Bachelor Thesis

What the correlation between Critical Thinking and Academic Emotions can mean for education

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Date:	June 2, 2020

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SAXION

Preface

Proudly, I present you my bachelor thesis "What the correlation between Critical Thinking and Academic Emotions can mean for education". This thesis was written in response to the completion of the Applied Psychology course at the Saxion in Deventer. It took me from September 2019 to June 2020 to complete my thesis. After spending three months in Russian Siberia during this time on a Erasmus exchange, I can finally say I did it. It was a journey of discovery that did not go without a struggle. Writing in the English language was not something I was familiar with, but for the opportunity to go to Russia and to dive deep into the subject of critical thinking I was happy to do it. I wrote some chapters or parts very quickly, while I got stuck with others. Fortunately, I can say that the end is near.

I would like to thank Laurens Ekkel and Olga Bogdanove, for starting up and supervising this research. I would also like to thank them for their feedback and guidance. Especially Olga Bogdanova how showed me around in Russia, for me a unknown country, and who was available at all times. I would also like to thank my fellow students who filled in the questionnaires. Without their cooperation, I would never have been able to complete the research. Lastly, my thanks go out to my significant other, family and friends, who helped me with emotional support and the occasional distractions.

I wish you a lot of reading pleasure.

Birthe Bruin

Deventer, June 2020

Abstract

Critical Thinking is a important indicator for achievement in education. It can benefit students to handle complex problems and to make better decisions. Adequate critical thinking skills help record and process information, making students more able to identify useful information and being less distracted by irrelevant information. However, students experience difficulties in the area of critical thinking. Academic emotions also indicate academic achievement. Positive emotions such as enjoyment, hope, and pride predicted high achievement, and negative emotions predicted low achievement. Critical thinking and academic emotions can mediate each other. Both in a positive and a negative way. This research was done to determine what the correlation between critical thinking and academic emotions is among second year psychology students of a Dutch University of Applied Sciences and a Russian University.

To answer the research questions, 54 second year applied psychology students have filled in the Critical Thinking Toolkit and the Learning-related section of the Achievement Emotions Questionnaire, together with sixteen open-ended question. The Spearman's rank correlation was used to examine the correlation between critical thinking and academic emotions.

The research results show that there is a correlation between positive academic emotions and critical thinking among second year psychology students. No correlation has been found between negative academic emotions and critical thinking among second year psychology students.

The purpose of this research was to explore how critical thinking and academic emotions can be used in education. CT should be more implemented in education through interaction between theoretical and practical knowledge. To enable positive emotions, interventions should be used to improve recognition of the importance of critical thinking and confidence in critical thinking. Interventions aimed at misconceptions and avoidance of CT should be used especially when negative emotions want to be inhibited. Interventions aimed to facilitate positive emotions could create cognitive openings, creating more self-confidence, self-effectiveness and appreciation for CT in itself.
Recommended for a further research is to explore the correlation between critical thinking and academic emotions more. Through collecting more data in upcoming academic years and collecting data from different cultures.

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Glossary

Appraisals: emotions extracted from our evaluations of events that cause specific reactions in different people.

Attributions: ways that people make in order to understand their experiences; ways for people to explain the behavior of themselves and others in terms of cause and effect.

Cognitive resources: refers to someones experiences, intellect, competence and tasks-relevant knowledge.

Delphi Committee: panel of experts convene to work toward a consensus.

Delphi Method: a quantitative method where an interactive panel of experts convene to work toward a consensus.

Self-concept: a person's self perceptions formed through experience with and interpretations of one's environment.

Self-confidence: one's own ability to reason and is part of the disposition of CT

Self-efficacy: an individual's judgment on their own abilities to achieve their designed performance levels.

Self-esteem: sense of self-worth and self-acceptance

Self-identity: the degree to which a person views himself as fulfilling a role that is linked to a specific domain of behavior

Chapter 1 - Introduction

In this chapter the research is introduced. The research is commissioned by a Dutch University of Applied Sciences, (DUAS) and a Russian University (RU). In paragraph 1 the background and significance, possible solutions and the relevance of the research are illustrated. The research question is composed in the second paragraph. In the last paragraph, paragraph 3, the purpose of the research has been formulated.

1.1 - Background and significance

In this paragraph, the definition and importance of critical thinking (CT) is described. Furthermore it illustrates the link between CT and emotions, as well as the definition of academic emotions (AE).

1.1.1 - Definition of Critical Thinking

CT is a broad concept that a considerable number of theorists have attempted to define. Niu, Behar-Horenstein and Garvan (2013) defined CT as skills that conduct analyzing, synthesizing and evaluating information. They stated that CT can be beneficial on both a personal and professional level, because among other things it influences the decision process. Lorencová, Jarošová, Avgitidou and Dimitriadou (2019) mention other definitions such as the ability to engage in purposeful, self-regulatory judgement and the use of cognitive skills or strategies that increase the probability of a desirable outcome. Facione (1990) definition of CT is a purposeful, self-regulatory judgment. In chapter 2, the definition is elaborated further.

The advantages of CT in education are that it ensures more self-confidence in making decisions, which more often leads to a desired result (Brookfield, 2007). It can also influence the way in which students record and process information. It ensures that they can better evaluate which information is useful and which is not (Weiler, 2004). Whether something is useful can depend on different things. The information provided is filtered with CT. Beliefs, assumptions and norms and values that emerge and influence the reliability of the information are noted. Being able to adequately filter information leads to a correct judgment. Students with adequate skills are more able to identify useful information and they are less distracted by irrelevant information (Cottrel, 2005).

1.1.2 - Importance of Critical Thinking

Partnership for 21st Century Learning (2009) developed a framework for teachers, education experts, and business leaders to define and illustrate the skills and knowledge students need to succeed in work and life. Besides the key subjects students learn in school, they also must learn life & career skills, information media & technology skills and learning & innovation skills. Learning & innovation skills relate to four competencies: CT, collaboration, creativity and communication. Partnership for 21st Century Learning (2009) stated that if schools and universities use this framework students will be more engaged in the learning process and will be better prepared for today's global economy. This research will focus specifically on CT. Salas-Pilco (2013) noted that although CT and problem solving skills have always been important, nowadays (in the 21st century) with the grow in knowledge-based economies skills in CT and problem solving are even more crucial. Salas-Pilco (2013) compared different 21st century competencies frameworks, six out of ten of these frameworks consider CT to be a performance indicator in education.

