejudiced opinions didn't fool the implicit measurement test, showing that it can find underlying associations of people by assessing automatically activated attitudes, which are implicit. Explicit measures asses the deliberative attitudes, where people are forced to think about their opinions and show them on for example a Likert-Scale. The explicit attitude is often used to compare a person's attitudes (both implicit and explicit) and make deductions from its differences or likeness. In this research only implicit attitudes are taken into account, for the sake of simplicity and time-constraints.

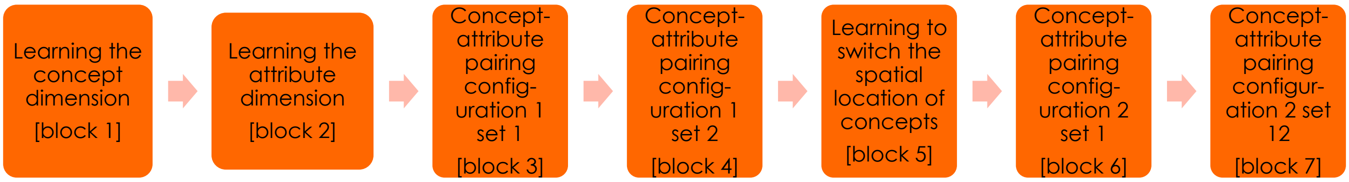
Based on Western views on entomophagy, implicit attitudes appear particularly relevant to measure western views on eating insects. This led to the first hypothesis. Hypothesis 1: Western Society has an implicit negative attitude towards consumption of insects.

1.3 IMPLICIT ASSOCIATION TEST

As noted before, certain ways of measuring implicit attitudes are developed over the years. For this research the Implicit Association Test (IAT) developed by Greenwald et al. (1998) is used. The IAT tries to find the underlying association people have regarding certain concepts. This association is established by making subjects map certain concepts and attributes. The IAT uses the time people need to respond to the given task in order to find the so-called "IAT-score" (Greenwald et al., 1998). The idea of working with response times regarding constructs to measure attitudes, can quite possibly originate from the research done by F.C Donders (1868/1969). He found that the time needed in order to perform a "mental computation" can provide a lot of basic information. He showed this by letting people do a task with their right hand for a stimulus on the right side, and to use the left hand with a stimulus on the left side. When switching the way the hands had to go, the respondents were keen to show more errors and take longer time to finish the task. The easier the task was to a respondent, the quicker the (right) responses would be (e.g. left-left and right-right is easier then left-right and right-left) (Donders, 1868/1969; Lane, 2007). The test was originally designed as a method for "indirectly measuring strength of association among concepts" (Nosek at al., 2007). Its design to rely on automatically activated attitudes is presumed to contribute to the test's characteristics and measures (Conrey et al., 2005).

In experimental practice the IAT is applied in certain stages. The stages, or blocks, 1,3 and 5 are used to train a respondent to map certain concepts (e.g. an image of normal food or an image of food with insects in them) or attributes (e.g. words that represent a good valence such as "love" against ones that represent bad valence, such as "war") as fast as possible to a key on the left (e.g. the "a" – key) and the opposing concept or attribute to the right (e.g. the " Num-5" –key"). These blocks are called "single-category classification". In stages 3 and 4 these concepts and attributes are paired in a certain configuration. The respondent is asked to classify the double categorization, so the attribute and concepts are paired. This configuration is randomized across all respondents, or so called counterbalanced. This counterbalancing is proven to have good implications regarding psychometric properties (Greenwald et al, 1998; Nosek at al., 2005). In stages 6 and 7 the same task is asked as in stage 3 and 4, only now the alternative configuration is used, meaning that the pairing of attributes and concepts are now switched around. Figure 1.1 shows an overview of these stages.

Figure 1.1



There should be at least 4 attributes and the concepts have to be strong and non-ambiguous (Nosek et al., 2005). In each stage there are trials for the respondent to practice the mapping of the concepts or attributes. Nosek et al., also showed that it is recommended to have 20 practice trials for the first combined practise sets (3 and 6) and 40 trials for the second combined sets (block 4 and 7).

