

MSc Thesis Course Guide

Division of Human Nutrition of Wageningen University

Chair groups/course codes:

Nutrition and Pharmacology	HNE-810xx
Nutrition, Metabolism and Genomics	HNE-824xx
Sensory Science and Eating Behaviour	HNE-838xx
Nutrition and Disease	HNE-848xx
Nutrition and Health over the Lifecourse	HNE-853xx

Version 19

December 2017

Contents

- Contents 2
- 1. Introduction 3
- 2. Objective of an MSc thesis at the Division of Human Nutrition 3
- 3. Structure of an MSc thesis at the Division of Human Nutrition 4
- 4. MSc theses offered by the Division of Human Nutrition 5
- 5. Orientation on MSc Thesis topics 6
- 6. Supervision of the MSc theses 6
- 7. HNE Thesis Rings 7
- 8. Prerequisite knowledge 7
- 9. Thesis contract 8
- 10. Conducting a thesis 9
- 11. Research presentations 10
- 12. How to schedule & give a thesis presentation 11
- 13. Defence/Oral examination 13
- 14. Assessment 15
- 15. Finish 16
- Appendix 1: Assessment form colloquia 17
- Appendix 2: Thesis Assessment form 18
- Appendix 3: Rubric for assessment of MSc-thesis 19
- Appendix 4: Guideline and examples for writing an MSc thesis proposal 24
- Appendix 5: Plagiarism Statement 49

1. Introduction

An MSc programme culminates in an MSc thesis. MSc theses at the Division of Human Nutrition are open to students registered in a Wageningen MSc programme who have successfully completed the prerequisite courses and have a suitable knowledge of the subject at hand. The majority of the students doing their thesis research at the Division come from the MSc programme Nutrition and Health, although also students of the MSc programmes Food Safety, Biotechnology, Biology, Molecular Life Sciences and Bioinformatics (and others) are welcome.

2. Objective of an MSc thesis at the Division of Human Nutrition

The aim of the MSc thesis is: “To achieve an academic approach for solving problems by taking part in a scientific research project”. This means that the educational goal is to be able to provide a clear definition of the problem, solving the problem in a scientific way, drawing conclusions and discuss the outcome. For the MSc thesis, students have to be able to demonstrate that they can conduct a research or a research-based design project individually and independently.

Besides these general academic objectives, the student is asked to formulate some personal aims, for example achieving knowledge in a special field of research or a special methodological approach or practical experience according to study planning, realisation, analysis of data and the interpretation of these data.

The student independently addresses a topic, usually within an ongoing research project. The student works either individually or together with another MSc-student, and is supervised by a staff member and (in many cases) by a PhD-candidate (in Dutch: AIO).

Learning outcomes

After successful completion of your thesis, you are expected to be able to:

- demonstrate commitment, perseverance, initiative and creativity when investigating a research question or performing a design project
- work independently and efficiently
- demonstrate that you know when to ask help from your supervisor and how to handle any comments
- plan and keep to the time schedule
- delineate and define your research or design question
- build a sound theoretical and methodological framework
- collect data in a systematic and verifiable manner
- analyse the data critically and correctly
- develop a design or design alternative (in case of a research-based project)
- present the major finding(s) in a comprehensible manner for a specific audience, both orally and in writing
- formulate sound conclusions based on a comprehensive discussion of the results
- evaluate and discuss the contribution of your results to the development of the thesis topic
- write a comprehensive, consistent and concise thesis report.

3. Structure of an MSc thesis at the Division of Human Nutrition

A thesis offered by the Division of Human Nutrition consists of the following elements:

1. A research project
2. Attending research presentations (student or staff presentations)
3. Written report
4. Oral presentation
5. Defence/Oral Examination

Global time schedule of a thesis of 36 ETCS

TIME	ACTION	WHO	REMARK
	<i>Providing information on thesis topics</i>	<i>Thesis providers/ supervisors</i>	<i>Online</i>
2-6 months before	Searching topic, first appointment with supervisor	Student	
Week(s) before	Completing thesis contract	Student/supervisor(s)	Email scan of completed and signed (by student and supervisors) contract to studentdesk.hn@wur.nl with cc to supervisor(s). Hand in original contract with signatures at the student secretariat, room 1074 (Helix)
Week 1-3	Literature reading proposal writing	Student	
Week 4	Discussing /completing research proposal	Student/supervisor	
Week 5-18/22	Data collection, (statistical) analyses and draft chapters report	Regular meetings student and supervisor(s)	
Week 19-25	Finalizing report		
	Planning colloquium	Student in consultation with supervisor, because supervisor needs to be present	Via https://teamsites.wur.nl/sites/hn/web/seminars.htm
	Plan oral examination	Student, after approval of supervisor	Via <u>secretariat*</u>
Week 23	Selection of discussion paper	Student/supervisor(s)	Hand in selected paper with the commentary together with thesis
Week 24/25	Handing in thesis report, selected paper with remarks	Student	2 hardcopies of all documents; PDF of thesis report, hand in at the secretariat*
Week 25	Colloquium (thesis presentation)		Make summary of thesis, and bring with you to meeting room (~50 copies)
	Completing Assessment form	Student/supervisor(s)	
Week 26/27	Oral examination	Examiners	
	Register Final mark of the thesis	Student secretariat	

* secretariat:

Theses Nutrition and Disease and Theses Nutrition Metabolism and Genomics via Jasmijn.Mater@wur.nl; thesees Sensory Science and Eating Behaviour via Gea.Brussen@wur.nl ; thesees Pharmacology and Nutrition via Rianne.Maasen@wur.nl and thesees Nutrition and Health over the Lifecourse via studentdesk.hn@wur.nl

4. MSc theses offered by the Division of Human Nutrition

The Division of Human Nutrition offers MSc theses indicated by code HNE in the following areas:

- Nutrition and Pharmacology HNE-810xx
- Nutrition, Metabolism and Genomics HNE-824xx
- Sensory Science and Eating Behaviour HNE-838xx
- Nutrition and Disease HNE-848xx
- Nutrition and Health over the Lifecourse HNE-853xx

MSc theses can range in size from 24 credits (4 months full-time) to 39 credits (6.5 months full-time), in increments of 3 credits. At Wageningen University, full-time education is equivalent to 40 to 42 hours per week.

For each thesis, *mandatory prerequisite knowledge* required, see also chapter 7.

Characteristics of area specific theses

The different chair groups within the Division of Human Nutrition all offer distinctive theses. Students will in general choose a thesis that fits within their MSc-specialisation.

The type of work done during the thesis will vary.

One can imagine that a thesis Nutrition and Disease or Nutrition and Health over the Lifecourse are likely to contain a lot of work with human participants and/or data analysis, while a thesis Nutrition Metabolism and Genomics is likely to contain lab work such as cell-culture.

5. Orientation on MSc Thesis topics

A large number of suggested topics is permanently available on the website of the Division in the 'online MSc thesis & internship shop' (www.humannutrition.nl → education → thesis).

In addition once a year a meeting will be held where information is given about general issues to take into account when selecting a thesis topic. An overview of all thesis topics that can currently be chosen will be available, and you can speak with supervisors and coaches. There may be even posters, flyers and leaflets to attract your attention to specific topics.

Students are recommended to get informed about the possibilities and limitations in time. Please make an appointment with a staff member or PhD student in good time, but at least 2 months in advance.

If you wish to go abroad for the fieldwork of your thesis you need extra time to do all the preparations, so contact the supervisor (staff member) about six months in advance.

The MSc theses are always related to the research projects and research interests of the Division of Human Nutrition to guarantee the quality of the thesis work and research facilities available for the thesis.

6. Supervision of the MSc theses

A research project of the Division of Human Nutrition is supervised by a staff member of the Division.

The day-to-day coaching is quite often delegated to a PhD candidate or 'AIO'. In some cases this PhD candidate might be working in another location than Wageningen (e.g. a PhD candidate of the division of Human Nutrition working at RIVM or TNO).

In exceptional cases, a MSc thesis may also be supervised by a staff member of another research institute with which the division has a good working cooperation (e.g. RIVM, TNO-Quality of Life) or organisation (e.g. GGD). However, in all cases a staff member of the Division of Human Nutrition should have the final responsibility.

The examiner is the head of the chair group that is responsible for the thesis:

- | | |
|--|------------------------------|
| • Nutrition and Pharmacology | prof. dr. Renger Witkamp |
| • Nutrition, Metabolism and Genomics | prof. dr. ir. Sander Kersten |
| • Sensory Science and Eating Behaviour | prof. dr. ir. Kees de Graaf |
| • Nutrition and Disease | prof. dr. ir. Ellen Kampman |
| • Nutrition and Health over the Lifecourse | prof. dr. ir. Edith Feskens |

7. HNE Thesis Rings

MSc thesis students have the option to participate in the HNE Thesis Rings. These are weekly meetings with 8-10 MSc students working on a master thesis and one staff member (chair). Within a thesis ring students will give each other feedback on their MSc protocol/thesis with respect to scientific writing (aspects like organisation, sentence structure, clarity, balance, depth etc). In this way students can learn from each other and supervisors should receive better quality reports. Participation is voluntary, but when participating full commitment is expected. In some periods Thesis Rings may be full and students will be placed on a waiting list. More information can be found on www.humannutrition.nl > Education > Thesis.

If you wish to participate, please register by sending an email (*including your name, name(s) of your thesis supervisors, start- and end date of your thesis and your login name*) to the contact person of your chair group:

- | | | |
|--|--------------------------------------|--|
| • Sensory Science and Eating Behaviour | dr. Gerry Jager | Gerry.Jager@wur.nl |
| • Nutrition and Disease | dr. Cora Busstra | Cora.Busstra@wur.nl |
| • Nutrition and Health over the Lifecourse | dr. Ondine van de Rest | Ondine.vandeRest@wur.nl |
| • Nutrition and Pharmacology* | dr. Klaske van Norren | Klaske.vanNorren@wur.nl |
| • Nutrition, Metabolism and Genomics | the Thesis Ring chair at that moment | |
- * *Thesis Ring for lab work only*

8. Prerequisite knowledge

All theses do have prerequisite courses. This means that before starting with a thesis these courses should have been successfully completed.

If you wish to attend/complete a prerequisite course during the thesis work, discuss with your supervisor whether this is feasible for the subject of your choice (before the start of the thesis).

Prerequisite courses are listed in the study handbook (www.studyhandbook.wu.nl) for each of the theses offered by the division of Human Nutrition. These requirements might change once in a while. When you do not meet these requirements, please discuss your options with your supervisor or examiner.

Please note that it is in all cases required to be registered as an MSc-student at Wageningen University before starting with your thesis!

Students in the MSc programme Nutrition and Health will have to have successfully completed the RO-0 courses in their programme, prior to starting with the thesis. Those that have completed the BSc programme Nutrition and Health do meet the RO-0 criteria based on their BSc-programme.

9. Thesis contract

After you have agreed with an intended supervisor on a thesis topic, a thesis contract should be completed. The format for a thesis contract can be downloaded from www.humannutrition.nl (→education → thesis). For supervisors, there is additional information available on the H-drive: H:\Education\Instructions_Teachers\MSc_thesis
The contract needs to be filled in by the student together with the supervisor, prior to starting with the thesis.

The aim of the contract is to discuss and record mutual expectations and agreements between student and supervisor. Special attention should be given to exceptions, such as absence (e.g. holiday, taking a course, etc.) and working/supervision during academic holidays (e.g. summer months). The student is expected to be available 40 hrs per week and be present from Monday till Friday. Exceptional situations should be discussed and agreed on by the supervisor.

The completed contract needs to be signed by the student and supervisor(s) (on behalf of the examiner). The student then sends a scan of the contract to studentdesk.hn@wur.nl with a cc to the supervisor(s) and hands in the original contract with signatures at the student secretariat (room 1074, Helix).

MSc thesis students can use one of the flex places in the student rooms 1031, 1038 or 2071 (for students working in the lab)

Thesis students should print with their student card by using the eWallet. Thesis students can get a compensation for printing by filling out the form which is attached to the document of the thesis contract.

Access to the buildings through the student card will be arranged by the student secretariat upon receipt of the signed contract.

A key for a locker can be borrowed at the general secretariat, room 1073, 1rst floor Helix building. Do not forget to hand in the key after competing your MSc Thesis period: no key, no mark.

During the period of your thesis the student is expected to keep in touch with the supervisor(s) regularly. The frequency of these meetings should be laid down in the thesis contract. During these meetings, the research proposal, problems, analysis of data, and the report are being discussed. If there are problems with coaching during the thesis period (for example illness of supervisor or inadequate coaching), please contact the examiner without delay!

10. Conducting a thesis

Research proposal

At the start of the thesis, you should prepare yourself by reading literature related to the project. After this initial orientation, you formulate a research question/hypothesis and the principle approach to your research or design proposal. This then has to be discussed in depth with the supervisor.

The research or design proposal should include questions supported by up-to-date literature related to the topic, an explicit and specific method for tackling the proposed questions, a project plan and an estimate of the required budget. Appendix 4 includes two examples of MSc thesis proposals, one is short and concise, the other one more extended. Discuss with your supervisor what is desired in your case. If drafted correctly and more extensive, sections of the proposal can form part of the final thesis report (e.g. the Introduction and Methodology section). However, you cannot start conducting the research project before the research or design proposal/planning has been approved by your supervisor(s).

Field work

Although this is the major part of the thesis, no general guidelines are given for this item since the contents of this part may vary from thesis to thesis considerably.

Report

The MSc thesis is completed by writing a report, which will be composed under supervision of, and in collaboration with your supervisors. Guidelines for writing a scientific report include: cover, title page, contents, summary, list of abbreviations, preface, introduction, materials and methods, results with tables and figures, discussion, conclusions, references, and appendices.

The thesis report should be finished within the time mentioned in the contract. Each supervisor should receive a copy, and two hardcopies as well as one report in PDF should be handed in to the secretary*

Concluding discussion and evaluation

After completion of the report, the supervisor will have a concluding discussion with the student to evaluate the thesis period. Also the assessment form (parts A/B/C) will be filled in and discussed. The supervisor puts a hard copy of this form in the post box of the examiner and sends a scan to studentdesk.hn@wur.nl

The procedure for the defence/oral examination for the thesis is discussed further on in this document.