Students in higher education don't have enough adequate competences regarding CT (Carrithers, Ling, & Bean, 2008; Flores, Matkin, Burbach, Quinn, & Harding, 2012; Weiler, 2004). According to Carrithers et al. (2008) and Weiler (2004) this regards to students having difficulty to see problems from other perspectives and understanding the nature of the problem or identify the situation. They also have difficulties coming up with and evaluating other alternatives. Often they apply what they just learned in class as the solution for the problem without considering other alternatives. Flores et al. (2012) noted the underlying problem of students not having adequate competences lies with the teachers. They don't know or understand the concept of CT, which results in the ineffective teaching of CT. They can't teach what they don't understand. Also the traditional teaching techniques that most universities use, memorizing and lectures, seldom leads to CT. Case (2005) stated that the way in which CT is applied in education and the extent to which it is applied is too low. According to Hernández and Grijalva (2020) there is a lack of systematic work to promote the development and evaluation of CT in education. To improve this, more research is needed into the subject of CT. Interventions now usually consist of improving CT skills. But perhaps other possible solutions lie with the link between CT and emotions. Hargreaves (2007) stated that emotions are important in educational change because emotional learning adds value to the conventional kinds of achievement by which students are usually assessed.

1.1.3 - Link between Critical Thinking and emotions

According to Niu et al. (2013), there is a connection between emotional intelligence and CT. Elder (1996) claims that CT mediates intelligence and emotion, meaning that CT brings the ability to control not only thoughts, but also emotions. This suggests that CT provides people with the mental aids that help with the functioning of intelligence. Intelligence, in turn, is seen as a success factor for good academic performance (Jaeger & Eagan Jr, 2007). Academic success can largely be predicted on the basis of emotional and social issues. Emotional intelligence is important for promoting good relationships with people, among other things, and for helping them deal better in difficult situations. Emotional intelligence can differ between gender, girls are often more emotionally developed (Goleman, 1996). Emotions and thoughts are mutually indispensable for each other and emotions serve as the basis for thoughts. Evidence has shown that emotional intelligence is related to individual success or failure in various areas of life. Students who are aware of their emotions can identify and attach meaning to their emotions, values, goals, strengths and weaknesses and capacities (Kaya, Şenyuva, & Bodur, 2017). MacCann, Fogarty, Zeidner and Roberts (2011) stated that the way emotional intelligence may have an effect on academic performances is because of the skill to regulate negative emotions. The better a student is in regulating their negative emotions the less likely it is that negative emotions take the upper hand in situations that involve assessments and learning. Emotional intelligence is also linked with better social skills. When a student is better in maintaining social relationships they are more effective in group work, like presentations. Higher social skills also have a positive correlation with maintaining social support and well-being in the educational environment. Emotional intelligence is linked to academic performances, students who are more emotional intellectual have less academic problems, as rated by their teachers. Problems like attention and learning problems. They are also less likely to have a negative attitude towards school and teachers. An academic surrounding with a positive emotional learning climate is a harbinger for academic engagement and academic achievement (Brackett, Rivers, & Salovey, 2011).

1.1.4 - Academic Emotions

Pekrun, Goetz, Titz and Perry (2002) noted that students experience a rich diversity of emotions in academic settings. Not only negative emotions like fear, but also positive emotions such as joy can be experienced in academic situations. Academic settings abound with achievement emotions such as enjoyment of learning, hope, pride, anger, anxiety, shame, hopelessness, or boredom. These emotions are critically important for students' motivation, learning, performance, identity development, and health (Pekrun, Goetz, FreVnzel, Barchfeld, & Perry, 2011). Emotions that arise from academic situations can be traced back to how a student functions on an individual level in regards to academic learning and achievement. Academic learning and achievement are the basis for good educational and professional careers as well as social relationships. They are highly valued in todays society. This implies that learning and achievement are important and thus major sources of human emotions today, instigating a variety of self-referenced, task-related, and social emotions (Pekrun et al., 2002). Positive emotions such as enjoyment, hope, and pride predicted high achievement, and negative emotions predicted low achievement. Villavicencio (2011) did a research among engineering students. The results show that there is a negative correlation between negative AE and achievement. CT showed a positive correlation with achievement. So according to Villavicencio (2011) CT can help students be more effective learners or performers in an academic setting. However when negative AE are experienced, CT is no longer as significant. Hopelessness and anxiety have an effect on the significance on the link between CT and achievement as it becomes no longer significant. If more is known about the connection between AE and CT among students, it might be possible to intervene in this area. Learning more about these two concepts in combination with each other and in education is relevant because, for example, when potential similarities emerge, the educational institution can more quickly recognize who can develop better CT skills through AE or to use interventions on AE that may have positive consequences for CT and therefore academic performance and vice versa.

1.2 - Research questions

In order to be able to do the research properly, two research questions have been formulated. Sub-questions have been prepared to supplement the two research questions. An additional question is added to address the implementation of interventions in education. Only literature research will be done on this question.

1. "What is the correlation between critical thinking and positive academic emotions among second year psychology students?"

- 1.1 What is the correlation between confidence in critical thinking and positive academic emotions?
- 1.2 What is the correlation between valuing critical thinking and positive academic emotions?
- 1.3 What is the correlation between misconceptions about critical thinking and positive academic emotions?

2. "What is the correlation between critical thinking and negative academic emotions among second year psychology students?"

- 2.1 What is the correlation between confidence in critical thinking and negative academic emotions?

- 2.2 What is the correlation between valuing critical thinking and negative academic emotions?
- 2.3 What is the correlation between misconceptions about critical thinking and negative academic emotions?

Additional question:
"What are the characteristics for efficient interventions for critical thinking?"

In this study the term academic emotions is defined as emotions that are significantly related to students' motivation, learning strategies, cognitive resources, self-regulation, and academic achievement, as well as to personality and classroom antecedents. Such as enjoyment, hope, pride, relief, anger, anxiety, shame, hopelessness, and boredom (Pekrun et al., 2002). Enjoyment, hope and pride belong to positive emotions. Anger, anxiety, shame, hopelessness and boredom belong to negative emotions. Critical thinking is a broad concept and has several definitions. In this research critical thinking is defined as a cognitive process that leads to interpretation, analysis, evaluation, inference and explanation through purposeful, self-regulatory judgment (Abrami, Bernard, Borokhovski, Wade, Surkes, Tamim, & Zhang, 2008).
Confidence in critical thinking means confident about one's own critical thinking skills, valuing critical thinking is described as the extent of which students recognize the importance of critical thinking and misconceptions is the avoidance of critical thinking or misconceptions of critical thinking (Stupple, Maratos, Elander, Hunt, Cheung, & Aubeeluck, 2017).
Furthermore, this study describes psychology students as young people who follow the applied psychology study at DUAS or the psychology study at RU with an age between 17 and 30 years old.