The IAT is proven to work in designs where strong concepts were posed, such as ethnic background (black vs. white), smokers vs. non-smokers and gender (Fazio & Olsen, 2003, Greenwald, & Nosek, 2001). This research is trying to find whether Western Society has a negative implicit attitude against eating insects, which is supposedly a concept at least as strong as the ones named. If so, it would seem that the IAT can also work for this research.

Since its development in 1998, the IAT has been used by countless studies, providing tons of information about the measure and its validity and reliability. The last one is a point of interest, since researches have shown that the IAT, compared to explicit measures, has proved to be of "rather low" reliability (Nosek and Banaji, 2001). The research done by Lebel and Paunonen in 2011 shows, by comparing various studies using implicit measures, that the overall reliability and replicability of these implicit measures vary often but are mostly as low to be unacceptable. Though researchers try and prove the advantages of a low reliability, they pose it's conservative to leave out the random measurement error. They conclude: "Experiments' probability of replicating decreased systematically when the random measurement error contaminating this increased." (p. 12) They also pose the proposition to, when using an implicit measurement, use ones that are "known to have acceptable psychometric properties." As the IAT is a test widely used and tested and said to have reasonable psychometric properties (Lane, 2007; Cunningham et al., 2001), it is interesting to see whether, using the design of this study, it is possible to achieve a high reliability in the experiment. To test for reliability, the test-retest reliability is often used (Lebel and Paunonen, 2011; Greenwald, 2003). Though the experiment in this research is only done once, testing reliability with this method is not doable. Luckily, more reliability analysing methods are often used, such as the cronbach's alpha and split-half reliability (Lane, 2007; Lebel, 2011). Using these methods, this research will try to show that an IAT can prove sufficient reliability and is therefore a proper method of evaluating one's implicit attitudes. This is the second hypothesis of this study.

Hypothesis 2: The IAT can, given the insect-food-design, prove an acceptable reliability level.

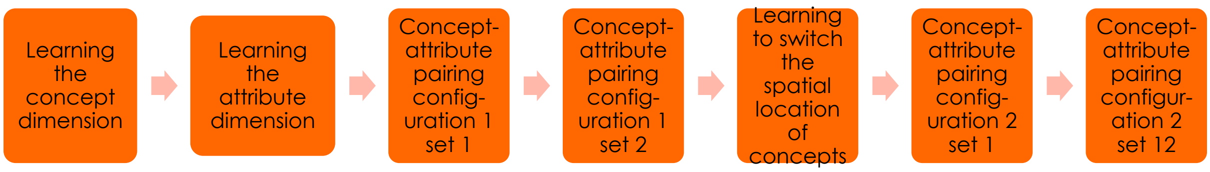
2. METHOD

2.1DESIGN

The IAT design used in this research uses the association between a *target-concept discrimination* and an *attribute dimension* (Greenwald et al., 1998). The concepts were pictures of food with insects or without insects. The attribute dimension were words either describing pleasant or unpleasant feelings. This is because we want to know in what fashion people look towards food and insects, both negative and positive. The concepts were combined with the attributes one time in a certain configuration, then switched the configuration half way to pair the attribute with concepts that changed places. Respondents had to complete the trials as fast as they could and were instructed to do so in the instruction screens between each blocks.

The concepts were pictures representing either "Normal Food" (abbreviated in experiment with "FoodNormal") or "Food made with Insects" (abbreviated in experiment with "FoodInsect"). The aim was to make sure that the food with insects clearly showed they had insects in or on them. For the list of the pictures, see appendix 1. The attributes were 8 words describing either "pleasant" feelings such as beautiful and superb, and 8 "unpleasant" words on the other hand, such as tragic and nasty. See appendix 2 for a list. The design worked in 7 stages, or the so called blocks. In Figure 2.1 is shown what happens in each block.