Plagiarism

Plagiarism is considered to be a serious form of fraud. In appendix 5 you can find information about several forms of plagiarism. Read this information carefully.

* *Theses Nutrition and Disease and Theses Nutrition Metabolism and Genomics via Jasmijn.Mater@wur.nl; theses Sensory Science and Eating Behaviour via Gea.Brussen@wur.nl; theses Pharmacology and Nutrition via Rianne.Maasen@wur.nl and theses Nutrition and Health over the Lifecourse via studentdesk.hn@wur.nl*

11. Research presentations

Thesis presentations given by students are scheduled on Monday morning (10:30-11:30h) and Thursday afternoon (15:30-16:30h). Research presentations given by staff are scheduled on Monday morning (10:30-12:00h). All students doing their thesis at the division of Human Nutrition are expected to attend at least one of the research/thesis presentation sessions per week. Attendance during the presentations is registered. Summaries of the student presentations will be available in the room. Presentations are being announced via e-mail and can be found on intranet: <https://portal2.wur.nl/sites/hn/web/seminars.htm>. The frequency of the presentations will depend on various factors, but will in general be every week except during holidays (summer, Christmas/New year).

Students that are not physically present in Wageningen during their thesis work will discuss with their supervisor on alternative options (e.g. attending research discussions at the institute where the thesis is done).

Objective

The research presentations by students and staff of the Division provide the opportunity to present ongoing and finished research on a regular basis. Staff presentations usually focus on on-going research or future research plans, striving after an open and critical discussion. The objective is to inform each other on recent developments and to foster scientific discussions. Student presentations address the results of MSc theses of the Division of Human Nutrition. The theses usually address the most recent results and progress of the research projects at the Division.

Attending research presentations is an important part of a student's thesis and they are central to our scientific mission. The main goal is to broaden the scope on the field of human nutrition in general and more specifically on research conducted by the Division of Human Nutrition.

Duration

A research presentation by a student will be 10 minutes plus 5-10 minutes of discussion. The chairperson for the presentations will watch time during the discussion.

12. How to schedule & give a thesis presentation

General

To fulfil the requirements of an MSc thesis, research results have to be presented to other students and staff of our Division.

Language

Presentations should be held in English.

Only in very exceptional cases (for example when external supervisors are present that do not understand English) a presentation in Dutch can be allowed.

Arranging a date

Students choose a date in consultation with their principle supervisor(s). The supervisor's presence during the presentation is required.

Available options in the future and subscription for a date can be found on intranet: <https://portal2.wur.nl/sites/hn/web/seminars.htm> thesis presentation schedule (use the button "new").

In general, no presentations are scheduled mid-July till mid- August due to holidays. Please claim a timeslot for a presentation 6 weeks in advance and in peak periods (January through April) 2 months before the preferable date. Be sure that you will be able to properly present your results. This does not necessarily mean that your report should be finished at that time though.

Printed summary

Printed summaries of the presentation (about 50 copies) have to be made by the student and made available in the presentation room before the start of your presentation (i.e. at 10:20h)

Example

See below for an example of a printed summary.

Use these items in your own summary. Limit the summary to 1 page A4 (landscape, 2 columns). Use a font size of 11 points or larger.

Summary thesis presentation: HNE-8xxxx <mention chair group e.g. Nutrition and Pharmacology>

Date presentation:

Title:

(part of official project:)

Student(s):

Supervisor(s):

Period:

Hypothesis and short explanation

Introduction, materials and methods

Results

Discussion

Conclusions and if applicable recommendations

PowerPoint

A PowerPoint presentation should be used to support your oral presentation.

To enable a fluent succession of different presentations with a minimal delay between two presentations make sure you have your PowerPoint presentation with you on USB-stick. Please copy your presentation to the D:\-drive¹ of the computer before the session starts. For easy file identification, give your PowerPoint presentation a distinct name, for example your own name.

Assessment

A thesis presentation is assessed amongst others on the basis of content and form.

The staff members present during the presentation will use an assessment form. For reference, this form is provided in appendix 1 to this document.

After the presentations, the staff members/supervisors present will briefly discuss all presentations and grade the presentations.

¹ Using the D:-drive instead of the desktop prevents you from getting annoying messages during the presentation stating that your profile space has been exceeded.

13. Defence/Oral examination

Every thesis at the division of Human Nutrition will be examined orally.

- For a thesis < 36 credits, this examination will be done by the supervisor (staff-member) and coach (e.g. PhD-candidate). This might be combined with the concluding discussion and evaluation mentioned in chapter 9. No specific conditions apply to this oral examination (in that case, please skip the remaining part of this chapter). The final grade for the thesis will be known at the end of this meeting.
- For a thesis ≥ 36 credits, this examination will be done by the examiner (chair of the chair group) and has the form of a scientific discussion. This is an independent evaluation of the scientific qualities of the work and the student. The format and procedure for this examination is presented below.

Present during examination

During the oral examination of a thesis ≥36 credits, the examination will be done by the relevant examiner (see chapter 6) and an independent second examiner. The second examiner will be a staff member of the division of Human Nutrition that was not directly involved in the research performed by the student.

The supervisor and coach are not present during this oral examination.

Format of the examination

The examination will take 45-60 minutes at the room of the examiner and the following points might be discussed. The first 2 points will take the majority of the time in general:

- *A discussion on the content and results of the thesis work and thesis report.*
Part of this will be a critical reflection by the student on the work and results.
- *Reflection on the relevant scientific field by the student*
This will be a discussion on the scientific paper that the student has suggested.
- *Discussion on the field of Nutrition and Health in general*
Based on the list of presentations the student has attended, the field of nutrition and health in general will be discussed.
- A brief discussion on the student's plans for a future career.

At the end of the examination, the examiner and second examiner will briefly discuss the examination, without the student present. Immediately afterwards, the student will be allowed back in the meeting and the outcome of the examination will be communicated, as well as the final grade for the thesis.

Procedure

Set a date and time for the oral examination through the secretariat* (mention also title and supervisor of your thesis) at least 4 weeks in advance and when the supervisor(s) have given approval.

Together with the final thesis report, the student should hand in a scientific article to show the ability of reflection on the scientific field.

*Theses Nutrition and Disease and Theses Nutrition Metabolism and Genomics via Jasmijn.Mater@wur.nl; theses Sensory Science and Eating Behaviour via Gea.Brussen@wur.nl; theses Pharmacology and Nutrition via Rianne.Maasen@wur.nl and theses Nutrition and Health over the Lifecourse via studentdesk.hn@wur.nl

This article should:

- be recent, i.e. not be published >3 years ago
- be published in a good journal, i.e. in a Q1 (the top 25% of the journals in a subject category) journal. You can find this information on this website: <http://www.scimagojr.com/journalrank.php>. Choose a relevant subject category such as for example 'Nutrition and Dietetics', 'Internal Medicine', 'Medicine', or 'Aging'.
- not be a review article
- not be similar in content to the thesis
- preferably have a study design different from that used in the thesis

The student suggests a scientific paper that fulfils to these guidelines and he/she wants to use for this purpose. This paper will be proposed to the thesis supervisor who needs give approval on suitability of the paper.

As a preparation for the discussion of this article, the student will write a brief (max 1 A4) comment of this article, including strong and weak points. Topics covered in this comment are; motive, questions, population, methods, execution, data collection, data analyses, results and tables, interpretation and discussion.

No later than 1 week before the oral examination, the student should hand in the following items at the respective secretary* :

- thesis report (2 hardcopies)
After the oral exam, one hard copy is for the archive of the student secretariat, the other copy will be returned at the end of the oral examination.
- pdf file of the thesis report (send per e-mail to studentdesk.hn@wur.nl)
- summary of the thesis presentation (2 hardcopies)
- comments on the article (2 hardcopies)
- the article (2 hardcopies)
- list of presentations attended (2 hardcopies)

The student should bring his/her own copy of all above mentioned items to the oral exam!

The secretary will provide these items to both the examiner and the second examiner. The supervisor is responsible for providing the examiner in time with the partially completed (A/B/C) assessment form.

14. Assessment

The thesis assessment at the division of Human Nutrition is based on the Wageningen University thesis assessment procedure as prepared by the educational institute. A copy of the assessment form can be found in appendix 2.

The grading scale is: 1, 2 .. 6, 6.5, 7.0, 7.5, 8.0, 8.5, 9.0, 9.5, 10.0 .

Grade 9.0 is given for excellent work. Grades 9.5 or 10.0 are given to <<1% of the theses. Appendix 3 includes an assessment tool called a Rubric that you can use as a guideline for calculating your thesis grade.

The final assessment is based on the following three items:

- Research competence (A) and Thesis report (B)
- Thesis presentation (C)
- Oral examination (D)

You need to achieve a grade of at least 5.5 for both categories 'Research competence' and 'Thesis report' in order to pass an MSc thesis project. The other two categories cannot yet be evaluated, but they should also be satisfactory at the end of the thesis project in order to achieve a pass grade.

For the chair groups Nutrition and Health over the Lifecourse, Nutrition and Disease, and Sensory Science and Eating Behaviour weights of each item are:

- A) Practical performance: 30%
- B) Thesis report: 60%
- C) Colloquium: 5%
- D) Examination: 5%

For the chair groups Nutrition and Pharmacology and Nutrition Metabolism and Genomics practical performance is weighted a bit heavier and weights of each item are:

- A) Practical performance: 40%
- B) Thesis report: 50%
- C) Colloquium: 5%
- D) Examination: 5%

Parts A and B are set by the supervisor and coach.

Part A assesses the practical research skills of the student.

Part B assesses the research protocol, scientific performance and the written report. During an oral examination by the examiner, the examiner could modify the grade for scientific performance by 0.5 point (up or down).

Part C is judged by the staff members present during the presentation (excluding the supervisor), see previously.

Part D is either judged by the examiner and second examiner or by the supervisor and coach (see chapter 12).

15. Finish

After the completed assessment form has been handed in to the student secretariat (Lyda de Jong) either by the supervisor or the examiner, the student secretariat will register the grade with the Student Service Centre (SSC), the student doesn't have to register at SSC-online for the thesis or thesis-examination.

Evaluation of the thesis

Following the assessment, Wageningen University will send you a link to an online evaluation questionnaire. Please complete this, even if your work has finished. The results of the questionnaires help us to improve the quality of the thesis supervision and organisation, and to identify potential (or actual) problems. The evaluation is anonymous.

Note

The MSc thesis cannot be completed successfully unless the supervisor/coach has approved that literature and data collection is documented in a proper way and handed over to the supervisor, and the working place is cleaned up. Of course, keys or copy/print cards that were provided to the student have to be returned to the student secretariat.

Appendix 2: Thesis Assessment form

Master Thesis evaluation Wageningen University - Human Nutrition (HNE)			
Fill out the single lined fields. Use a comma or a point as decimal sign, depending on the language chosen.			
Name chair group	Nutrition and Health over the Life Course (prof. E Feskens)		
Name student			
Registration number			
Study programme			
Specialisation			
Code thesis	HNE- 8		
Short title thesis			
Date examination		Signature	
Supervisor(s)			
Examiner (chair group holder)	Prof. E. Feskens		
Second reviewer			
		grade (1-10)	relative weight
A) Research competence (practical performance)			30%
Commitment and perseverance			
Initiative and creativity			
Independence			
Efficiency in working with data			
Handling supervisor's comments and development of research skills			
Keeping to the time schedule			
B) Thesis report			60%
Relevance research, clearness goals, delineation research			
Theoretical underpinning, use of literature			
Use of methods and data			
Critical reflection research performed (discussion)			
Clarity of conclusions and recommendations			
Writing skills			
C) Colloquium			5%
Graphical presentation			
Verbal presentation and defence			
D) Examination			5%
Defence of the thesis			
Knowledge of study domain			
	<i>mark before oral examination</i>	0.00	
	TOTAL	0.00	
	FINAL GRADE	0.0	

Appendix 3: Rubric for assessment of MSc-thesis

Rubric for assessment of MSc-thesis

Author: Arnold F. Moene, Meteorology and Air Quality Group, Wageningen University

Version: 1.1 (December 15, 2010)

This document is released under the Creative Commons Attribution-Noncommercial-Share Alike 3.0 Netherlands License



Item	Mark for item					
	2-3	4-5	6	7	8	9-10
1. Research competence (30-60%) *						
1.1. Commitment and perseverance	Student is not motivated. Student escapes work and gives up regularly	Student has little motivation. Tends to be distracted easily. Has given up once or twice	Student is motivated at times, but often, sees the work as a compulsory task. Is distracted from thesis work now and then.	The student is motivated. Overcomes an occasional setback with help of the supervisor.	The student is motivated and/or overcomes an occasional setback on his own and considers the work as his "own" project.	The student is very motivated, goes at length to get the most out of the project. Takes complete control of his own project. Considers setbacks as an extra motivation.
1.2. Initiative and creativity	Student shows no initiative or new ideas at all.	Student picks up some initiatives and/or new ideas suggested by others (e.g. supervisor), but the selection is not motivated.	Student shows some initiative and/or together with the supervisor develops one or two new ideas on minor parts of the research.	Student initiates discussions on new ideas with supervisor and develops one or two own ideas on minor parts of the research.	Student has his own creative ideas on hypothesis formulation, design or data processing.	Innovative research methods and/or data-analysis methods developed. Possibly the scientific problem has been formulated by the student.
1.3. Independence	The student can only perform the project properly after repeated detailed instructions and with direct help from the supervisor.	The student needs frequent instructions and well-defined tasks from the supervisor and the supervisor needs careful checks to see if all tasks have been performed.	The supervisor is the main responsible for setting out the tasks, but the student is able to perform them mostly independently	Student selects and plans the tasks together with the supervisor and performs these tasks on his own	Student plans and performs tasks mostly independently, asks for help from the supervisor when needed.	Student plans and performs tasks independently and organizes his sources of help independently.
	No critical self-reflection at all.	No critical self-reflection at all.	Student is able to reflect on his functioning with the help of the supervisor only.	The student occasionally shows critical self-reflection.	Student actively performs critical self-reflection on some aspects of his functioning	Student actively performs critical self-reflection on various aspects of his own functioning and performance.
1.4. Efficiency in working with data Note: depending on the characteristics of the thesis work, not all three aspects (experimental work, data analysis and model development)	Experimental work Student is not able to setup and/or execute an experiment.	Student is able to execute detailed instructions to some extent, but errors are made often, invalidating (part of) the experiment.	Student is able to execute an experiment that has been designed by someone else (without critical assessment of sources of error and uncertainty).	Student is able to execute an experiment that has been designed by someone else. Takes sources of error and uncertainty into account in a qualitative sense.	Student is able to judge the setup of an existing experiment and to include modifications if needed. Takes into account sources of error and uncertainty quantitatively.	Student is able to setup or modify an experiment exactly tailored to answering the research questions. Quantitative consideration of sources of error and uncertainty. Execution of the experiment is flawless.
	Data analysis Student is lost when using data. Is not able to use a spreadsheet program or any	Student is able to organize the data, but is not able to perform checks and/or simple analyses	Student is able to organize data and perform some simple checks; but the way the data are used does not clearly contribute to answering of the	Student is able to organize the data, perform some basic checks and perform basic analyses that contribute to the research question	Student is able to organize the data, perform commonly used checks and perform some advanced analyses on the data	Student is able to organize the data, perform thorough checks and perform advanced and original analyses on the data.