1.3 - Purpose of the research

The organizations from which the issue arose are a Russian University and a Dutch University of Applied Sciences. RU and DUAS have committed a partnership to research cross cultural aspects of CT in education. With this partnership, they attempt to improve the level of CT among their students. The researcher of this project is participating in an Erasmus exchange and will be staying in Russia for three months to carry out part of this research. Not everything can be done within these three months, so the research will be completed back in The Netherlands. RU is a public research university that lies in the West Siberian part of Russia. It is the oldest university in Russia and is considered one of the best universities. RU has around 18,000 students. RU's mission is to preserve and strengthen the spiritual values of humanity in creating and disseminating progressive knowledge and information. Scientific research and innovative approaches are fundamental to this educational process. DUAS is an institution of higher education in the Netherlands and consist of thirteen academies. Each academy has its own range of bachelor's and master's programs, study routes and courses. The number of students in 2018/2019 is around 27,000.
The contact persons for this project are Dr. Bogdanova and Dr. Ekkel. Dr. Bogdanova is a Associate Professor in the Psychology Department at RU and Dr. Ekkel is a senior lecturer and researcher at DUAS. He is also the supervisor of the researcher on this study. This research provides the universities information about the CT and AE of their second year Bachelor students. The main purpose is what CT can mean for education. Because this research also has the concept of AE, the purpose becomes broader and changes into how the two concepts, CT and AE, can be used in education. This can involve possible similarities and how this can be used, but also about how these concepts can possibly be used separately in education.

The results of this study could be used for a publication about CT. Based on the results, further research can be done to create interventions in the field of CT. Which in turn can lead to better functioning of students. The results will also shed light on a possible cultural difference and similarities between Dutch and Russian students with regard to CT. This outcome can be used in further research into possible interventions for CT or AE based on cultural advantages or disadvantages. Results of the research can also be used to implement changes in the curriculum within DUAS. DUAS is focusing more and more on CT and how this can lead to effective studying and perhaps this research may help to increase knowledge about CT, along with AE, which can result in a step towards effective interventions of CT.

The purpose of this research is to investigate the correlation between CT and AE. Finally, the results of this study are used to advice the universities, about possible aids or further research.

Chapter 2 - Theoretical Framework

In this chapter relevant literature is presented. Paragraph 1 provides literature on the concept of CT, paragraph 2 addresses AE and paragraph 3 provides literature about the link between CT and AE. Paragraph 4 discusses types of interventions, next is the conceptual model elaborated and at last the initial expectations for the results are described.

2.1 - What is Critical Thinking?

2.1.1 - Definition Critical Thinking

CT is a difficult concept to define and that is the reason for a variety of definitions. Psychologist Glaser stated in 1942 that CT is an attitude and a logical application of skills in problem-solving contexts. He defined CT as "(1) an attitude of being disposed to consider the problems and subjects that come within the range of one's experience in a thoughtful way, (2) knowledge of the methods of logical enquiry and reasoning, and (3) some skill in applying those methods." (Glaser, as cited in The Critical Thinking Foundation, 2013).

Ennis (1993) explains CT as the correct assessing of statements and thinking reflectively to decide what to believe or what to do. To achieve this, a person must apply the following 10 things: (1) judge the credibility of sources; (2) identify conclusions, reasons, and assumptions; (3) judge the quality of an argument, including the acceptability of its reasons, assumptions, and evidence; (4) develop and defend a position on an issue; (5) ask appropriate clarifying questions; (6) plan experiments and judge experimental designs; (7) define terms in a way appropriate for the context; (8) be open-minded; (9) try to be well informed; (10) draw conclusions when arranged, but with caution.

Brooksfield (1987) defines CT as identifying and challenging the assumptions underlying our own or another's beliefs and behavior, as well as exploring and imagining alternatives to current ways of thinking and living.

In the paper of Facione that was published in 1990 a Delphi method was used to come to a broad definition of CT. The panel of experts consisted of 46 experts in the field of psychology. The consensus definition of CT they agreed on is the following:

> we understand CT to be purposeful, self-regulatory judgment which results in interpretation, analysis, evaluation, and inference, as well as explanation of the evidential, conceptual, methodological, criteriological, or contextual considerations upon which that judgment is based. The ideal critical thinker is habitually inquisitive, well-informed, trustful of reason, open-minded, flexible, fair-minded in evaluation, honest in facing personal biases, prudent in making judgments, willing to reconsider, clear about issues, orderly in complex matters, diligent in seeking relevant information, reasonable in the selection of criteria, focused in inquiry, and persistent in seeking results which are as precise as the subject and the circumstances of inquiry permit (Facione, 1990, p. 3).

To assess the cognitive level of someones CT there is a division into two categories: CT skills and disposition. Facione (1990) identified six CT skills (interpretation, analysis, evaluation, inference,

explanation, and self-regulation) with sixteen sub-skills, and nineteen dispositions (including inquisitiveness, open-mindedness, understanding others, self-confidence and so on).

This definition created by the Delphi Committee is widely used in multiple articles about CT, such as Abrami et al. (2008), Abrami, Bernard, Borokhovski, Waddington, Wade and Persson (2015), Behar-Horenstein and Niu (2011), Fong, Kim, Davis, Hoang and Kim (2017) and more. This shows this definition is reliable and therefore this definition will also be used in this research. Furthermore this is the definition described and used in the questionnaire for CT used in this research. Stupple et al. (2017), the founders of the Critical Thinking Toolkit (CriTT), noted that this definition captures the complex and multifaceted nature of CT.

2.1.2 - Attitudes and beliefs about Critical Thinking

By evaluating our perception of objects or activities, attitudes and beliefs towards these objects and activities are created. They are mainly defined in terms of favorable, unfavorable perceptions associated with aspects of objects or activities. Attitude strength is often determined by the importance of these perceptions (Celuch, Black, & Warthan, 2009).

Attitudes have been implicated in the process whereby self-identity is formed and changed. Self-identity is defined as the degree to which a person views himself as fulfilling a role that is linked to a specific domain of behavior. It is understood as an important influencer of intrinsic motivation, behavioral intentions and behavior, through a process of internalization. The more self-identity is tied to a specific domain of one's behavior it becomes a more prominent aspect of a person's overall self-concept (Celuch et al., 2009).