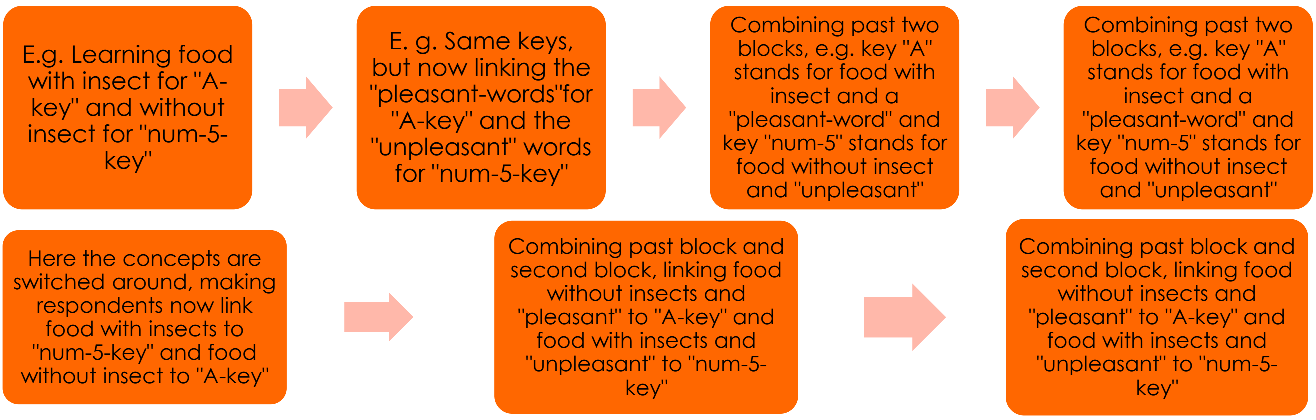
Figure 2.1



In block 1 the respondents were trained to map the concepts "FoodNormal" or "FoodInsect" to either the left-hand side, which used the A-key, or the right-hand side, which used the Num-Lock 5 key. The reason for choosing these particular keys were their position on the keyboard. They lay apart as far as possible on the keyboard, forcing respondents to use their two hands during the experiment. After having learned the concept dimension, they have to do exactly the same in block 2, only then mapping the attributes (pleasant and unpleasant words) to either the left-hand side or right-hand side. In the third block, the attributes and concepts are combined. They are in the same place as learned before, e.g. food with insects and pleasant words on the left side opposing normal food and unpleasant words on the right side. The only difference is, is that the respondent now has to map them at the same time, randomly getting a word or picture in the same block. This is done for 20 trials in block 3. Where all 3 previous blocks where practice-trials, block 4 is the first data-collection block. This is the block, along with blocks 3, 6 and 7, where the eventual D-value, the scoring algorithm, is calculated from. The respondent has to map 40 trials while the concept-attributes are paired.

After this block, a 30 second pause was computed into the IAT for people to relax a bit and loosen their muscles in order to be able to also complete the second part of the experiment as fast and as accurate as possible. Next came block 5, which is different from its predecessor. The attributes are put aside for a second and now only the concepts of “FoodNormal” and “FoodInsect” remain. Where, in this example, “FoodNormal” used to be left and “FoodInsect” used to be right, they have now changed places. “FoodNormal” has to be mapped on the right-hand side, “FoodInsect” on the left-hand side. After having learned this new configuration, the respondents were asked in block 6 to practice mapping the newly configured concepts with the same attributes as before. Note, the concepts have changed places, the attributes have not! In block 7, they were asked the same thing, only this time for 40 trials instead of 20. In Figure 2.2 the design used for this particular experiment is illustrated in a graph.

Figure 2.2



2.2 RESPONDENTS

In this research 71 students of the Wageningen University participated. Nationalities were different, but all were from western societies, such as Germany, France, the USA and, most of all, the Netherlands. The respondents volunteered in participating, though being promised a small reward after completion of the experiment might have motivated a few. In the analysis, no complete respondents were deleted.

2.3 MATERIALS

This experiment used 14 pictures as the concepts: 7 of them showed an image of food without insects, the other 7 showed food with insects on or in them. The attributes were 16 words derived from Greenwald et al., 2007, originally from Bellezza, Greenwald en Banaji (1986), either rated as high in pleasantness or low in pleasantness. The words used in this experiment are shown in appendix 2. Both pictures and words were chosen because they were thought to be non-ambiguously classifiable by the subjects.