Item	Mark for item					
	2-3	4-5	6	7	8	9-10
may be relevant and some may be omitted	other appropriate data-processing program.		research questions and/or he is unable to analyze the data independently.			
	Model development Student is not able to make any modification/addition to an existing model.	Student modifies an existing model, but errors occur and persist. No validation.	Student is able to make minor modifications (say a single formula) to an existing model. Superficial validation or no validation at all.	Student is able to make major modifications to an existing model, based on literature. Validation using some basic measures of quality.	Student is able to make major modifications to an existing model, based on literature or own analyses. Validation using appropriate statistical measures.	Student is able to develop a model from scratch, or add an important new part to an existing model. Excellent theoretical basis for modelling as well as use of advanced validation methods.
1.5. Handling supervisor's comments and development of research skills	Student does not pick up suggestions and ideas of the supervisor	The supervisor needs to act as an instructor and/or supervisor needs to suggest solutions for problems	Student incorporates some of the comments of the supervisor, but ignores others without arguments	Student incorporates most or all of the supervisor's comments.	Supervisor's comments are weighed by the student and asked for when needed.	Supervisor's comments are critically weighed by the student and asked for when needed, also from other staff members or students.
	Knowledge and insight of the student (in relation to the prerequisites) is insufficient and the student is not able to take appropriate action to remedy this	There is some progress in the research skills of the student, but suggestions of the supervisor are also ignored occasionally.	The student is able to adopt some skills as they are presented during supervision	The student is able to adopt skills as they are presented during supervision and develops some skills independently as well	The student is able to adopt new skills mostly independently, and asks for assistance from the supervisor if needed.	The student has knowledge and insight on a scientific level, i.e. he explores solutions on his own, increases skills and knowledge where necessary.
1.6. Keeping to the time schedule	Final version of thesis or colloquium more than 50% of the nominal period overdue without a valid reason (force majeure)	Final version of thesis or colloquium at most 50% of the nominal period overdue (without a valid reason).	Final version of thesis or colloquium at most 25% of nominal period overdue (without valid reason)	Final version of thesis or colloquium at most 10% of nominal period overdue (without valid reasons)	Final version of thesis or colloquium at most 5% of nominal period overdue (without good reasons)	Final version of thesis and colloquium finished within planned period (or overdue but with good reason).
	No time schedule made.	No realistic time schedule.	Mostly realistic time schedule, but no timely adjustment of time schedule.	Realistic time schedule, with some adjustments (but not enough or not all in time) in times only.	Realistic time schedule, with timely adjustments. of times only.	Realistic time schedule, with timely adjustments of both time and tasks.
2. Thesis report (30-60%) *						
2.1. Relevance research, clearness goals, delineation research	No link is made to existing research on the topic. No research context is described.	The context of the topic at hand is described in broad terms but there is no link between what is known and what will be researched.	The link between the thesis research and existing research does not go beyond the information provided by the supervisor.	Context of the research is defined well, with input from the student. There is a link between the context and research questions.	Context of the research is defined sharply and to-the-point. Research questions emerge directly from the described context.	Thesis research is positioned sharply in the relevant scientific field. Novelty and innovation of the research are indicated.
	There is no researchable research question and the delineation of the research is	Most research questions are unclear, or not researchable and the delineation of the	At least either the research questions or the delineation of the research are clear	The research questions and the delineation are mostly clear but could have been defined	The research questions are clear and researchable and the delineation is clear.	The research questions are clear and formulated to-the-point and limits of the research

Item	Mark for item					
	2-3	4-5	6	7	8	9-10
	absent	research is weak		sharper at some points		are well-defined.
2.2. Theoretical underpinning, use of literature	No discussion of underlying theory.	There is some discussion of underlying theory, but the description shows serious errors.	The relevant theory is used, but the description has not been tailored to the research at hand or shows occasional errors.	The relevant theory is used, and the description has been tailored partially successful to the research at hand. Few errors occur.	The relevant theory is used, it is nicely synthesized, and it is successfully tailored to the research at hand.	Clear, complete and coherent overview of relevant theory on the level of an up-to-date review paper. Exactly tailored to the research at hand.
	No peer-reviewed/primary scientific papers in reference list except for those already suggested by the supervisor	Only a couple of peer-reviewed papers in reference list.	Some peer-reviewed papers in reference list but also a significant body of grey literature.	Relevant peer-reviewed papers in reference list but also some grey literature or text books. Some included references less relevant.	Mostly peer-reviewed papers or specialized monographs in reference list. An occasional reference may be less relevant.	Almost exclusively peer-reviewed papers in reference list or specialized monographs (not text books). All papers included are relevant.
2.3. Use of methods and data	No description of methods and/or data.	Research is not reproducible due to insufficient information on data (collection and/or treatment) and analysis methods	Some aspects of the research regarding data-collection, data-treatment, models or the analysis methods are described insufficiently so that that particular aspect of the research is not reproducible.	Description of the data (collection, treatment) or models as well as the analysis methods used is lacking in a number of places so that at most a more or less similar research could be performed.	Description of the data (collection, treatment) or models as well as the analysis methods used is mostly complete, but exact reproduction of the research is not possible due to lack of some details.	Description of the data (collection, treatment) or models as well as the analysis methods is complete and clear so that exact reproduction of the research is possible.
2.4. Critical reflection on the research performed (discussion)	No discussion and/or reflection on the research. Discussion only touches trivial or very general points of criticism.	Only some possible weaknesses and/or weaknesses which are in reality irrelevant or non-existent have been identified.	Most weaknesses in the research are indicated, but impacts on the main results are not weighed relative to each other.	Most weaknesses in the research are indicated and impacts on the main results are weighed relative to each other.	All weaknesses in the research are indicated and weighed relative to each other. Furthermore, (better) alternatives for the methods used are indicated.	Not only all possible weaknesses in the research are indicated, but also it is indicated which weaknesses affect the conclusions most.
	No confrontation with existing literature.	Confrontation with irrelevant existing literature.	Only trivial reflection vis-a-vis existing literature.	Only most obvious conflicts and correspondences with existing literature are identified. The value of the study is described, but it is not related to existing research.	Minor and major conflicts and correspondences with literature are shown. The added value of the research relative to existing literature is identified.	Results are critically confronted with existing literature. In case of conflicts, the relative weight of own results and existing literature is assessed. The contribution of his work to the development of scientific concepts is identified.
2.5. Clarity of conclusions and recommendations	No link between research questions, results and conclusions.	Conclusions are drawn, but in many cases these are only partial answers to the research question. Conclusions merely repeat results.	Conclusions are linked to the research questions, but not all questions are addressed. Some conclusions are not substantiated by results or merely repeat results.	Most conclusions well-linked to research questions and substantiated by results. Conclusions are mostly formulated clearly but with some vagueness in wording.	Clear link between research questions and conclusions. All conclusions substantiated by results. Conclusions are formulated exact.	Clear link between research questions and conclusions. Conclusions substantiated by results. Conclusions are formulated exact and concise. Conclusions are

Item	Mark for item					
	2-3	4-5	6	7	8	9-10
						grouped/ordered in a logical way.
	No recommendations given.	Recommendations are absent or trivial.	Some recommendations are given, but the link of those to the conclusions is not always clear.	Recommendations are well-linked to the conclusions.	Recommendations are to-the-point, well-linked to the conclusions and original.	Recommendations are to-the-point, well-linked to the conclusions, original and are extensive enough to serve as project description for a new thesis project.
2.6. Writing skills	Thesis is badly structured. In many cases information appears in wrong locations. Level of detail is inappropriate throughout.	Main structure incorrect in some places, and placement of material in different chapters illogical in many places. Level of detail varies widely (information missing, or irrelevant information given).	Main structure is correct, but lower level hierarchy of sections is not logical in places. Some sections have overlapping functions leading to ambiguity in placement of information. Level of detail varies widely (information missing, or irrelevant information given).	Main structure correct, but placement of material in different chapters illogical in places. Level of detail inappropriate in a number of places (irrelevant information given).	Most sections have a clear and unique function. Hierarchy of sections is mostly correct. Ordering of sections is mostly logical. All information occurs at the correct place, with few exceptions. In most places level of detail is appropriate.	Well-structured: each section has a clear and unique function. Hierarchy of sections is correct. Ordering of sections is logical. All information occurs at the correct place. Level of detail is appropriate throughout.
	Formulations in the text are often incorrect/inexact inhibiting a correct interpretation of the text.	Vagueness and/or inexactness in wording occur regularly and it affects the interpretation of the text.	The text is ambiguous in some places but this does not always inhibit a correct interpretation of the text.	Formulations in text are predominantly clear and exact. Thesis could have been written more concisely.	Formulations in text are clear and exact, as well as concise.	<i>Textual</i> quality of thesis (or manuscript in the form of a journal paper) is such that it could be acceptable for a peer-reviewed journal.
3. Colloquium (5%) *						
3.1. Graphical presentation	Presentation has no structure.	Presentation has unclear structure.	Presentation is structured, though the audience gets lost in some places.	Presentation has a clear structure with only few exceptions.	Presentation has a clear structure. Mostly a good separation between the main message and side-steps.	Presentation clearly structured, concise and to-the-point. Good separation between the main message and side-steps.
	Unclear lay-out. Unbalanced use of text, graphs, tables or graphics throughout. Too small font size, too many or too few slides.	Lay-out in many places insufficient: too much text and too few graphics (or graphs, tables) or vice versa.	Quality of the layout of the slides is mixed. Inappropriate use of text, tables, graphs and graphics in some places.	Lay-out is mostly clear, with unbalanced use of text, tables, graphs and graphics in few places only.	Lay-out is clear. Appropriate use of text, tables, graphs and graphics.	Lay-out is functional and clear. Clever use of graphs and graphics.
3.2. Verbal presentation and defense	Spoken in such a way that majority of audience could not follow the presentation.	Presentation is uninspired and/or monotonous and/or student reads from slides: attention of audience not captured	Quality of presentation is mixed: sometimes clear, sometimes hard to follow.	Mostly clearly spoken. Perhaps monotonous in some places.	Clearly spoken.	Relaxed and lively though concentrated presentation. Clearly spoken.

Item	Mark for item					
	2-3	4-5	6	7	8	9-10
	Level of audience not taken into consideration at all.	Level of audience hardly taken into consideration.	Presentation not at appropriate level of audience.	Level of presentation mostly targeted at audience.	Level of presentation well-targeted at audience. Student is able to adjust to some extent to signals from audience that certain parts are not understood.	Clear take-home message. Level well-targeted at audience. Student is able to adjust to signals from audience that certain parts are not understood.
	Bad timing (way too short or too long).	Timing not well kept (at most 30% deviation from planned time).	Timing not well kept (at most 20% deviation from planned time).	Timing is OK (at most 10% deviation from planned time).	Timing is OK.	Presentation finished well in time.
	Student is not able to answer questions.	Student is able to answer only the simplest questions	Student answers at least half of the questions appropriately.	Student is able to answer nearly all questions in an appropriate way.	Student is able to answer all questions in an appropriate way, although not to-the-point in some cases.	Student is able to give appropriate, clear and to-the-point answers to all questions.
4. Examination (5%) *						
4.1. Defense of the thesis	Student is not able to defend/discuss his thesis. He does not master the contents	The student has difficulty to explain the subject matter of the thesis.	Student is able to defend his thesis. He mostly masters the contents of what he wrote, but for a limited number of items he is not able to explain what he did, or why.	Student is able to defend his thesis. He masters the contents of what he wrote, but not beyond that. Is not able to place thesis in scientific or practical context.	Student is able to defend his thesis, including indications where the work could have been done better. Student is able to place thesis in either scientific or practical context.	Student is able to freely discuss the contents of the thesis and to place the thesis in the context of current scientific literature and practical contexts.
4.2. Knowledge of study domain	Student does not master the most basic knowledge (even below the starting level for the thesis).	The student does not understand all of the subject matter discussed in the thesis.	The student understands the subject matter of the thesis on a textbook level.	The student understands the subject matter of the thesis including the literature used in the thesis.	Student is well on top of subjects discussed in thesis: not only does he understand but he is also aware of current discussions in the literature related to the thesis topic.	Student is well on top of subjects discussed in thesis: not only does he understand but he is also aware of discussions in the literature beyond the topic (but related to) of the thesis.

Appendix 4: Guideline and examples for writing an MSc thesis proposal

Introduction

During the first 3-4 weeks of the thesis period a research protocol must be prepared. The protocol reflects the work done during the preparation phase and also constitutes the basis for the thesis. A carefully designed, well-thought-out protocol is an important prerequisite for the success of any project. Therefore, the concept and definite protocol need to be discussed with the daily supervisor and the coaching teacher. The protocol includes a clear and concise description of the essence of the project (2-3 pages), but could also be more extended, varying per project and per supervisor. On the following pages you can find two examples: a short one and a more extensive one.