According to Stupple et al. (2017) being confident about one's own CT skills, avoiding CT or misconceptions of CT are components that belong to the attitudes and beliefs about CT. Duro, Elander, Maratos, Stupple and Aubeeluck (2013) did a qualitative study among psychology students and their lecturers about understanding CT in higher education. They concluded that the initial views and expectations of students are very vague, with many expressions showing that they don't understand what CT is, and how to do it. When students are unsure how they can develop CT skills and struggle to demonstrate them in their assessment, one can talk about a lack in confidence in the application of CT in education. However, being confident about CT skills is important because it has a positive correlation with the ability to over-ride ones beliefs when considering the strength of arguments (Stupple et al., 2017). Confidence is part of the self-efficacy, this refers to an individual's judgment on their own abilities to achieve their designed performance levels. High confidence is a positive attitude, and makes them belief in their abilities which result in motivation. If their is a lack in confidence it becomes a negative attitude and thereby an obstacle to CT (Dehghani, Pakmehr, & Malekzadeh, 2011).

Because students too often have a vague and not extensive definition of the term CT, it has an influence on determining the value of CT in education. Students with no understanding of CT don't immediately see it as an added value in their learning process (Duro et al., 2013). According to Stupple et al. (2017) a high valuing of CT correlates with the ability to over-ride ones beliefs and ability to assess argument strength. If students see CT as more important the attitude strength of the CT related activity will be higher. For example, a student thinks CT is important in his education, he identifies more as a critical thinker and therefore has a higher intrinsic motivation or behavioral intention to actually learn more about CT and use CT in his assessments (Celuch et al., 2009).

With the not understanding what CT is and how to apply CT, it is no surprise misconceptions about CT and avoiding CT come to the surface. This correlates negative with the ability strength of

arguments. So there is a high avoidance, ones ability to asses arguments strength is not really high (Stupple et al., 2017)

Teachers can use the CriTT to assess students' needs, to identify those who don't have confidence in their CT skills, do not value CT, or have misconceptions about CT. This would simplify the implementation of learning interventions to support their development as critical thinkers. These interventions can consist of confidence building activities, demonstrating the value of critical thinking and challenging misconceptions. The items of the CriTT could help with teaching CT by generation conversations about expectations of CT, to draw attention to the concerns of students or to encourage students to reflect on the role of CT in their studies (Stupple et al., 2017).

2.1.3 - Measuring Critical Thinking

A number of measuring instruments mainly focus on measuring the problem solving in CT, examples of such measuring instruments are OCR AS (Wells, Burton, & Burton, 2006) and Thinking Skills Assessment (Black, 2008, 2012). This focus stems from the idea that those who can think critically are able to solve problems effectively. Problem solving is thereby a CT skill (Snyder & Snyder, 2008). According to Stupple et al. (2017) the main focus on measuring problem solving and CT skill is limited in size due to an excessive reliance on formal reasoning tasks. Other instruments measure dispositions of CT. Although these are important perspectives they don't adequately reflect students' attitudes and beliefs about CT, which have the potential to play an important self-regulatory role. It would be helpful to use a wider range of measures to investigate CT, including measures of attitudes and beliefs about CT and CT behavior like the CriTT.

CriTT can provide teachers with information in which domains students experience blockages related to confidence in CT skills, place insufficient value on CT or have misconceptions about CT. This would facilitate the implementation of interventions to support students development to critical thinkers (Stupple et al., 2017). Because this research focuses on the question of what CT can mean for education, this questionnaire is very suitable. It provides insight for teachers on how and in what area they can implement CT interventions in their lessons and perhaps the curriculum.

2.2 - What are Academic Emotions?

2.2.1 - Definition Academic Emotions

Emotions are defined as sets of interrelated psychological processes. These can be subdivided into affective, cognitive, motivational, and physiological components. The affective component is where feelings occur. Thinking or thoughts belong to the cognitive component. Reaction to specific situations pertain to the motivational component and the physiological component pertains the peripheral activation (Pekrun, Frenzel, Goetz, & Perry, 2007; Pekrun et al., 2011). An example: feeling uncomfortable and nervous is part of the affective component. Worrying (cognitive), avoidance motivation (motivational), and peripheral physiological activation (physiological) are examples of the other components.

Pekrun et al. (2007) focus on the theoretical perspective on emotions in education. They view AE according to the control-value theory. It is a social-cognitive perspective on AE. They specify that academic learning and academic achievement are seen as achievement emotions. Achievement is a quality of activities or their outcomes as evaluated by some standard of excellence (Heckhausen, 1991 as cited by Pekrun et al., 2007, p. 13). So there is a separation between activity-related emotions and outcome-related emotions. Emotions that arise from activities in academic settings,

like certain tasks or experiencing emotions during a lecture are activity-related emotions. Outcome-related emotions are emotions pertained to outcomes of academic activities. It can be defined into two sets of emotions: prospective and retrospective outcome emotions. Prospective outcome-related emotions are emotions about looking into the future. Feeling confident about a presentation for instance. Retrospective outcome-related emotions contain emotions when looking back at certain academic settings. For example, not achieving a good grade (Pekrun et al., 2007).

Also the control-value theory suggest that emotions in education result from control and value appraisals relating to learning and achievement. Control appraisals can be explained as having or feel like having intern control over activities and outcomes. It consist of expectancies and attributions that success will be achieved or failure can be prevented. Value is divided into intrinsic and extrinsic value. For example, intrinsic value is to do tasks because someone is interested in the subject without any regard what the outcome would be. The motivation to do good comes from within. Extrinsic value is that certain positive outcomes can lead to other positive outcomes. Like, study hard to get good grade to eventually get a good job. If the control appraisals or the value appraisals is lacking, the emotion is not caused. There are different things that can contribute to the intensity emotions. Specific features of classroom, social environments, and different types and combinations of control-value appraisals contribute to the development of AE (Pekrun, 2006). Furthermore, emotions experienced by students can be categorized into positive or negative emotions. Papers about AE almost always use or mention the control-value theory of Pekrun et al. (2007). See Boekaerts (2007), Elliot and Pekrun (2007), Linnenbrink (2007), Pekrun (2006), Pekrun et al. (2011), Ratner (2007), Villavicencio (2011), Villavicencio (2013) and Weiner (2007). Pekrun is the main founder of the questionnaire for AE used in this research, the definition described in this paragraph is found back in the development of the AE questionnaire. Because Pekrun is the most common author in the field of AE and he is the main founder of the questionnaire used in this research this is a reliable definition and the reason this definition is used in this research.