2.4 APPARATUS

The experiment was conducted in the Consumer Research Room (CRR), at the location Leeuwenborch, faculty of Social Sciences. The CRR was set-up in a way that 6 individual units were created, providing an individual workspace that tried to minimize external distraction for each subject. For this research 6 Dell laptops were used, installed with Inquisit 3.0. The respondents were asked to map the concepts and attributes with the "Num-5 key" for the right-hand side and the "A" key for the left-hand side. This in order to make sure those respondents would use both their hands.

2.5 MEASURES

The IAT uses the knowledge described by Donders (1969) in section 1.3 as a basis for the calculation of the "IAT-score", where the more "easy-tasks" are seen as the implicit associations people are used to, for example normal food associated with a pleasant word, and therefor map them quicker.

The way of calculating this score has developed quite a bit since its introduction in 1998. In 2003 Greenwald, Nosek en Banaji (2003) published an article where they posed certain alternatives for the initial way of evaluating the latencies of the responses. In this article they recommended that the following measure is supposedly the best way of evaluating these latency scores:

Figure 3.1

1. Delete trials greater than 10,000 milliseconds
2. Delete subjects for whom more than 10% of trials have latency less than 300ms.
3. Compute the "inclusive" standard deviation for all trials in stages 3 and 6 and likewise for all trails in Stages 4 and 7.
4. Compute the mean latency for responses for each of Stages 3,4,6 and 7.
5. Compute the two mean differences (Mean*stage6* – Mean*stage3*) and (Mean*stage7* – Mean*stage4*).
6. Divide each difference score by its associated "inclusive" standard deviation
7. *D* = the equal-weight average of the two resulting rations

Note: From Greenwald, Nosek en Banaji (2003, Table 4).

The way described above is the one used in this research. Note that in this research testblock 4, practiceblock 6 and testblock 7 are testblock 5, practiceblock 8 and testblock 10 respectively. This is due to a difference in the way the software was programed. Apart from their number, the Stages are exactly the same.

After having formed the D-value, this value will be put into analysis again. A one-sided T-test will be conducted in order to see if the values are significant. To test reliability, the split-half reliability and chronbach's alpha will be calculated, using the standard deviations of the latencies from stages 3, 5, 8 and 10.

3. RESULTS

3.1 DATA

The data collection resulted in 6 text files where all 71 respondents were spread across. In order to obtain 1 big file, first all the data files were combined. After having put all the data into one file, this file was uploaded into SPSS for data analysis, making sure all data was copied correctly.

Looking at the recommendations done by Greenwald, Nosek and Banaji (2003), a variable was created in order to spot outliers in latency of the responses. These outliers are of no theoretical interest and can also negatively influence means and can increase variances. Trial responses that took longer than 10,000 ms were deleted right away, respondents where more than 10% of their response latencies were faster than 300 ms were deleted entirely as respondent. In this research, no respondent was deleted because of this last restriction. The following 9 respondents had one or two trial(s) deleted in the respective blocks because they took longer than 10,000ms: Subject 12 block 10, Subject 13 block 3, Subject 16 block 3, Subject 17 block 5, Subject 36 block 8, Subject 37 block 3, Subject 44 block 8, Subject 57 block 2, Subject 57 block 5.

Next a new variable was created in order to calculate the inclusive standard deviations of both groups (3 and 8, 5 and 10). The blocknummers 3 and 8 were given the value -1. Blocknummers 5 and 10 were given the value of 1. This in order to create two inclusive groups, one labelled as 'groups 3 and 8' = -1, the other 'groups 5 and 10' = 1. Next, by using the split file command in the SPSS syntax, the variables (latencies) were explored for their means and standard deviations, sorted by their subjects, blocknummers and inclusive groups. We now have the required inclusive standard deviations of 'groups 3 and 8' and 'groups 5 and 10'.

Next, the data-set was restructured. This means that the cases turned into variables and vice versa. This lead to 71 rows, each for one respondent. The columns were the rest of the data. Irrelevant data was deleted: time, date, blockcode, blocknummer, trialcode, trialnummer, response, stimulusnumber1, stimulusitem1, expression.da, expresson.db. The variables that remained, where the response latencies and the response correctness (whether people answered the trial correctly). These variables were not taken into account in further analysis. Using the syntax, the means of each respondent was calculated for the blocknummers 3, 5, 8 and 10. This created a new variable for each block, where the means were reported: MEANBLOCK3, MEANBLOCK5, MEANBLOCK8 and MEANBLOCK10. Then, the inclusive standard deviations, which were calculated in an earlier stage, were put into the data-set as well, giving two more variables: 'SDBLOCK3_8' and 'SDBLOCK5_10'. This was checked by using the syntax.