Designing the protocol

The protocol clearly states the title of the thesis, the names of the supervisors and your motivation for choosing this specific thesis. Furthermore, you should clearly describe the relevance of the study, the specific research questions and sub-questions, and the main hypothesis. Also, you should describe the design of the study, the number of subjects and how they were selected, the materials and methods you are going to use, how you plan to analyse the data and the expected results. Finally, you must state the time period for the thesis with a global time schedule, as well as the reference list of cited literature. The protocol generally has the following basic structure, although you may arrange it differently after discussing this with your supervisor(s):

Title page:

- Title of research project and/or thesis
- Student name (incl. reg.nr.)
- Main supervisor (final responsibility) and daily supervisor
- Chair group name
- Date/ period of thesis
- Optional: illustration relevant to the subject

Preface

- Personal statement , brief motivation on choice of subject
- Relation of subject to personal objectives and aims

Background of the thesis/Introduction:

- Scientific background
- Objective of the study
- Study question, hypothesis and expected results

Design of the thesis:

- Subjects
- Materials and methods, design of the study
- Data analysis

Project planning

Literature references

The association of dietary fat including fatty acids and their sources with visceral fat accumulation

<Name and student number>

<Date>

<Supervisor(s):>

Wageningen University

Division of Human Nutrition

Contents

1. Preface:	27
2. Introduction:	28
Total fat	28
Fatty acids	29
Dietary sources of fatty acids	29
Other macronutrients	29
Holistic approaches	30
Proposal	30
3. Objective:	30
Primary objective	30
Secondary and explorative objectives	30
4. Hypotheses:	30
5. Methods:	31
Participants:	31
Dietary intake:	31
Dutch healthy diet –index	31
Measures of body fat	32
Physical activity	32
Statistical analysis:	32
Dependent variables	33
Exposures	33
Confounding and effect modification	34
Crude nutrient models	35
Nutrient exchange models	36
Full models	37
Reporting and interpretation	37
6. Tables	39
7. Period of thesis:	42
8. Project planning:	42
Period of thesis:	42
9. References	43

1. Preface:

The epidemic of obesity is one of the most important problems of our times. As a future physician and epidemiologist, this is a great opportunity to get to know more about the causes and consequences of obesity, which I am sure I can use of benefit in where ever I will work. Hereby I would like to share some thoughts about obesity that I have gained during the past years:

After finishing high school, I worked some years in Mc Donald's as a waitress. I could see obese people eating huge amounts of unhealthy food. I remember it didn't make sense to me. Why would all those unhealthy people, who certainly know that it is bad for them to eat fast food regularly, still keep repeating the unhealthy behaviour?

Later on, while studying in Medical school I took part in IFMSA (International Federation of Medical Students' Associations) – Public Health committee – workshops and meetings around the world. Once we had a general assembly in Baltimore, USA. Besides learning public health in the conference, the stereotype of America hit me, as I observed how big everything was: the highways, portions of food, and people. On the other hand I noticed the lack of bicycles on the streets and vegetables for lunch. Once again I had the feeling that the obesity was partly out of the hands of an individual.

On the other hand, what else could I expect to encounter in America! Well, afterwards, as a part of a public health program in the Medical school, I attended a one month field visit in Sumbawanga, Tansania. Although I knew the concept *double burden of malnutrition* before, it suddenly became real to me that obesity and metabolic diseases were among the most common problems in the local healthcare centre! I got more interested in understanding the problem in its complexity.

Now, studying the Master of Nutrition and Health in Wageningen, I have got to understand how researchers in the field have an important task to provide evidence for the people in charge of the food and lifestyle related policies. In order to change the food culture and the prevalence of obesity, well designed and performed research on the topic must be done.

Nutrition and life-style are recognised as a major reason for obesity,[1] but the factors contributing specifically in visceral fat accumulation, which shows a specially strong link with the metabolic diseases, are unclear.[1, 2] Thus, I would be happy to study the link between diet and visceral fat, being an ex- burger fryer, especially the fatty acids are close to my heart (hopefully not literally!). On top of the fatty acids, I am looking forward to look at the association between Dutch Healthy Diet – index with VAT. As a foreigner living in the Netherlands, it would be personally really interesting to get to know and study the Dutch food recommendations and culture better.

As many of the previous observational studies performed about the link between diet and visceral fat have had rather small sample sizes, [2] I believe with this large population of 2580 participants, valid associations could be found! Moreover, I love to play with data, so I am looking forward to practice modelling with a large dataset like this!

2. Introduction:

Visceral adipose tissue (VAT), distinguished from subcutaneous abdominal adipose tissue (SAAT), generally refers to omental, mesenteric, pre- and retroperitoneal adipose tissue.[1] According to current scientific judgement, VAT is associated with various metabolic changes which increase the risk for chronic metabolic diseases.[1, 3-5] Key metabolic VAT correlates include hyperglycaemia, hyperinsulinemia, hypertriglyceridemia, hypercholesterolemia, lower levels of HDL, hypertension and systemic inflammation.[1, 5] Also comorbidities like type 2 diabetes, CHD, stroke, sleep apnoea and colorectal cancer are related to VAT, usually shown in each level of total adiposity [1]. For the prevention and treatment of metabolic diseases it is essential to study the reasons of VAT accumulation.

The current data suggests that where SAAT is predominantly affected by caloric changes in diet, VAT is also affected by isocaloric changes in dietary composition.[2] Anyhow, the studies performed on the topic in general have had rather small samples sizes and various methods. Thus the evidence regarding specific nutrients and VAT is limited.[2]

Total fat

The studies on the relation between the energy% from dietary fat and general body fatness show contradicting results.[6] In recent RCTs it seems like high fat contents of the diet compared to low fat diet would lead to weight loss, but some of the studies are suspected to be biased.[6] Also, many ecological data from observational studies have found opposite results.[6] Recently visceral fat as an outcome has been the focus of interest, also without consensus.[2] An RCT compared a diet with no fat limitations to two fat-reduced diets (fat 30%E) of either high-protein or high-carbohydrate contents, and found a reduction in VAT in both fat reduced diets.[7] Moreover, one crossover study found a positive association between total dietary fat and VAT,[8] but many other observational and clinical studies didn't find any results.[9-14]

The methods of the studies on dietary fat and VAT vary and have several limitations. In the RCT that found an effect, DXA was used to estimate the VAT quantity, [7] so it cannot be counted on as much as the studies with standard CT/MRI as a screening method.[8] Some of the studies, including the crossover study with an observed association, used absolute amounts of nutrients instead of nutrient densities or residuals in the models[8-11], so the results are not interpretable in relation to the energy requirement of a person. Some didn't account for total energy as a confounder [10, 12], so the results might be biased in either direction depending on whether total energy was a positive or negative predictor for VAT in the study. One of them didn't adjust for any non-dietary covariates [10], so at least age and sex probably have biased the results. A longitudinal study examined an association between dietary components' change over time and VAT, but the change in most of the nutrients was statistically not significant and clinically very small, so not many conclusions could be drawn.[13]

Fatty acids

WHO and FAO report in 2010 that dietary fatty acids are strongly linked together with many metabolic outcomes.[6] There is convincing evidence that replacing SFA with PUFA decreases the risk of coronary heart disease,[6, 15] the LDL cholesterol levels as well as the total/HDL levels.[6] Also, an increase in TFA intake, in comparison to SFA, cis MUFA or PUFA intake, increases the coronary heart disease events.[6] Evidence on the relation between fatty acids and diabetes as well as metabolic syndrome components is also described probable.[6] Anyhow, the evidence on the association between fatty acids and VAT is insufficient.[2, 6]

One recent clinical double blinded RCT found a two times larger increase in VAT in a group that was overfed SFA compared to a group overfed PUFA.[16] Then again, another RCT studying high-PUFA diet in comparison to more general low-PUFA diet,[17] a 349 persons cross-sectional[11] and a 1114 participants longitudinal study[9], failed to find an association for the types of fatty acid and VAT.

However, in order to get interpretable results, it seems important to compare specific nutrients to each other, like the first mentioned RCT did. In an observational study it would mean to use nutrient exchange models, what has not been usually done. The longitudinal study used a model with no dietary adjustments, so it was basically comparing the effect of PUFA, MUFA and SFA to eating everything else.[9] The cross sectional study then again, added all studied fatty acids and an adjustment for non-fat energy in the model, so the results could be interpreted as in comparison to eating nothing.[11] Also results from animal studies are in line with the idea of comparing specific nutrients, showing a decrease in body fat accumulation when PUFA-rich diet was compared to SFA-rich diet.[16]

Dietary sources of fatty acids

Another factor that shows a relation with VAT in some studies, is the dietary source of fat. A cross sectional study of 583 people that examined 133 nutrients with PCA and PLS techniques suggests that n-6 PUFA arachidonic acid and eicosadienoic acid from meat could be causal agents in their positive association with VAT.[18] It also reports that short chain fatty acids (SCFA) and medium chain fatty acids (MCFA) found from milk fat were negatively associated with VAT in women.[18] This is in line with the studies investigating the relationship between SFA and other metabolic outcomes. SFA from processed and red meat sources have been associated with increased mortality and risk of cancer.[15] Moreover, in a large case-control study, even-chain SFA were positively associated with type 2 diabetes, whereas odd chain SFA, which seem to be an accurate biomarker of dairy, were inversely associated with type 2 diabetes.[19] In a pooled analysis of 11 cohorts, it was found that a replacement of SFA with MUFA increased the risk of myocardial infarction, but the primary source of MUFA was animal fat and the separation for dietary sources was not done.[15]

Other macronutrients

One RCT found a reduction of VAT in women following low glycaemic load -diet compared to a high glycaemic load -diet.[20] Other studies on carbohydrates and also on proteins didn't usually find any associations and mostly they faced the same problems in methodology as dietary fat.[7-13, 18, 21]

Only fibre seems to have a consensus: it is shown to have a negative association with VAT by many studies.[2, 9, 13, 18]

Holistic approaches

Besides studying single nutrients, also more holistic approaches taking dietary patterns into account are applied. They have succeeded to find inverse associations between healthy diet patterns for participants that followed 2005 Dietary Guidelines for Americans[22], those having a high Mediterranean diet score[23] and those in “healthy foods” cluster.[2]

Proposal

In general, the study populations and power of the studies examining dietary composition and VAT accumulation have often been small [8-12, 21] and the methods have had above described limitations. The meta-analysis 2015 requests more research on topic.[2] In the present analysis, we propose an epidemiological cross-sectional approach to study the association with fat contents of the diet and VAT. No observational study before has used the fat substitution models to study the comparison of SFA and PUFA, and no study has looked at TFA before. Dividing the fatty acids into their dietary sources (milk, meat, plant, fish) is also a novel approach in VAT research. Moreover, carbohydrates, protein and fibre as well as Dutch Healthy Diet index (DHD-index) would be examined. These all together would add new information to the overall evidence on the association between dietary composition and visceral fat accumulation. The study is larger than any study on the link between fat and VAT before, and thus it has a strong power (n=2580) to perform subgroup analyses and find valid associations.

3. Objective:

Primary objective

1. To investigate the association between the dietary fat including type of fatty-acids and their dietary sources (meat, dairy, plant, fish) with the visceral fat accumulation.

Secondary and explorative objectives

2. To investigate the cross-sectional association between the other macronutrient contents of the diet and visceral fat accumulation.
3. To investigate the cross-sectional association between the Dutch Healthy Diet –index and visceral fat accumulation.
4. To investigate whether the associations differ between men and women.

4. Hypotheses:

1. There are differences in the relations between type of fatty acids and visceral fat accumulation.
2. There are differences in the relations between fatty acids dietary sources and visceral fat accumulation.
3. There are differences in the relations between macronutrient contents of the diet and visceral fat accumulation.
4. The relations between the nutrients and visceral fat accumulation are sex specific.

5. Methods:

The analysis will be carried out by using data from The NEO (The Netherlands Epidemiology of Obesity) study. The NEO study is a population-based, prospective cohort study which started in 2008 and is designed to investigate pathways that lead to obesity-related diseases. The Medical Ethical Committee of the Leiden University Medical Center (LUMC) approved the design of the study and the participants gave their written consent for the study.

The literature study about dietary factors and VAT accumulation will be carried out by searching internet (PubMed).

Participants:

The NEO study includes 6673 individuals aged 45-65, of which 2580 the abdominal fat mass is assessed by MRI. The participants were recruited from the Leiden area in the West of the Netherlands via GPs, municipality registries, posters in public areas and advertisements in local newspapers. Only participants with BMI of 27 kg/m² or higher were invited to the study, apart from one municipality (Leiderdorp), from which all people regardless of their BMI were invited. All questionnaires were sent to home for all participants. A general questionnaire included questions about demographics, lifestyle and clinical information.[24] The following participants will be excluded from the analyses:

- Impossible Energy Intake: Basal Metabolic Rate (EI:BMR <1.1 [25]). BMR will be calculated by the WHO formula based on height, weight and sex [26].
- Missing values for baseline dietary intake for the variables being studied

Dietary intake:

Dietary intake was estimated with a semi-quantitative FFQ (Food frequency questionnaire), originally designed for studying fatty acids [27] and validated in the Dutch general population.[28] Moreover, two 24-hour recalls were performed in a random subsample of 110 men and 119 women and urinary nitrogen was measured in all participants for calibrating the FFQ results in the study population.

Some people may have changed their diet due to getting sick or obese and thus the study might be susceptible to bias. In order to investigate if that is the case, sensitivity analyses with an exclusion of the following participants will be conducted:

- Diagnosed type 1 or type 2 Diabetes Mellitus or using diabetes medication
- Following an energy restrictive or disease related diet

Dutch healthy diet -index

The DHD-index is a continuous score, representing the Dutch Guidelines for Healthy diet of 2006.[29] [30]. An adapted version of the DHD- index with eight components instead of original ten is used in our study, because of absent of two components: Acidic drinks and food and sodium consumption. The components included in the study contain information about physical activity, vegetable, fruit, fish (=EPA+DHA), fibre, SFA, TFA and alcohol consumption. Alcohol consumption was scored sex-specifically. Each components gets points from 0 to 10, thus giving the index the score from 0-80 in our study. The higher the score, the higher the adherence to the Dutch Guidelines for a Healthy Diet.