2.2.2 - Measuring Academic Emotion

Questionnaire like Emotional Skills & Competence Questionnaire (Takšić, Mohorić, & Duran, 2009). and The Profile of Emotional Competence (Brasseur, Grégoire, Bourdu, & Mikolajczak, 2013) measure emotional intelligence, however they are not specified for students in academic settings. The Achievement Emotions Questionnaire (AEQ) is a multidimensional self-report instrument designed to assess college students' achievement emotions. It measures the emotional experiences of students in academic achievement situations (Pekrun, Goetz, & Perry, 2005). It is basically the go to questionnaire for measuring AE.

There are some variations of the AEQ for more specific domains such as mathematics and language related subjects. These versions are the Achievement Emotions Questionnaire - Mathematics (Goetz, 2004; Pekrun, Goetz, Jullien, Frenzel, vom Hofe, & Blum, 2003), Achievement Emotions Questionnaire - Language (Goetz, Pekrun, Hall, & Haag, in press) and the Test Emotions Questionnaire (Pekrun, Goetz, Perry, Kramer, & Hochstadt, 2004)

2.3 - Link between Critical Thinking and Academic Emotions

2.3.1 - Mediator

Villavicencio (2011) stated that AE is a mediator between CT and academic achievement. Positive emotions make way for flexible and creative train of thoughts. In other words, positive emotions facilitate the use of CT. CT has a significant effect on achievement. So if positive emotions makes a better critical thinker, achievement also changes for the better. Students who experience positive emotions tend to use deep cognitive strategies and high engagement. In contrast, negative emotions reduce the chance that students will use cognitive strategies that result in deeper, more extensive processing of information. Negative emotions can interfere with the cognitive processing needed to perform academic tasks. When there is a negative interference it results in the inhibition of achievement (Linnenbrink & Pintrich, 2000). When anxiety or hopelessness is a direct mediator between CT and achievement, the effect of CT is no longer significant.

CT is also a mediator, it mediates between AE and their outcome. Villavicencio (2011) noted that students make insufficient use of high cognitive pathways that uses CT. They use simple rehearsal strategies, like simply preparing for a test, which has no regard to undermine negative emotions. If they make use of cognitive strategies that involves CT in their academic activity it lowers the negative emotions that they may experience. When CT is high, students' cognitive resources are used appropriately for the task to be completed. Making them less anxious and less hopeless, thereby increasing their achievement (outcome).

It is beneficial for students to think critically about academic tasks because it would inhibit them from experiencing negative emotions. Consequently, their performance would improve. In short, students experienced less anxiety and hopelessness when they were engaged in more task-related thinking, increasing cognitive resources available for task purposes, prompting a more analytical and detailed way to process information, thereby increasing academic achievement (Villavicencio, 2011). What teachers can do is to offer challenging activities that stimulate students' CT skills, promote achievement and leave no room for negative emotions.

2.3.2 - Attitudes and beliefs about Critical Thinking and Academic Emotions

As mentioned in paragraph 2.1.2 confidence in CT is part of the self-efficacy. Self-efficacy can influence emotional experiences, because it effects thought, action and emotions. When a high self-efficacy is present it allows a person to construct, display and retrieve life events to create enjoyable experiences. High self-efficacy also has an effect on disturbing thoughts, which can be controlled easier, creating more space for pleasant thoughts and emotions (Götz, Cronjäger, Frenzel, Lüdtke, & Hall, 2010).

Pleasant emotions such as enjoyment and pride are positively related to self-efficacy and self-concept. Unpleasant emotions like anxiety, anger and boredom are negatively related to self-efficacy and self-concept. For example, this means that when a students experience pride at their academic activities they also experience a high-efficacy and self-concept. This results in creating enjoyable academic experiences (Götz et al., 2010).

Suliman and Halabi (2007) stated that there is a positive correlation between CT and self-esteem, and a negative correlation between CT and anxiety. According to them self-confidence in CT contributes to the reduction of anxiety and the improvement of self-esteem.

2.4 - Interventions

To improve students CT the overall method used is implementation of CT interventions (Niu et al., 2013). There are four approaches for interventions, the general approach, infusion, immersion approach and the mixed approach. The general approach teachings CT skills as a separate subject, so without subject content. Infusion is the use of CT through deep understanding of the subject matter of a course. So the subject matter works encouraging to think critically in the subject. And general principles of CT skills and dispositions are made explicit. Immersion is also within a subject but the general principles are not made explicit. Both the infusion and immersion approach teaches CT with subject content. The last approach is the mixed approach and in here a combination of general and infusion or immersion applies (Abrami et al., 2008; Niu et al., 2013). According to Abrami et al. (2015) and Lorencová, et al. (2019) for students to benefit the most of the intervention there must be an interaction between theoretical and practical knowledge of CT. Lorencová et al. (2019) described four interventions. Self-learning, discussion, authentic or anchored instruction and mentoring. Abrami et al. (2015) describes similar interventions: Individual study, dialogue, authentic or anchored instruction and mentoring. The meta-analysis of Abrami et al. (2015) stated that a combination of dialogue, authentic or anchored instruction and mentoring had the highest positive effect to improve CT. Dialogue is characterized by learning through discussion. Authentic or anchored instruction is characterized by an attempt to present students with real problems or issues that make sense to them, engage them and encourage them to inform. Mentoring is characterized by one-to-one interaction where error correction is applied between an expert and someone with less expertise (Abrami et al., 2015). Confidence building activities, demonstrating the value of critical thinking and challenging misconceptions could be part of interventions to facilitate positive attitudes and beliefs about CT (Stupple et al., 2017). Regulation is an important aspect for interventions for AE. Regulation can come in the form of emotion-oriented regulation, appraisal-oriented regulation or competence-oriented regulation. These interventions target the emotion itself. Emotion-oriented regulation is about coping with certain emotions, like relaxation techniques to cope with anxiety or employing interest-enhancing strategies to reduce boredom. Appraisal-oriented regulation is the retraining of attributional factors. And the competence-oriented regulation is to train students learning skills (Pekrun & Linnenbrink-Garcia, 2012; Pekrun et al., 2007).