At that point, almost all the variables are there in order to calculate the D – value. There are two things left to be done to obtain all the variables: First, the inclusive means of MEANBLOCK 3 and 8 and MEANBLOCK5 and 10 have to be calculated. This is done by adding MEANBLOCK3 and MEANBLOCK 8 and dividing this by 2. This results in variable MEANBLOCK3_8. The same is done for blocks 5 and 10. The other one is to divide MEANBLOCK3_8 and MEANBLOCK5_10 by their respective inclusive standard deviation groups. So, MEANBLOCK3_8/SDBLOCK3_8, resulting in variable INCLUSIVEMEAN3_8. Again, the same is done for blocks 5 and 10.

Following Greenwald, Nosek and Bajani (2003), to calculate the "D" we need the equal weight ratio of the INCLUSIVEMEAN3_8 and INCLUSIVEMEAN5_10. Adding these two and dividing it by 2 results in 71 "D"-values, the so called "IAT-scores".

3.2 OUTCOMES

The 71 "IAT-scores" are now put into different analysis. In order to find the overall score of the test, the mean is calculated, resulting in a score of 0.082431 (sd=0.874). A one-sided T-test comparing this scores shows it is not different from a zero (neutral score) t=(70)= 0.08243 (p= 0.430). In spite of an average score close to 0, it is striking to note that participants first trained to associate insects with the positive evaluative dimension (N=36) had an average D of 0.88252 (sd=0.288, p=0.000) while participants (N=35) trained to associate insects with the negative dimension first had an average D of -0.74051 (sd=0.336, p=0.000). The overall D score tells us that there is a minor (almost neglect able) preference for Normal Food over Food with Insects among the 71 respondents.

As far as reliability is concerned, a split-half analysis was conducted on the latency scores of blocks 3, 5, 8 and 10. The split-half reliability comparing one half of a latency to the other half scored 0.979319 (Spearman-Brown Correction 0.989522). The split-half reliability indicates a high internal congruence in scores, meaning that the results reflect the similar constructs in the test. In addition, a cronbach's alpha was calculated for the latency scores across all trials. This resulted in α = 0.970.

4. DISCUSSION

This research set out on two goals. The first was to see whether western society has a negative implicit attitude regarding insects as food. Looking at the results, Bodenheimer's (1951) statements on the implicit negative association of insects in Western Society can, by this research, not be proven. The IAT-effect resulted in a score very close to 0. Though the score shows a slight preference from the respondents for Normal Food over Food with Insects, it is far from significant and too small to build any argument proving the first hypothesis: Western Society has a negative implicit attitude regarding eating insects.

The current research did not add a measure for extrinsic attitudes. Nonetheless the reactions of respondents after completing the test was rather interesting. Most of them indicated (outside the formal experimental environment) that they are open to entomophagy. Since it's not actually tested, no real deductions can be drawn from this, though it is interesting that most respondents mention being in-favour of insects for consumption, which would reflect an IAT that is about neutral in scores towards insect and non-insect foods. Considering the inconclusive outcomes of the IAT we cannot be sure though, and this is a problem for more IAT-experiments, as shown by several other studies (Banse, Seise, & Zerbes, 2001; Assendorpf et al., 2002; Kim, 2003).

In spite of this explanation analysing the results, we are more inclined to say that the scores are more a result of a methodological effect than a genuine implicit attitude effect. With the 71 respondents who were counterbalanced in their experimental designs, the IAT-effect showed almost 0, meaning an almost equal favour from the respondents for Normal Food or Food with Insects. Interpreting the results section where the participants were split whether they learned the positive evaluative dimension or the negative evaluation dimension first, it's striking to see the big difference in scores. This may be ascribed to the random selection of whether targetcompatible-condition or whether the targetincompatible-condition was learned first, therefore it might be ascribed as a methodological effect instead of an effect in implicit associations.