Measures of body fat

Magnetic resonance imaging (MRI) of abdominal fat at the L5 level was performed in a random sub-sample of 2580 participants. VAT and SAAT were estimated using a turbo spin echo imaging protocol. Three transverse images of 10mm thickness per participant were obtained during a breath-hold.[24]

Bioelectrical impedance analysis (=BIA, TBF-310, Tanita International Division, UK) was used to measure body weight (BW) and percent body fat (TBF). All participants were measured, without shoes and one kilogram was subtracted to take the extra weight caused by clothing into account. Height was measured with a vertically fixed, calibrated tape measure and BMI was calculated by dividing weight in kilograms by the height in meters squared. Also, waist circumference with 0,1 cm precision was measured with a horizontally placed tape measure, mid-way between the lower costal margin and the iliac crest.[24]

Dual-energy X-ray (DXA) was used to estimate the total fat mass (FM) and lean body mass (FFM) in 916 participants.[24]

Physical activity

Physical activity (PA) was assessed from all participants by using the Short questionnaire to Assess Health-enhancing physical activity (SQUASH). It measures the physical activity level over the past four weeks and is previously validated tool in the Dutch population.[31, 32]

Statistical analysis:

The statistical analysis of the data will be carried out using the statistical software program STATA. In the analysis the cross-sectional data from the baseline measurements in the NEO study is used. In order to be able to extrapolate the results in the Dutch general population, the study population will be weighed towards the BMI distribution of the general population. Normal distribution of the continuous variables is graphically estimated and in case of skewed distributions log transformation is performed.

To graphically illustrate the setting, the following directed acyclic graph (DAG) can be drawn[33]:

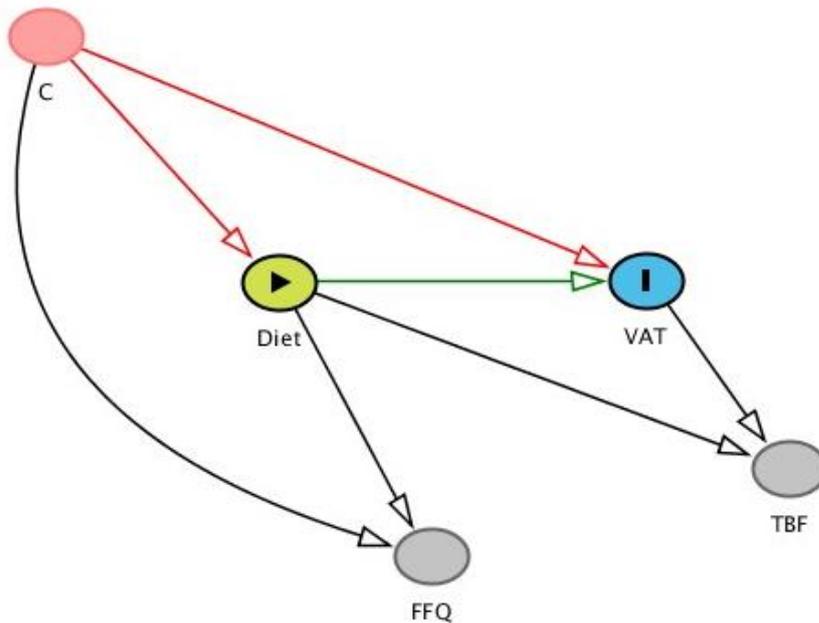


Figure 1: DAG on the relation between diet and VAT, C= confounding factors, Diet= exposure (for ex. type of fatty acid), FFQ= Food frequency questionnaire, an instrument to assess diet, TBF= total body fat.

Dependent variables

VAT as the primary interest is used as a dependent variable in all analyses. Because VAT is a part of the total adiposity of a person, it is important to understand whether a potential association is specific for VAT, or if it just reflects an association with the total adiposity. In order to account for total adiposity or total body size, a previous study used BMI or height, respectively, as an independent variable in the analysis.[18] Another study used total fat mass (FM) to account for total adiposity[11]. By using total body fat measures as independent variables anyhow, some of the variation in VAT might be lost. Thus, in our analysis, total body fat (TBF) is used as a dependent variable. Moreover, the associations with SAAT are investigated by using it as a dependent variable.

Exposures

Nutrient density method is chosen instead of crude nutrient method, since people with bigger body and bigger energy consumption need more energy and consequently more of each nutrient. (Figure2) Thus nutrient density methods will give us more relevant information. In this proposal nutrient densities are used as exposures and they are abbreviated as “nutrient En%” (for ex. SFA En%).

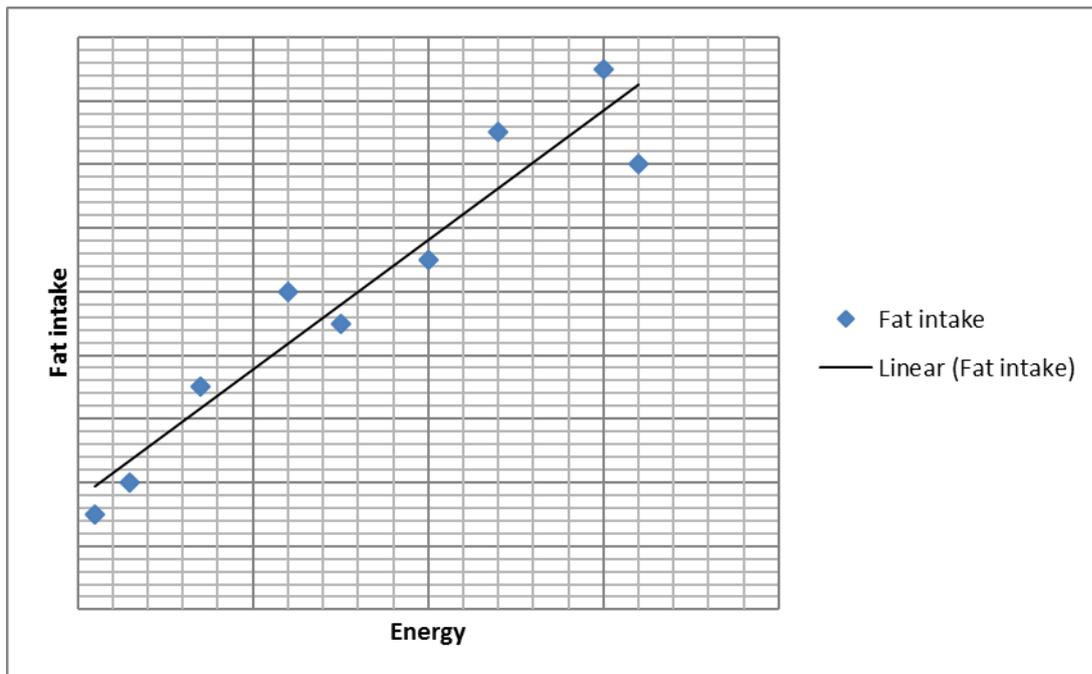


Figure2: An example of the relation between fat intake and energy intake.

Confounding and effect modification

In order to be a confounding factor, a factor should be associated with the exposure, and a risk factor of the disease occurrence, but it should not be an effect of the exposure in the causal pathway from exposure to disease. The current literature recognises several etiological factors that contribute to visceral fat accumulation: age, sex, total energy intake, ethnicity, physical activity, tobacco smoking and education level. [1, 2]

It must be noted, that the nutrient density in relation with VAT might still be confounded by the total energy intake. That can happen for example if the people in the study who gain more calories, are more likely to have an unbalanced, unhealthy diet, thus gaining more calories from fat. (Figure 3)

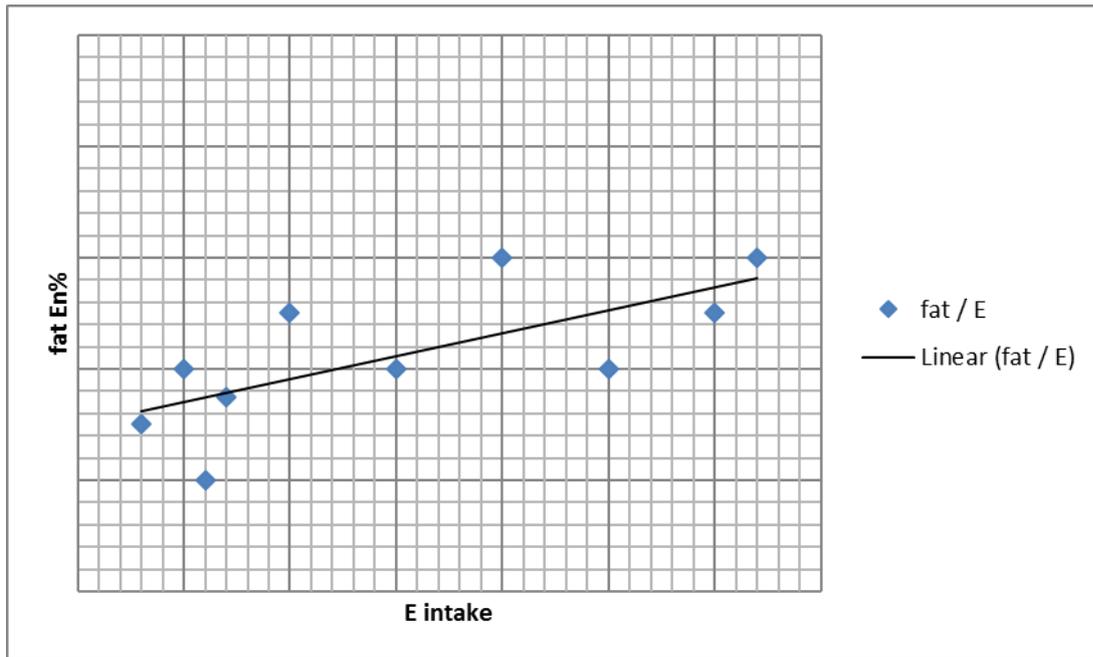


Figure 3: An example of fat density in relation to energy intake

The characteristics of the above mentioned non-dietary covariates in our study population are explored in the quartiles of the exposures (total dietary fat, SFA, TFA, PUFA, MUFA, carbohydrates, protein, DHD) as well as the outcomes (TBF, VAT and SAAT) and R^2 for trend over categories is calculated. (SFA as an example: Table 1)

For being an effect modifier, the factor should cause a distinct effect on the outcome on different values of another factor, in statistical terms there is interaction between the two factors. Age and sex are considered as potential effect modifiers in the analysis, because of there are differences in the size and location of fat mass in different ages and between men and women.[1, 2] Also physical exercise might affect the nutrient metabolism and consequently fat accumulation in the body, so PA is also considered as a potential effect modifier. (Table 2)

Linear regression models

First crude models for non-dietary variables and for the potential effect modifiers are run. According to the coefficients for the covariates some preliminary conclusions about the relevance of the non-dietary factors in the analysis can be done.(Table 2) If the term for effect modifier is significant, it will be considered further in the analysis.(Table 2)

Crude nutrient models

First, models for crude associations between nutrient densities (energy from nutrient/ total energy) and VAT accumulation are developed.

The following models will be developed. These models give us the crude association between nutrient density and VAT, other nutrients or non-dietary covariates are not yet accounted for. Additionally a crude model for DHD is developed.

- 1) VAT=fat En%
- 2) VAT=SFA En%
- 3) VAT=TFA En%
- 4) VAT=PUFA En%
- 5) VAT=MUFA En%
- 6) VAT=n6 En%
- 7) VAT=n3 En%
- 8) VAT=carbohydrates En%
- 9) VAT=protein En%
- 10) VAT= fibre En%
- 11) VAT= DHD

Nutrient exchange models

In order to compare isocaloric changes of replacing one nutrient with another, nutrient exchange models are developed.[34] First, a model to describe the association between dietary fat (E%) and visceral fat is developed. Here, the specific question asked is: Does fat compared to carbohydrate add independently to the prediction of the amount of visceral fat above and beyond total energy? Thus, dietary fat and all the other macronutrients except of carbohydrates, that is used as a comparison, are added as independent variables and total energy is added as a confounder to the model.

- 1) VAT= fat En%+ protein En%+ fibre En%+ alcohol En%+E

Next, different fatty acids as a percentage of energy are compared to each other. Now, the specific question we are asking actually is: Does the type of fat compared to another type of fat add independently to the prediction of amount of visceral fat above and beyond total dietary fat and total energy? Thus, the total fat and total energy are added to the models, with the type of fatty acid examined, and all the other fatty acids except of the one used as a comparison.[6]

With this principle, PUFA (En%) is compared to the same amount of energy from SFA (En%), MUFA (En%) is compared to the same amount of energy from SFA (En%), TFA is compared to the same amount of energy from PUFA (En%) and also against MUFA (En%). N-6 fatty acids (En%) are compared to the n-3 fatty acids (En%). As an example the model 1) comparison between PUFA (En%) and SFA (En%).

- 2) VAT= fat% En% + PUFA En%+ MUFA En%+ TFA En%+ E

Also the models to describe the dietary sources of different fatty acids are developed. For an example a model to compare MUFA from plant source to MUFA from animal source is developed. All the other fat sources but MUFA (animal) is left out.

$$3) \text{ VAT} = \text{Fat En\%} + \text{MUFA (plant) En\%} + \text{PUFA En\%} + \text{TFA En\%} + \text{SFA En\%} + E$$

Finally, by using the same principles described above, other macronutrients are studied. Protein (En%) is compared to the same amount of energy from carbohydrates (En%) and fibre is compared to the same amount of energy from carbohydrates (En%).