2.5 - Conceptual model

Figure 1 shows the conceptual model of this research. It is based on the literature described in this chapter. AE consist of positive and negative components. Negative emotions can be the mediator between CT and achievement. This can also work the other way, CT can mediate between the emotion and its outcome.
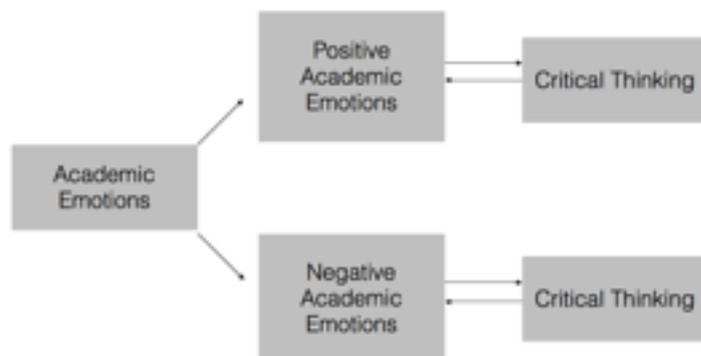
Figure 1. Conceptual model

2.6 - Hypotheses

Based on the literature hypotheses on the sub-questions (as described in paragraph 1.2) are formed.

Hypothesis for sub-question 1.1: *There will be a positive correlation between confidence in critical thinking and positive academic emotions.* Based on the previous studies supporting that confidence in CT is part of the self-efficacy and that when a high self-efficacy is present it allows a person to construct, display and retrieve life events to create enjoyable experiences (Dehghani et al., 2011; Götz et al., 2010).

Hypothesis for sub-question 1.2: *There will be a positive correlation between valuing critical thinking and positive academic emotions.* Consistent with theoretical assumptions that when CT is considered important, the strength of CT related activity is higher. When CT activity is high, students use their cognitive resources better, which inhibits the experience of negative AE and leaves more room for positive AE (Celuch et al., 2009; Villavicencio, 2011).

Hypothesis for sub-question 1.3: *There will be a negative correlation between misconceptions about critical thinking and positive academic emotions.* Following the theoretical assumptions that misconceptions correlate negatively with the ability strength of arguments. So high avoidance results in a relatively low ability to judge arguments strength, which is a CT skill. When CT is low, simple rehearsal strategies are used that disregard positive emotions (Stupple et al., 2017; Villavicencio, 2011).

Hypothesis for sub-question 2.1: *There will be a negative correlation between confidence in critical thinking and negative academic emotions.* Based on the previous studies supporting that if there is a lack in confidence it becomes a negative attitude and thereby an obstacle to CT. CT could be necessary to inhibit the experience of negative emotions. In addition, negative emotions reduce the chance that students will use cognitive strategies that result in deeper, more extensive processing of information needed for CT (Dehghani et al., 2011; Villavicencio, 2011).

Hypothesis for sub-question 2.2: *There will be a negative correlation between valuing critical thinking and negative academic emotions.* Corresponding with theoretical assumptions that when students see CT as more important the attitude strength of the CT related activity will be higher. When CT is high, students' cognitive resources are used appropriately for the task to be completed, making them less anxious and less hopeless (Celuch et al., 2009; Villavicencio, 2011).

Hypothesis for sub-question 2.3: *There will be a positive correlation between misconceptions about critical thinking and negative academic emotions*. Following the theoretical assumptions that high avoidance results in a not really high ability to asses arguments strength. When CT is low students use simple rehearsal strategies that don't account for undermining negative emotions (Stupple et al., 2017; Villavicencio, 2011).

2.7 - Onset

A research is started as a result of the literature search. Some studies have been done on the variables CT and AE. However, these studies are often conducted separately. In this research, the concepts of CT and AE are linked together to fill this void in the literature. In this research, the relationship between attitudes and beliefs about CT and positive and negative AE is investigated among students. Using quantitative research with qualitative research as support. This makes it possible to look per variable (confidence in CT, valuing CT and misconceptions) to which emotions students experience. In the next chapter the research method is represented. In the fourth chapter the results are written, and in the fifth and last chapter the conclusion and discussion and the recommendations are described.

Chapter 3 - Research design

On the basis of this chapter, it is clear how data has been gathered in order to answer the research questions. In the first paragraph the research method is described, followed by paragraphs about the participants of the research, the research instruments, the procedure and the analyzes that will be used.

3.1 - Research method

To be able to substantiate the research as well as possible, a literature study is first carried out. Here, it is investigated what components of the concept of AE and the concept of CT ensure better results for students. There will also be looked for known knowledge about a link between CT and AE. Due to insufficient time and availability because the researcher only has three months to set up the research and to collect all the data, a cross-sectional research was chosen.

In previous studies concerning CT linked to AE, like Villavicencio (2011) and Götz et al. (2010), only quantitative analyzes were used. This research uses a triangulation, this is a form of research that combines different quantitative and qualitative data collection methods. It increases the validity of research results (Verhoeven, 2014). With quantitative research a large amount of data can be obtained in a short period of time. Furthermore, it is a cross-culture study. This means that data is collected from different cultures, in this case the Dutch and Russian culture, and that these are compared with each other. This is done through questionnaires. The questionnaires have closed questions or statements with a number of answer choices. Participants can choose which of the answers is most appropriate for them. This is structured and the questions are already determined in advance. A questionnaire study, also called survey research, was chosen because this is a useful method for measuring the opinions, attitudes and knowledge of large groups of people (Verhoeven, 2014). Qualitative information will be collected to complement the quantitative data in this research. The benefit of employing a mix of methods is that, while a quantitative method provides numerical facts, a qualitative method gives rich description (Verhoeven, 2014). Fifteen open-ended questions and one question with a Likert scale answer system are used in addition to the structured questionnaires. The purpose of the open-ended questions is to elicit what the students learning experiences are (Tiwari, Lai, So, & Yuen, 2006).

The information arising from the questionnaires will be analyzed in SPSS.

3.2 - Participants

In this study, a random sample from the population of 197 Dutch second year applied psychology (TP) students is taken of approximately n=60. Another sample is taken from the population of 60 second year psychology students from Russia n=60. This brings the total to N=120. This is to guarantee the reliability of the research (Verhoeven, 2014). The focus will be on second-year students, because in result of this study the curriculum may change, therefore the respondents are expected to have experience with studying. Dutch students have to choose their speciality after the second year, while Russian students already have chosen a speciality in their second year. Because of this difference per university, a difficulty occurs where and how to divide the Dutch students into variables. Students could be divided on the basis of their specialty, but for the Dutch students this can't be done. This is the reason to generate the second year psychology students as a whole group without any variables per university. For both universities the estimated age of the students was between 17 and 30 years old.