The second goal of the study was to prove that this IAT-experiment can prove acceptable scores of reliability. Both the reliability measures used in this experiment scored high which is in line with many other studies that have shown a reasonable internal consistency, with comparable or lower split-half reliability - ranging from 0.6 to 0.9 (Greenwald & Nosek, 2001; Schmulke & Egloff, 2004); which are seen a reasonable level of reliability (Nosek et al., 2007), so in that light the score over 0.90 found in this research seems indicative of a high internal consistency.

In addition, the cronbach's alpha in this research showed a high value of α=0.970. The cronbach's alpha was calculated in order to have an extra view on reliability, though the measure isn't that very useful for the IAT. This is because the more trials analysed, the higher the cronbach's alpha tends to get, regardless of reliability. Since this IAT experiment has a lot of trials, it seems logical that the alpha has a high value.

The most important measure for reliability in other IAT-researches is the test-retest reliability (Egloff et al., 2005; Nosek, 2007). This reliability shows if a measure is a trait measure rather than a state measure, meaning that it the IAT should show something about a person's implicit overall attitude rather than an attitude on a certain moment. The test-retest reliability is done by letting the same respondents do the same task, only with a certain period of time between them. When the two results are congruent, the test-retest reliability is high and therefor supposed to be a trait measure (Nosek, 2007). In this research it was not practically possible to repeat the test on different times, therefore making it unable to measure this. As this could also shed light on the effect of training on the reported associations, as illustrated in the results section, such test-retest reliability is recommended for future research. The second hypothesis can therefore be partly answered. Yes, internal consistency was proved, though to really test whether the IAT measures a trait in state of state, the test should be retested with the same respondents.

A major strength of this research was the possibility of controlling all the data-entries in an experimental design, making sure that external influences were limited. Also having conducted the experiment in a short period of time made sure that respondents were not able to influence each other, increasing score validity. In addition, the ability to work with a data-set which was, compared to other IAT's, still rather clear because of the amount of respondents, proved to be helpful in the data-analysis and its computations.

Of course, the research also had its limitations. Since this experiment was conducted for a BSc thesis experiment, it was restricted to a few constraints. Time was limited, which led to only being able to achieve 71 respondents and not having the time for a retest in order to measure the test-retest reliability. This also restricted the possibility of exploring the explicit attitudes of respondents alongside their implicit attitudes. Hofmann et al. (2005) showed that implicit and explicit self-reports can relate to one-another and for future research it is recommended to see what this would do with the insect as food design.

An addition, this research used the IAT to measure the implicit attitudes. Though IAT is a widely used measure of implicit attitudes, it is not the only one, and has received some criticism especially regarding what the theoretical construct measured exactly is (e.g. Gawronski, 2007). A recent alternative, the Affect Misattribution test could be used to test hypothesis 1 in order to whether this measure receives similar or different results.

An implication for future research would be to do the same design, so with insects as food, only then using different attributes. How often do we really classify food on a good/bad scale, rather than on an axis defining tasty/disgusting attributes. Implementing attributes representing these valences might improve the IAT's results. Also more participants should be used, in order to find whether the IAT-scores are really influenced by the method or by the people's implicit attitudes. The test-retest reliability should be taken into account in this study. Also exploring the explicit attitudes compared to implicit attitudes regarding insects as food in Western Society can be interesting in this design, since people tend to have a strong opinion on insects and food, explicit measures cannot be ignored regarding this topic.

Concluding, the first hypothesis cannot be proved with the results of this experiment. From this research it cannot be said whether Western Society has an implicit negative attitude towards the consumption of insects. The IAT-effect observed might have been more the work of methodological influences then the measurement of implicit attitudes of respondents. The IAT measure does show to be sufficiently reliable in measuring insect as food associations, leaving room for future research to explore this design.

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APPENDIX 1. IAT PICTURES

NORMAL FOOD







APPENDIX 2

Pleasant words

Lovely, Joyful, Wonderful, Pleasure, Glorious, Beautiful, Superb, Marvellous

Unpleasant words

Painful, Humiliate, Terrible, Horrible, Tragic, Awful, Agony, Nasty