Full models

Then, the non-dietary covariates are added to the model one at the time. First, the accuracy of the model is improved by looking at the coefficient for the nutrient. Then, the precision of the model is improved by looking at the standard error of the model. Models are developed by following the instructions to use multivariate analysis in nutritional epidemiology for isocaloric comparisons. [34] Here as an example a model for replacing SFA (En%) with PUFA (En%) tested for age as a confounder.

$$1) \text{ VAT} = \text{fat En\%} + \text{PUFA En\%} + \text{MUFA En\%} + \text{TFA En\%} + \text{age}$$

Additionally a multivariable model for DHD-index will be developed with the same principle by adding one covariate at time to the model, first improving the accuracy which after the precision of the model. PA and energy intake are not considered, since they are already included in the index itself. Hereby an example of the full model for DHD assuming that all covariates improve the model accuracy or precision.

$$2) \text{ VAT} = \text{DHD} + \text{age} + \text{sex} + \text{ethnicity} + \text{smoking status} + \text{educational level} + \text{sleep duration} + \text{height (BMI)} + \text{age} \times \text{DHD} + \text{sex} \times \text{DHD}$$

Reporting and interpretation

The characteristics of the non-dietary covariates in our study population are reported in the quartiles of SFA. The preliminary interpretation of confounders can be done by observing the trend over categories in table 1 and by observing the coefficients and their confidence intervals in the linear models in table 2. The further from null the coefficient is, the bigger clinical relevance it possesses, and if the confidence interval does not cross the null, the coefficient is also statistically significant. When choosing coefficients to a model, confidence interval of maximum 90% can be considered.

The crude relation between the nutrients and VAT without any adjustments can be observed by looking at the coefficients and their confidence intervals in table 3. The nutrient exchange models will tell us about the crude associations between replacing a nutrient in a diet with the same amount of energy of another nutrient and are reported in table 4. Clinical relevance of the coefficients are assessed keeping an eye on the 95 % confidence interval.

Finally, the associations between the nutrients and VAT together with all relevant covariates are interpreted from table 5. Only the coefficients for the nutrients are reported. The relevant non-dietary covariates are listed in the description of the table. In the table it can also be interpreted if the associations are specific indeed for VAT or if there is even stronger association with TBF, from which the association with VAT would only construct a part.

In case of effect modification, the models are run again separately and results are reported separately for the different groups, for example for men and women in table 6.

6.Tables

Characteristics of the study population, with a mean (sd) for the continuous variables and n (percent) for categorical variables by the quartiles of the exposures and outcomes are provided.

Table1. Characteristics of the study population by the quartiles of total SFA intake :

	Q1	Q2	Q3	Q4	R ² for trend
Age (y)					
Sex (%men)					
Height (cm)					
BMI (kg/m2)					
Tobacco smoking (% never)					
Alcohol intake (% never)					
Physical activity level (% low)					
Education level (% high)					
Ethnicity (% Caucasian)					
VAT (cm³)					
SAAT (cm³)					
EI (kJ)					
Protein intake (En%)					
Carbohydrate intake (En%)					
Fat intake (En%)					
MUFA intake (En%)					
TFA intake (En%)					
PUFA intake (En%)					
Dietary cholesterol (En%)					
Alcohol intake (En%)					
Dietary fibre intake (En%)					

Table 2: The crude models for non-dietary covariates and effect modification by age, sex and PA in relation to VAT

	Beta for covariate (95% CI)
Age	
Sex	
Total Energy intake	
Physical activity	
Smoking status	
Educational level	
Sleep duration	
Ethnicity	
Effect modification by sex	
SFA	
Sex	
Sex x SFA	
Effect modification by age	
SFA	
Age	
Age x SFA	
Effect modification by PA	

SFA
PA
PA x SFA

Table 3: Crude nutrient models: the coefficients for VAT accumulation

Beta for nutrient En% (95% CI)
Fat En%
SFA En%
TFA En%
PUFA En%
MUFA En%
n6 En%
n3 En%
carb En%
prot En%
fibre En%
alco En%
DHD

Table 4: Nutrient exchange models: % of energy of one nutrient exchanged for the same amount of energy from another nutrient

Beta for the nutrient (95% CI)
Fat En% instead of carbohydrates En%
PUFA En % instead of SFA En %
MUFA En % instead of SFA En %
TFA En % instead of PUFA En %
TFA En % instead of MUFA En %
N6 En % instead of N3 En %
MUFA plant En % instead of MUFA animal En %
Protein En % instead of carbohydrates En %
Fibre En % instead of carbohydrates En %

Table 5: An example: The coefficients for nutrient exchange models adjusted for all relevant covariates including age, sex, education, physical activity, total energy intake, and effect modification by sex for fat and PUFA/ SFA models.

	VAT Beta for the nutrient (95% CI)	TBF Beta for the nutrient (95% CI)
Fat En % instead of carb En %		
Fat		
Protein		
Fibre		
Alcohol		
PUFA En % instead of SFA En %		
Fat		
PUFA		
MUFA		
TFA		
MUFA En % instead of SFA En %		
Fat		
MUFA		
PUFA		
TFA		
TFA En % instead of PUFA En %		
Fat		
TFA		
MUFA		
SFA		
TFA En % instead of MUFA En %		
Fat		
TFA		
PUFA		
SFA		
N6 En % instead of N3 En %		
Fat		
N6 PUFA		
MUFA		
TFA		
SFA		
MUFA En % plant instead of MUFA En % animal		
Fat		
MUFA plant		
SFA		
TFA		
PUFA		
Protein En % instead of carbohydrates En %		
Protein		
Fat		
Fibre		
Alcohol		
Fibre En % instead of carbohydrates En %		
Fibre		
Protein		

9. References

1. Tchernof, A. and J.-P. Després, *Pathophysiology of human visceral obesity: an update*. *Physiological reviews*, 2013. **93**(1): p. 359-404.
2. Fischer, K., et al., *Qualitative aspects of diet affecting visceral and subcutaneous abdominal adipose tissue: a systematic review of observational and controlled intervention studies*. *Nutrition Reviews*, 2015. **73**(4): p. 191-215.
3. Smith, J.D., et al., *Visceral adipose tissue indicates the severity of cardiometabolic risk in patients with and without type 2 diabetes: results from the INSPIRE ME IAA study*. *J Clin Endocrinol Metab*, 2012. **97**(5): p. 1517-25.
4. Liu, J., et al., *Fatty liver, abdominal visceral fat, and cardiometabolic risk factors: the Jackson Heart Study*. *Arterioscler Thromb Vasc Biol*, 2011. **31**(11): p. 2715-22.
5. Ibrahim, M.M., *Subcutaneous and visceral adipose tissue: structural and functional differences*. *Obes Rev*, 2010. **11**(1): p. 11-8.
6. *Fats and fatty acids in human nutrition. Report of an expert consultation*. 2010, World Health Organization and Foods and Agricultural Organization.
7. Skov, A.R., et al., *Randomized trial on protein vs carbohydrate in ad libitum fat reduced diet for the treatment of obesity*. *International journal of obesity*, 1999. **23**(5): p. 528-36.
8. Bailey, B., et al., *Dietary predictors of visceral adiposity in overweight young adults*. *British journal of nutrition*, 2010. **103**(12): p. 1702-5.
9. Hairston, K., et al., *Lifestyle factors and 5-year abdominal fat accumulation in a minority cohort: the IRAS Family Study*. *Obesity*, 2012. **20**(2): p. 421-7.
10. Kondoh, T., et al., *Association of dietary factors with abdominal subcutaneous and visceral adiposity in Japanese men*. *Obesity Research & Clinical Practice*, 2014. **8**(1): p. e16-25.
11. Larson, D.E., et al., *Dietary fat in relation to body fat and intraabdominal adipose tissue: a cross-sectional analysis*. *The American journal of clinical nutrition*, 1996. **64**(5): p. 677-84.
12. Stallmann Jorgensen, I.S., et al., *General and visceral adiposity in black and white adolescents and their relation with reported physical activity and diet*. *International journal of obesity*, 2007. **31**(4): p. 622-9.
13. Davis, J., et al., *Inverse relation between dietary fiber intake and visceral adiposity in overweight Latino youth*. *The American journal of clinical nutrition*, 2009. **90**(5): p. 1160-6.
14. Bray, G., et al., *A 9-mo randomized clinical trial comparing fat-substituted and fat-reduced diets in healthy obese men: the Ole Study*. *The American journal of clinical nutrition*, 2002. **76**(5): p. 928-34.
15. de Souza, R.J., et al., *Intake of saturated and trans unsaturated fatty acids and risk of all cause mortality, cardiovascular disease, and type 2 diabetes: systematic review and meta-analysis of observational studies*. *Bmj*, 2015. **351**: p. h3978.
16. Rosqvist, F., et al., *Overfeeding Polyunsaturated and Saturated Fat Causes Distinct Effects on Liver and Visceral Fat Accumulation in Humans*. *Diabetes*, 2014. **63**(7): p. 2356-2368.
17. Tan, S.-Y., M. Batterham, and L. Tapsell, *Increased intake of dietary polyunsaturated fat does not promote whole body or preferential abdominal fat mass loss in overweight adults*. *Obesity facts*, 2011. **4**(5): p. 352-7.
18. Fischer, K., et al., *MRI-determined total volumes of visceral and subcutaneous abdominal and trunk adipose tissue are differentially and sex-dependently associated with patterns of estimated usual nutrient intake in a northern German population*. *Am J Clin Nutr*, 2015. **101**(4): p. 794-807.
19. Forouhi, N.G., et al., *Differences in the prospective association between individual plasma phospholipid saturated fatty acids and incident type 2 diabetes: the EPIC-InterAct case-cohort study*. *Lancet Diabetes Endocrinol*, 2014. **2**(10): p. 810-8.
20. Goss, A.M., et al., *Effects of diet macronutrient composition on body composition and fat distribution during weight maintenance and weight loss*. *Obesity (Silver Spring)*, 2013. **21**(6): p. 1139-42.
21. Lagou, V., et al., *Lifestyle and socioeconomic-status modify the effects of ADRB2 and NOS3 on adiposity in European-American and African-American adolescents*. *Obesity*, 2011. **19**(3): p. 595-603.
22. Molenaar, E.A., et al., *Association of Lifestyle Factors With Abdominal Subcutaneous and Visceral Adiposity: The Framingham Heart Study*. *Diabetes Care*, 2009. **32**(3): p. 505-510.
23. Tonorezos, E.S., et al., *Contribution of diet and physical activity to metabolic parameters among survivors of childhood leukemia*. *Cancer Causes Control*, 2013. **24**(2): p. 313-21.
24. de Mutsert, R., et al., *The Netherlands Epidemiology of Obesity (NEO) study: study design and data collection*. *European Journal of Epidemiology*, 2013. **28**(6): p. 513-523.
25. Goldberg, G.R., et al., *Critical evaluation of energy intake data using fundamental principles of energy physiology: 1. Derivation of cut-off limits to identify under-recording*. *Eur J Clin Nutr*, 1991. **45**(12): p. 569-81.
26. *Principles for the estimation of energy requirements. Energy and protein requirements.*, W.H. Organization, Editor. 1985, World Health Organization: Geneva. p. 34-52.
27. Feunekes, G.I., et al., *Relative and biomarker-based validity of a food-frequency questionnaire estimating intake of fats and cholesterol*. *Am J Clin Nutr*, 1993. **58**(4): p. 489-96.
28. Verkleij-Hagoort, A.C., et al., *Validation of the assessment of folate and vitamin B12 intake in women of reproductive age: the method of triads*. *Eur J Clin Nutr*, 2006. **61**(5): p. 610-615.
29. Health Council of the Netherlands, *Guidelines for a healthy diet*. 2006.
30. van Lee, L., et al., *The Dutch Healthy Diet index (DHD-index): an instrument to measure adherence to the Dutch Guidelines for a Healthy Diet*. *Nutr J*, 2012. **11**: p. 49.

31. de Hollander, E.L., et al., *The SQUASH was a more valid tool than the OBIN for categorizing adults according to the Dutch physical activity and the combined guideline*. *Journal of Clinical Epidemiology*, 2012. **65**(1): p. 73-81.
32. Wendel-Vos, G.C.W., et al., *Reproducibility and relative validity of the short questionnaire to assess health-enhancing physical activity*. *Journal of Clinical Epidemiology*, 2003. **56**(12): p. 1163-1169.
33. Textor, J., J. Hardt, and S. Knüppel, *DAGitty: A Graphical Tool for Analyzing Causal Diagrams*. *Epidemiology*, 2011. **22**(5): p. 745.
34. Willet, W., *Nutritional Epidemiology*. Third Edition ed. 2012: Oxford.

Example Research proposal 2

WAGENINGEN UR

Research proposal

MSc thesis

<Name Student>

<Date>

Research proposal containing general aspects of thesis, motivation, background information, design for the thesis study, investigation scheme and literature references.

Title: Differences in implicit and explicit emotional responses to images of healthy and unhealthy foods.

Date: <>

Supervisors:

<Name>, daily supervisor

<Name>, main supervisor

Wageningen University, Division of Human Nutrition

Motivation:

I am aiming to learn how to interpret differences in emotions associated with unhealthy and healthy food options while using different types of methods to measure emotions. With that in mind, I have chosen to explore differences in emotional responses evoked by foods, using an explicit as well as an implicit method, opting for those not often used in this field of study. Even though nations worldwide have become more familiar with the importance of healthy food behaviour through media, governmental actions, etc., emotions often act subtly and unconsciously (Leigh Gibson 2006), sometimes guiding consumers to make the "wrong" food choice, the less healthy one. With persisting alarming rates of health issues caused by poor dietary habits, and with emotions undoubtedly influencing food behaviour via sensory, psychological and physiological mechanisms (Leigh Gibson 2006) I find it important to explore emotional responses to (un)healthy foods. I sincerely hope that, with further additional research, results obtained in this project will play a role in directing the consumers towards making healthier food choices.

Background:

Emotions and sensory attributes of food influence food choice through complex interactions. A study by Desmet and Schifferstein (2008) confirmed that sensory attributes are indeed one of five sources of food related emotions. The same study also showed that emotions elicited by food are mainly pleasant. Schifferstein (2013) found that taste is the most important sensory modality when eating food. In short, eating can be described as a pleasant experience during which people choose to consume the food that they like because it "tastes good". However, it has been shown by several studies that expectations of tastiness are negatively correlated with portrayed healthiness of a food product. For instance Liem (2012) showed that soup with a "reduced salt" label or "healthy tick" logo significantly decreased expected liking of the soup. Raghunathan (2006), has also studied the concept "unhealthy=tasty". He compared pairs of equal food products. One product was always portrayed as less healthy in comparison to its paired equivalent. The product which was portrayed as less healthy was expected to have a better taste, its consumption was more enjoyable, and it was the preferred choice when hedonic goals were salient. Another important finding of his study is that the concept "unhealthy=tasty" works on an implicit level even for those consumers who explicitly claim to disagree with such concepts. This finding was taken into consideration while planning the study design for my own research. Even though implicit methods are less biased and give more objective results, some evidence suggests that explicitly learned relationships have a strong influence and overcome the implicit effect on judgements (Allen and Janiszewski 1989). Therefore, use of explicit methods is equally as important as use of implicit methods.