The Dutch respondents will be approached digitally in contrast to the Russian respondents who will be approached during lectures where they will fill out the questionnaires on paper. The general introduction together with the link to the questionnaires and open-ended questions is send in a e-mail to the students. Because the introduction is added in the e-mail, the students have information about the research and an understanding of what kind of research they will be participating in. In Appendix A. the general introduction and demographic information is presented.

3.3 - Research instruments

This research uses the Critical Thinking Toolkit (CriTT) questionnaire to chart the respondents CT. This is a structured questionnaire originally written in English and will be translated into Dutch and Russian. The Achievement Emotions Questionnaire (AEQ) is also a structured questionnaire, originally written in English and will be translated into both Dutch and Russian as well. Each student will complete both questionnaires once.

The CriTT consist of 27 items on the subject of CT. There is a ten-point Likert scale for each item (ranging from 1 'Strongly disagree' to 10 'Strongly agree'). The Dutch version of the CriTT is included in Appendix B. These items are randomly divided into three factors: misconceptions, valuing CT and confidence in CT. Stupple et al. (2017) analyzed the reliability of each factor. The factor confidence measured a Cronbach's Alpha of 0,92, valuing CT α= 0,79 and misconceptions α= 0,60. This demonstrates a high Cronbach's Alpha of factor 1 and 2, and a moderate reliability of factor 3. Item 6, 10, 12 and 21 are related to misconceptions about higher education, CT and conceptual knowledge. Item 4, 5, 7, 9, 16, and 18 relate to the perceived utility of CT for good performance in higher education. The 17 items that are left belong to the factor 'confidence in CT'. They measure the self-efficacy and confidence as well as self-reported CT behavior (Stupple et al., 2017). See Appendix D. for an overview of items corresponding with the sub scales. The items that appear in the CriTT are based on scientific literature research along with transcripts of interviews and focus groups conducted by Duro et al. (2013). They interviewed students as well as academics about the subject CT. Item samples were presented to 133 psychology students from the United Kingdom, the most valid items were selected after the samples were tested. This makes the CriTT a suitable instrument to use, because the respondents in this study are also psychology students with a Western cultural background.

The questionnaire AEQ consist of 232 items. The items are divided into three different sections. These sections contain class-related, learning-related and test-related emotions. The subsection class-related emotions include 80 items, 75 items about learning-related emotion and 77 items asses the test-related emotions. Because of the large amount of items the choice is made to only focus on the learning-related emotions. The items related to learning-related emotion measure an total of eight AE: enjoyment, hope, pride, anger, anxiety, shame, hopelessness, and boredom. The items have a five-point Likert scale ranging from 1; strongly disagree to 5; strongly agree (Pekrun et al., 2005). The Dutch version of the AEQ learning-related section is included in Appendix C. In the questionnaire, items are presented in three blocks pertaining to emotional feelings experienced before, during, and after studying. AE can be defined into four components, affective, cognitive, motivational, and physiological components. In this questionnaire the items can pertain to one of these four components. The AEQ scales were administered to a sample of N=389 students enrolled in undergraduate psychology courses at a large midwestern Canadian university. (Pekrun et al., 2005).

The number of items containing learning-related emotions are 75. With for the sub scales learning-related enjoyment 10 items, learning-related hope 6 items, learning-related pride 6 items, learning-related anger 9 items, learning-related anxiety 11 items, learning-related shame 11 items, learning-related hopelessness 11 items and learning-related boredom 11 items. See Appendix E. for an overview of the items and corresponding sub scales. The reliabilities of the AEQ learning-related scales range from adequate to very good ($\alpha= 0,75$ to $0,92$, with $\alpha > 0,80$ for five of the eight scales). learning-related enjoyment $\alpha= 0,78$, learning-related hope $\alpha= 0,77$, learning-related pride $\alpha= 0,75$, learning-related anger $\alpha= 0,86$, learning-related anxiety $\alpha= 0,84$, learning-related shame $\alpha= 0,86$, learning-related hopelessness $\alpha= 0,90$ and learning-related boredom $\alpha= 0,92$ (Pekrun et al., 2005).

Fifteen open-ended questions and one Likert scale question are added to support the quantitative part of this research. Because it increases the validity of research results and gives a more meaningful representation of the students' learning experiences. For this amount of questions was chosen because the subjects of CT and AE are complex and could not be covered completely with fewer questions. The Dutch version of the open-ended questions are presented in Appendix F. Question 1, 2, 3 is in addition to misconceptions of CT. Question 5 in addition to overall emotions. So for each student which emotions arise first and perhaps dominate most in their studies. Question 6 tries to build a bridge between the two concepts of CT and AE to bring the two questionnaires together. Question 7 and 8 are in addition to the negative emotion and sub scale hopelessness. Question 9 and 10 in addition to the negative emotion and sub scale anxiety. Question 11 and 12 are in addition to the negative emotion and sub scale boredom. Question 8, 10 and 12 are in addition to see how students cope with the experience of negative emotions. AEQ doesn't provide such inside. Question 13, 14 and 15 are in addition to positive emotions during studying. Question 16 is in addition to the CriTT sub scale confidence in CT. Students rate their own CT skills. This provides insight into how the students assess themselves and whether they think they have mastered the skills.

3.4 - Procedure

The CriTT and AEQ questionnaires (Dutch version CriTT in Appendix B. and Dutch version AEQ in Appendix C.) and the open-ended questions are handed out digitally to 197 Dutch students. Aside from answering the questions of the questionnaires and open-ended questions they are asked to release demographic details regarding their gender, age and study year. The purpose of the research and information about the questionnaires are written in the e-mail that is send to the students. The Russian respondents are approached during lectures, because there is only a total of 60 students in the second year of psychology. With this approach there is a higher chance of more respondents. The researcher, while in Russia, has no other option to reach the students in the Netherlands other than digitally. In the e-mail the respondents from DUAS receive, is a link to redirect them to the questionnaires and open-ended questions. In this research Qualtrics is used as an online software tool for spreading the surveys. It takes the students approximately 30 minutes to answer all questions. The questions are translated into Dutch so that the students would have a good understanding of the content of the questionnaires. While completing the questionnaires and open-ended questions they can not click back to previous questions, this is deliberately chosen because some questions concealed possible answers to previous questions. After the respondents are done the data is transferred from Qualtrics to SPSS automatically, this ensures no errors can take place.