The question is posed: if unhealthier food products are considered to taste better, and good taste evokes positive affect, would it be safe to assume that unhealthy food is associated with positive emotions? The aim of this research is to establish differences in emotional response to unhealthy and healthy foods, to explore whether they are congruent on an implicit and explicit level, and to discover how emotional response is associated with liking. If such emotional responses were defined, they may help improve the understanding of food choice. Further research may then be directed towards using emotions to guide consumers towards making healthier food choices. Exploring emotional response and

its relation to food liking may also be advantageous in food industry, potentially indicating liking better than a simple hedonic scale.

Study question:

What are the differences in emotional responses to images of unhealthy and healthy foods?

Are emotional responses to images of unhealthy and healthy foods congruent when measured implicitly via Implicit Association Test (IAT) and explicitly using the Affect Grid?

Can emotional responses be associated with liking scores?

Hypothesis:

Based on literature findings, which show that positive emotions are associated with good taste, and unhealthy foods considered to be tastier than healthy foods, I suspect that emotions associated with images of unhealthy foods will be more positive than emotions associated with pictures of healthier food options. This is certainly expected as an implicit response, however, previous research suggests that there might not be congruency between explicit and implicit responses. Liking scores are expected to be higher for those images of foods which are associated with more positive emotions.

Subjects:

30 participants will be recruited via flyers/posters and internet, from Wageningen and surrounding area. Subject criteria: aged between 18 and 65 with no previous history of eating disorders, currently not on a restrictive diet, and of a normal weight Body Mass Index (BMI=18.5-25). Additionally, all participants will be screened for eating behaviour using the Dutch Eating Behaviour Questionnaire (DEBQ). They will be asked to sign a consent form prior to testing. Furthermore, participants will receive reimbursement of €7.00 per hour; considering session duration, costs will not exceed €10.00 per person.

Methods:

- *Data collection:* Firstly, implicit emotional response will be measured via Implicit Association Test (IAT). Secondly, explicit emotional response will be recorded using the Affect Grid. Thirdly, liking scores will be noted. All three tests will be executed in one session. Sessions will be performed in afternoon hours. IAT will contain four categories: positive and negative emotional terms, and healthy and unhealthy foods presented as picture stimuli. Emotional terms will be generated using a Geneva Emotion Wheel (Scherer 2005), choosing terms clearly representative of their category and evenly spread across alternative dimensional structures of the semantic space for emotions. Additionally, a pilot study will be executed in order to create final choice of terms. Participants of pilot study will be asked to place the chosen emotional terms accordingly on the Affect grid, using two-dimensional structures (pleasant vs. unpleasant and aroused vs. sleepy). Combining results of pilot study with terms initially chosen from Geneva Emotion Wheel, a list of 12 emotions will be composed; six positive and six negative emotional terms. Approximately the same number of picture stimuli will be used. The chosen images of food will be pairs of stereotypical examples of healthy and unhealthy food options from different categories, e.g. whole meal, snack, drink, side-dish, etc. Images used in IAT will also be used as stimuli for explicit methods; Affect Grid and Liking score. In Affect grid, participants will rate their emotional response to images of food on a two-dimensional grid (dimensions same as in pilot study). Liking scores will be recorded explicitly for all food picture stimuli using a 9-point hedonic scale.
- *Data analysis:* Obtained data will be pre-processed. IAT scores will be calculated and t-tests used to determine significance for establishing association relations. ANOVA analysis will be conducted for data obtained by Affect Grid questionnaire to check for significant differences in levels of pleasantness and arousal between products. Post hoc analysis will be used to determine which products differ significantly. This data will also be used to create PCA plots for establishing patterns in differences of emotional response. ANOVA and post hoc will also check for significant differences between liking scores. A PLS plot will be used to predict liking from emotional

responses. IAT and Affect Grid scores will be compared qualitatively, but also quantitatively using a multiple factor analysis.

Statistics: Software used for statistical data analysis will be SPSS and UnscramblerX

Period of thesis:

Duration of 26 weeks, starting from <date> until <date>

Thesis timeline:

Literature study and writing proposal	week 1-3
Finalizing proposal	week 4
Organizing data collection (booking lab, forming questionnaires, recruiting participants)	week 5-11
Data collection	week 12-13
Statistical analysis and draft of report chapters	week 13-19
Christmas/New Year holidays	week 16-17
Finalizing report	week 20-25
Selecting two discussion papers	week 23
Handing in thesis report, correcting remarks	week 25/26
Thesis presentation (Colloquium)	week 26
Oral examination	week 27

Literature references:

Allen, C. T. and C. A. Janiszewski (1989). "Assessing the Role of Contingency Awareness in Attitudinal Conditioning with Implications for Advertising Research." Journal of Marketing Research **26**(1): 30.

Desmet, P. M. A. and H. N. J. Schifferstein (2008). "Sources of positive and negative emotions in food experience." Appetite **50**(2-3): 290-301.

Leigh Gibson, E. (2006). "Emotional influences on food choice: Sensory, physiological and psychological pathways." Physiology & Behavior **89**(1): 53-61.

Liem, D. G., et al. (2012). "Effects of health labels on expected and actual taste perception of soup." Food Quality and Preference **25**(2): 192-197.

Ragunathan, R., et al. (2006). "The Unhealthy = Tasty Intuition and Its Effects on Taste Inferences, Enjoyment, and Choice of Food Products." Journal of Marketing **70**(4): 170-184.

Scherer, K. R. (2005). "What are emotions? And how can they be measured?" Social Science Information **44**(4): 695-729.

Schifferstein, H. N. J., et al. (2013). "Influence of package design on the dynamics of multisensory and emotional food experience." Food Quality and Preference **27**(1): 18-25.

Appendix 5: Plagiarism Statement

Authors: staff of the Environmental Policy Group

1. Introduction and definition

The task of writing a paper or other assignment for a course sometimes lures students into using other's work, ideas, facts, texts, etc. and represents it as their own. The goal of this statement is to distinguish between methods to do this in an appropriate way and methods that fall under plagiarism.² It is important for students to understand that plagiarism is considered as a very serious offense against academic norms and, hence subject to equally serious punishment.

"Plagiarism" is derived from the Latin *plagiarius*, 'plunderer', 'kidnapper'. It refers to intellectual theft, defined as "the false assumption of authorship: the wrongful act of taking the product of another person's mind, and presenting it as one's own"³ "To plagiarize is to give the impression that you wrote or thought something that you in fact borrowed from someone. While some plagiarize deliberately by copying or buying papers or soliciting unauthorized help, most plagiarism is accidental, *but it is usually dealt with just as harshly as intentional plagiarism.*"⁴ *It is precisely to avoid discussion about what constitutes plagiarism and it's intentional character that we want students to understand the content of this document well.*

The **sanction** in case of plagiarism is –based on WU policy (articles 35 and 36 of MSc Education/Examination Regulation):

- The examiner informs the student and reports to the secretary of the WU Examination Board the case of plagiarism. The examiner may utilize a plagiarism scanner to prove the case.
- The commission will ask the student to express his/her view about the case.
- Depending on the magnitude of the fraud the appropriate sanction will be assessed: a warning; a fail for the exam; exclusion of the exam for a maximum period of one a year or a combination of these sanctions.

In the following pages, you will first find several examples of plagiarism, then examples of accepted use of sources and ideas and finally some guidelines on how to avoid plagiarism. We urge students to carefully read these pages and when in doubt talk to their instructors in order to prevent later problems.

2. Examples of plagiarism⁵

A. DIRECT PLAGIARISM

Source Material

From: *Emotion in the Human Face: Guidelines for Research and an Integration of Findings* by Paul Ekman, Wallace V. Friesen, Phoebe Ellsworth (New York: Pergamon Press, Inc.), p.1. (Psychology source)

² See Department of English Northern Illinois University, <http://www.engl.niu.edu/fycomp/plag.html>

³ *MLA Style Manual*, 2nd ed. New York: MLA 1998, page 146.

⁴ US Naval Academy Plagiarism policy

⁵ This section is borrowed directly from the Northwestern University website on plagiarism. "The section was written by Jean Smith of the CAS Writing Program, with help from Bob Wiebe of the History Department. Contributors include Katrina Cucueco (Speech '96), Ryan Garino (CAS '98), Scott Goldstein (Tech '96), and Jean Smith and Ellen Wright of the Writing Program. The examples of plagiarism and comments are based upon *Sources: Their Use and Acknowledgement* (published by Dartmouth College)." (<http://www.northwestern.edu/uacc/plagiar.html>)

The human face in repose and in movement, at the moment of death as in life, in silence and in speech, when alone and with others, when seen or sensed from within, in actuality or as represented in art or recorded by the camera is a commanding, complicated, and at times confusing source of information. The face is commanding because of its very visibility and omnipresence. While sounds and speech are intermittent, the face even in repose can be informative. And, except by veils or masks, the face cannot be hidden from view. There is no facial maneuver equivalent to putting one's hands in one's pockets. Further, the face is the location for sensory inputs, life-necessary intake, and communicative output. The face is the site for the sense receptors of taste, smell, sight, and hearing, the intake organs for food, water, and air, and the output location for speech. The face is also commanding because of its role in early development; it is prior to language in the communication between parent and child.

Misuse of source

(italicized passages indicate direct plagiarism):

Many experts agree that *the human face, whether in repose or in movement, is a commanding, complicated, and sometimes confusing source of information. The face is commanding because it's visible and omnipresent. Although sounds and speech may be intermittent, the face even in repose may give information. And, except by veils or masks, the face cannot be hidden. Also, the face is the location for sensory inputs, life-supporting intake, and communication.*

Comment

The plagiarized passage is an almost verbatim copy of the original source. The writer has compressed the author's opinions into fewer sentences by omitting several phrases and sentences. But this compression does not disguise the writer's reliance on this text for the concepts he passes off as his own. The writer tries to disguise his indebtedness by beginning with the phrase "Many experts agree that. ..." This reference to "many experts" makes it appear that the writer was somehow acknowledging the work of scholars "too numerous to mention." The plagiarized passage makes several subtle changes in language (e.g., it changes "visibility and omnipresence" to "it's visible and omnipresent"). The writer has made the language seem more informal in keeping with his own writing style. He ignores any embellishments or additional information given in the source-passage. He contents himself with borrowing the sentence about how only masks and veils can hide the face, without using the follow-up elaboration about there not being a "facial equivalent to putting one's hands in one's pockets." He also reduces the source's list of the face's diverse activities at the end of the paragraph. Had the writer credited the authors of the Emotions book in this text or in a footnote, and enclosed the borrowed material in quotation marks, this would have been a legitimate use of a source.

B. THE MOSAIC

Source Material

From: *Language in Sociocultural Change* by Joshua Fishman (Stanford University Press, 1972), p.67. (Linguistics source)

In a relatively open and fluid society there will be few characteristics of lower-class speech that are not also present (albeit to a lesser extent) in the speech of the working and lower middle classes. Whether we look to phonological features such as those examined by Labov or to morphological units such as those reported by Fischer (1958) (Fischer studied the variation between -in' and -ing for the present participle ending, i.e. runnin' vs. running and found that the former realization was more common when children were talking to each other than when they were talking to him, more common among boys than girls, and more common among "typical boys" than among "model boys"), we find not a clear-cut cleavage between the social classes but a difference in rate of realization of particular variants of particular variables for particular contexts. Even the widely publicized distinction between the "restricted code" of lower-class speakers and the "elaborate code" of middle-class speakers (Bernstein 1964, 1966) is of this type, since Bernstein includes the cocktail party and the religious service among the social situations in which restricted codes are realized. Thus, even in the somewhat more stratified British setting the middle class is found to share some of the features of what is considered to be "typically" lower-class speech. Obviously then, "typicality," if it has any meaning at all in relatively open societies, must refer largely to repertoire range rather than to unique features of the repertoire.

Misuse of source

(italicized passages indicate direct plagiarism):

In a relatively fluid society many characteristics of lower-class speech will also be found among the working and

lower middle classes. Labov's and Fischer's studies show that *there is not a clear-cut cleavage between social classes but only a difference* in the frequency of certain speech modes. All classes share certain speech patterns. The difference among classes would only be apparent by the frequency with which speech expressions or patterns appeared. By this standard, then, Bernstein's distinction between the "restricted code" of the lower-class speakers and the "elaborated code" of middle-class speakers is useful only up to a point, since Bernstein mentions cocktail parties and religious services as examples of "restricted speech" groupings. "Typicality" *refers more to speech "range" than to particular speech features.*

Comment

While this passage contains relatively few direct borrowings from the original source, all its ideas and opinions are lifted from it. The writer hides her dependency on the source by translating its academic terms into more credible language for a novice in sociology. For example, the plagiarist steers clear of sophisticated terms like "phonological features," "morphological units," and "repertoire range." However, her substitutions are in themselves clues to her plagiarism, since they over-generalize the source's meaning. The writer seems to acknowledge secondary sources when she refers to Labov's and Fischer's studies, but she obviously has no first-hand knowledge of their research. If she had consulted these studies, she should have footnoted them, rather than pretending that both she and her audience would be completely familiar with them. She intertwines her own opinions with the source and forms a confused, plagiarized mass.

The writer should have acknowledged her indebtedness to her source by eliminating borrowed phrases and crediting her paragraph as a paraphrase of the original material.

C. PARAPHRASE

Source Material

From: *Cliff's Notes on The Sun Also Rises* by Ernest Hemingway

THE DISCIPLINE OF THE CODE HERO

If the old traditional values are no good anymore, if they will not serve man, what values then will serve man? Hemingway rejects things of abstract qualities courage, loyalty, honesty, bravery. These are all just words. What Hemingway would prefer to have are concrete things. For Hemingway a man can be courageous in battle on Tuesday morning at 10 o'clock. But this does not mean that he will be courageous on Wednesday morning at 9 o'clock. A single act of courage does not mean that a man is by nature courageous. Or a man who has been courageous in war might not be courageous in some civil affair or in some other human endeavor. What Hemingway is searching for are absolute values, which will be the same, which will be constant at every moment of every day and every day of every week.

Ultimately therefore, for Hemingway the only value that will serve man is an innate faculty of self-discipline. This is a value that grows out of man's essential being, in his inner nature. If a man has discipline to face one thing on one day he will still possess that same degree of discipline on another day and in another situation. Thus Francis Macomber in the short story "The Short, Happy Life of Francis Macomber," has faced a charging animal, and once he has had the resolution to stand and confront this charging beast, he has developed within himself a discipline that will serve him in all situations. This control can function in almost any way in a Hemingway work.

Misuse of source:

Hemingway tries to discover the values in life that will best serve man. Since Hemingway has rejected traditional values, he himself establishes a kind of "code" for his heroes. This code is better seen than spoken of. The Hemingway hero doesn't speak of abstract qualities like courage and honesty. He lives them. But this living of values entails continual performance the Hemingway hero is always having his values put to the test. How can the hero be up to this continual test? Hemingway stresses the faculty of self-discipline as the backbone of all other virtues. Self-discipline places man's good qualities on a continuum. The dramatic change in Francis Macomber in "The Short, Happy Life of Francis Macomber" stems more from his new-found self-control than from any accidental combination of traits.

Comment

This illustrates plagiarism since the writer used the notion of the "Hemingway code hero" presented in Cliff's Notes as the sole basis for his own essay. He has absorbed his source's concepts, re-phrased them, and, perhaps, made them simpler. But there is a one-to-one relationship between the development of ideas in the Cliff's Notes and the plagiarists' rendition.

The first two sentences of the plagiarist's are directly borrowed from his source; the remaining sentences are more artfully disguised. The worst feature of this idea-copying is that it seems to be the end product of a close reading of Hemingway's "Short, Happy Life," the writer makes it appear that his comments are based on this short story.

The writing here would be acceptable if he had written the same paraphrase with the proper acknowledgement of his source.

D. INSUFFICIENT ACKNOWLEDGEMENT

Source Material

From: Peter Laven, *Renaissance Italy: 1464-1534* (New York: Capricorn, 1964), pp. 130f.

The tenacious particularism of the Italian state gave rise to a wide variety of constitutional solutions and class structures throughout Italy. Even conquered territories and those swallowed up by bigger neighboring powers often managed to retain much of their internal organization as it had been. If power changed hands, the instruments and forms of power usually remained the same. Since the economic needs of such territories did not suddenly alter with a change of government or master, those classes which had been important before the change tended to continue to be important afterwards as well. Only when the nature of the change was economic and social might there have been a reversal in the relationships of classes; but even in this there was no sudden revolution in the structure of classes.

Misuse of source:

In his comprehensive study, *Renaissance Italy*, Peter Laven discusses the peculiar organization of Renaissance city-states:

The tenacious particularism of the Italian states gave rise to a wide variety of constitutional solutions and class structures throughout Italy. Even conquered territories and those swallowed up by bigger neighboring powers often managed to retain much of their internal organization as it had been.¹

This means that if power changed hands, the instruments and forms of power usually remained the same. Since the economic needs of such territories did not suddenly alter with a change of government or master, those classes which had been important before the change tended to continue to be important afterwards as well. Only when the nature of the change was economic and social might there have been a reversal in the relationships of classes; but even in this there was no sudden revolution in the structure of classes.

¹ Peter Laven, *Renaissance Italy*, p. 130-31.

Comment

This half-crediting of a source is a common form of plagiarism. It stems either from a desire to credit one's source and copy it too, or from ignorance as to where to footnote. The general rule is to footnote after rather than before your resource material. In this case, the plagiarist credits historian Peter Laven with two sentences and then continues using the author without giving acknowledgement. The writer disguises the direct plagiarism as a paraphrase by using the falsely-explanatory phrase "This means that ..." in the third sentence. This example of plagiarism is especially reprehensible because the writer seemingly acknowledges her source--but not enough.

3. How to do it right: examples of the good use of others' work⁶

In all academic work, and especially when writing papers, we are building upon the insights and words of others. A conscientious writer always distinguishes clearly between what has been learned from others and what he or she is personally contributing to the reader's understanding. To avoid plagiarism, it is important to understand how to attribute words and ideas you use to their proper source.

⁶ This section is borrowed directly from the Northwestern University website on plagiarism (<http://www.northwestern.edu/uacc/plagiar.html>)

A. QUOTED MATERIAL AND UNUSUAL OPINION OR KNOWLEDGE

Source:

The teenage detective who was once a symbol of spunky female independence has slowly been replaced by an image of prolonged childhood, currently evolving toward a Barbie doll detective. ... Every few pages bring reminders of Nancy's looks, her clothing, her effect on other people. ... The first entry in this series carries a description of Nancy: "The tight jeans looked great on her long, slim legs and the green sweater complemented her strawberry-blonde hair."

Jackie Vivelo, "The Mystery of Nancy Drew," *MS.*, November, 1992, pp. 76-77

Use and Adaptation of the Material:

Nancy Drew has become a "Barbie doll" version of her old self. She has become superficial and overly concerned with her looks. She is described in the new series as wearing "tight jeans [that] looked great on her long, slim legs."¹ She has traded her wits and independent spirit for a great body and killer looks.²

¹ Jackie Vivelo, "The Mystery of Nancy Drew," *MS.*, November, 1992, p. 77.

² Vivelo, pp. 76-77

Explanation:

The writer has paraphrased most of the material, and she has borrowed a few of the author's words. She has also discovered that the paraphrased ideas are unusual (not found in other sources). Therefore, the writer has placed quotation marks around the author's words and has credited the author twice--once directly after the quoted material and once at the conclusion of the author's ideas.

B. INTERPRETATION

Source:

One recent theory, advanced by the physicist Gerald Hawkins, holds that Stonehenge was actually an observatory, used to predict the movement of stars as well as eclipses of the sun and moon. Such a structure would have been of great value to an agricultural people, since it would enable them to mark the changing seasons accurately, and it would have conferred seemingly supernatural powers on the religious leaders who knew how to interpret its alignments.

Stanford Lehmborg, *The Peoples of the British Isles: A New History*, vol. I, (Wadsworth Publishing Company, 1992), p. 9.

Use and Adaptation of the Material:

If Stonehenge was an astronomical observatory which could predict the coming of spring, summer, and fall, this knowledge would have given tremendous power to the priestly leaders of an agricultural community.¹

¹ Stanford Lehmborg, *The Peoples of the British Isles: A New History*, vol. I, (Wadsworth Publishing Company, 1992), p. 9

Explanation:

The writer has appropriately cited this material since the writer is in debt to someone else for the analysis, even though the writer has not used any direct quotations.

C. PARAPHRASED MATERIAL

Source:

As a recent authority has pointed out, for a dependable long-blooming swatch of soft blue in your garden, ageratum is a fine choice. From early summer until frost, ageratum is continuously covered with clustered heads of fine, silky, fringed flowers in dusty shades of lavender-blue, lavender-pink, or white. The popular dwarf varieties grow in mounds six to twelve inches high and twelve inches across; they make fine container plants. Larger types

grow up to three feet tall. Ageratum makes an excellent edging.

How to Grow Annuals, ed. Sunset Books and Sunset Magazine (Menlo Park, CA: Lane Books, 1974), p. 24.

Use and Adaptation of the Material:

You can depend on ageratum if you want some soft blue in your garden. It blooms through the summer and the flowers, soft, small, and fringed, come in various shades of lavender. The small varieties which grow in mounds are very popular, especially when planted in containers. There are also larger varieties. Ageratum is good as a border plant.¹

¹*How to Grow Annuals*, ed. Sunset Books and Sunset Magazine (Menlo Park, CA: Lane Books, 1974), p. 24.

Explanation:

The writer has done a good job of paraphrasing what could be considered common knowledge (available in a number of sources), but because the structure and progression of detail is someone else's, the writer has acknowledged the source. This the writer can do at the end of the paragraph since he or she has not used the author's words.

D. USING OTHER AUTHORS' EXAMPLES

Sources:

The creative geniuses of art and science work obsessively. ... Bach wrote a cantata every week, even when he was sick or exhausted.

Sharon Begley, "The Puzzle of Genius," *Newsweek*, June 28, 1993, p. 50.

Albert Einstein published nearly 250 papers in his life, but a sizeable percentage of them were ignored or even proven wrong.

"What Produces Scientific Genius?" *USA Today*, June 1989, p. 11.

Use and Adaptation of the Material

If there is a single unifying characteristic about geniuses, it is that they produce. Bach wrote a cantata every week. Einstein drafted over 250 papers.¹

¹Sharon Begley, "The Puzzle of Genius," *Newsweek*, June 28, 1993, p. 50; "What Produces Scientific Genius?" *USA Today*, June 1989, p. 11.

Explanation:

Instead of finding an original example, the writer has used an author's example to back up what the writer had to say; therefore the writer has cited it.

E. USING OTHER AUTHORS' CHARTS AND GRAPHS

Chart

Source: Accretion Chart for Illinois tax on OID bond, prepared by John Lindsay, Principal Financial Securities, Inc., 6/12/95.

Use and Adaptation of the Material:

As the following chart indicates, investment in an OID (Original Issue Discount) bond is taxable by the State of Illinois on the accretion and interest.¹

¹Accretion Chart for Illinois tax on OID bond, prepared by John Lindsay, Principal Financial Securities, Inc., 6/12/95.

Explanation:

Instead of creating an original chart or graph, the writer has used one from an outside source to support what the writer has to say; therefore the chart or graph has been cited. If the writer had created an original chart, some of the facts might need citations (see example VIII).

F. USING CLASS NOTES

Source: Lecture Notes

A. Born in USA--Springsteen's 7th, most popular album

a. Recorded with songs on Nebraska album--therefore also about hardship

1. Nebraska about losers and killers

b. About America today--Vietnam, nostalgia, unemployment, deterioration of family

c. Opening song--many people missed the Vietnam message about how badly vets were treated.

class notes--Messages in Modern Music A05

Professor Mary McKay--March 10, 1995

Use and Adaptation of the Material:

As Professor McKay has pointed out, many of the songs in *Born in the USA* (Springsteen's seventh and most popular album), including the title song, were recorded with the songs on *Nebraska*. Consequently, *Born in the USA* is also about people who come to realize that life turns out harder and more hurtful than what they might have expected. However, while *Nebraska* deals with losers and killers, *Born in the USA* deals more locally with the crumbling of American society--its treatment of returning Vietnam veterans, its need to dwell on past glories, its unemployment and treatment of the unemployed, and the loss of family roots. This is apparent from the opening song of the album "Born in the USA" in which Springsteen sings from the perspective of a Vietnam Veteran.¹

¹Mary McKay, "Messages in Modern Music" A01 (Northwestern University) March 10, 1995.

Explanation:

The writer has acknowledged that these ideas (which are not commonly held or the writer has not investigated to find out if they are commonly held) come from a lecture.

G. DEBATABLE FACTS

In the campaigns of 1915 Russian casualties have been conservatively estimated at more than 2 million.

Gordon Craig, *Europe Since 1815* (Dryden Press, 1974), p. 370.

By the end of the summer [of 1915] in addition to military casualties totalling 2,500,000 men, Russia had lost 15 percent of her territories...

L. S. Stavrianos, *The World Since 1500* (Prentice Hall, 1966), p. 438.

Response to the Material

Estimates of the number of deaths in Russia during 1915 range from over two million¹ to two and a half million.²

¹ Gordon Craig, *Europe Since 1815* (Dryden Press, 1974), p. 370.

² L. S. Stavrianos, *The World Since 1500* (Prentice Hall, 1966), p. 438.

Explanation:

The writer found different facts in different sources; therefore the "facts" needed to be documented.

H. UNUSUAL FACTS

Source:

There also has been a dramatic shift in the percentage of our students whose mothers work outside the home.

Approximately 80% of our entering students in 1994 have mothers who are employed outside the home. In 1967, more than half of our students' mothers were full-time homemakers.

"Characteristics of Northwestern Students: Data from the Cooperative Institutional Research Project,"

Northwestern University, 1994 p. 2.

Use and Adaptation of the Material:

At Northwestern University, the rise in the number of mothers working outside the home has been dramatic-- moving from less than half in 1967 to about 80 percent among the freshman class of 1994.¹

¹"Characteristics of Northwestern Students: Data from the Cooperative Institutional Research Project," Northwestern University, 1994 p. 2.

Explanation:

The writer found this fact in only one source and wants his reader to know where to find it.

4. Guidelines to avoid and prevent plagiarism⁷

- Take carefully documented notes. Identify your sources by name of author, title of work, place and name of publication, date, and page numbers.
- Enclose all borrowed words in quotation marks, and set off longer borrowed passages in an indented block.
- Avoid mere paraphrasing, substituting your own words or synonyms for the original work without giving proper credit to your source.
- Do not plagiarize your own work by copying from it or submitting it more than once for credit unless specifically authorized by your professor.
- Document all figures, charts, statistics, graphs, tables, opinions and conclusions taken or adapted from any source, including electronic media such as CD-ROMs, diskettes or tapes, online resources like the World Wide Web, or computer services such as Nexis and Dialog. *Resist the temptation to cut and paste without attribution.*
- Do not use translation software to produce a foreign-language text for submission as your own work. Not only does this constitute misrepresenting another entity's work as your own, it also will be recognizable to your instructor as a machine-produced text.
- Do not document facts of common knowledge such as familiar proverbs or well-known quotations ("We shall overcome"), but you must indicate the source of any appropriated material that readers otherwise could mistake for your own. **If in doubt, ask. If still uncertain, err on the side of caution** (*borrowed from USNA statement*).
- Within a text, particularly in case of repeated reference to the same source, identify its origin briefly by name or title and page number, enclosed in parentheses, and provide complete documentation of all your sources in an alphabetized list of "Works Cited" at the end of your paper.

⁷ US Naval Academy Plagiarism Policy