3.5 - Analysis

The quantitative data is processed in Statistical Package for Social Sciences (SPSS), this is a computer program for statistical analyzes. In order to be able to answer the research and sub-questions, it is examined whether there is a correlation between the scales of the CriTT and the AEQ. First, the Chronbach's Alpha is calculated to measure the reliability of the questionnaires scales. Following the Chronbach's Alpha, composite variables are created and the average of those variables is calculated. Frequency analyzes are then performed based on the composite variables. Subsequently, to answer the research and sub-question of this research a correlation analysis is performed using the The Spearman's rank correlation. With this type of analysis the relationship between two variables at ordinal level is measured, the difference in the order of variables is calculated. The Spearman's rank correlation in collaboration with the qualitative analyzes are done to test all formulated hypotheses. A positive link implies that the ranking order of a variable equals the ranking order of the other variable and vice versa. A negative link means that a high ranking order on one variable goes together with a low order on the other variable and vice versa (Baarda, Van Dijkum, & De Goede, 2014). The variables in this research are: Confidence in CT, Valuing CT, Misconception, Positive AE, Negative AE, Learning-related Enjoyment, Learning-related Hope, Learning-related Pride, Learning-related Anger, Learning-related Anxiety, Learning-related Shame, Learning-related Hopelessness and Learning-related Boredom.

Because the open-ended questions can't be analyzed quantitatively, this must be done qualitatively. Qualitative analysis is done by unraveling the data and then structuring it in eight steps (Verhoeven, 2014). This starts with reading the data carefully and summarizing it in one word, then evaluating the terms, coding, grouping, making a hierarchy, looking for connections, step seven is to bring everything together in a model or diagram and the last step is to connect the model or diagram with the research questions. An overview of this process is presented in Appendix H.

Chapter 4 - Results

The research results are described in this chapter. First of all, the procedure and response are formulated. In paragraph 2 the reliability is described. The results frequency analyzes are explained. Then, the correlation analysis was carried out to answer the research questions and sub-questions. And finally, the qualitative analysis of the open-ended question are addressed.

4.1 - Procedure and response

The research procedure as described in chapter 3 deviates a bit from reality. Originally, the researcher was supposed to collect data from RU and DUAS during her time in Russia. Due to circumstances which will be discussed further in chapter five in the discussion, this turned out differently. Ultimately, it was not possible to collect Russian data during this research. Data on the RU sample will be collected in the upcoming academic year as the research on CT will be continued on other projects. The data collected from DUAS went as described in paragraph 3.4, only it was carried out when the researcher returned from Russia instead of during her stay. The first time an e-mail with the link to the questionnaires and open-ended questions was send out, was on March, 23. The first reminder was on April, 8 and the second reminder was done by the lecturer at DUAS and supervisor of this research Dr. Ekkel on the 21th of April. As more of an authoritarian figure, student trust and obey them faster (Aronson, Wilson, & Akert, 2010). The chance that more students would respond to the request to participate was higher. It resulted in a response of 54 out of 197 DUAS second year applied psychology students (27,41%). Tabel 1 (see Appendix G.) shows the response of this research. No items from the CriTT and AEQ needed to be recoded and there were no values missing in the questionnaires.

4.2 - Results reliability analysis

The Cronbach's Alpha of the CriTT is 0,86 and of the whole AEQ, 75 items, α= 0,91. Item 10 of the CriTT is deleted, the Cronbach's Alpha of the sub scale Misconceptions went from α= 0,53 up to α= 0,60. After item 10 was deleted all scales show a Cronbach's alpha above 0,60 which indicates reliability based on internal consistency (Baarda et al., 2014). In Table 2 (see Appendix G.) is the reliability analysis of the CriTT and the AEQ presented without the item deleted. For each sub scale the amount of items and the Cronbach's Alpha are shown. Further analyzes will be done without item 10 of the CriTT.

4.3 - Results frequency analysis

Based on the completed questionnaires frequency analyses were carried out. In Table 3 (see Appendix G.) is a description of the mean scores, standard deviations (SD), minimum and maximum of the scales based on the total score of the CriTT sub scales. In Table 4 (see Appendix G.) can the same description be found but based on the mean score of the CriTT sub scales. CriTT is sampled on 133 English students, they showed M=6,75 for Confidence in CT. As shown in Table 4, DUAS students with M= 5,29 have a lower mean score on this sub scale. This also counts for Valuing CT, the sample group scored M= 8,33 and DUAS score M= 6,90. The DUAS student do score higher on Misconceptions, M= 6,36, where the sample group scored M= 5,75.

Table 5 (see Appendix G.) present the mean scores, standard deviations (SD), minimum and maximum of the scales, based on the AEQ total score sub scales. In Table 6 (see Appendix G.) are the mean scores, standard deviations (SD), minimum and maximum of the scales, shown of the

mean score of the AEQ sub scales. Compared to the sample group DUAS students have a lower mean score on the total score of the sub scales than the sample group. The sample group score on the sub scale Joy M= 33,09 whereas DUAS students score M= 29,59, Hope M= 20,27 compared to DUAS's M= 19,65, Pride M= 21,59 and DUAS M= 21,39, Anger M= 22,00 compared to M= 17,93, Anxiety M= 30,69 for the sample group and M= 25,65 for the Dutch students, Shame M= 29,00 and M= 24,65, Hopelessness M=23,06 with M= 20,74 for DUAS and Boredom M= 30,69 compared to M= 29,02.

The side by side of the mean scores from the DUAS students and the sample groups with the difference in mean scores can be found in Table 7 (see Appendix G.).

When answering the open-ended questions, the respondents also had to fill in question 16. This was a question about their opinion about their own CT skills (Appendix F.). They had estimate their skills based on a Likert scale with five possible answers from 1= very poor to 5= excellent. As presented in Table 8 (see Appendix G.) the majority of the respondents estimate themselves to be average when it comes to their CT skills when answering question 16 of the open-ended question part. Only a small part consider themselves as very poor or below average critical thinkers. Interpretation shows even that there are no respondents at all who estimate themselves to have poor or below average CT skills. Furthermore the percentage on analysis show that 13% of the respondents estimate themselves poor or below average, evaluation 9,3%, inference 24,1%, explanation 1,9% and self-regulation 1,9%. The skill in which respondents rate themselves the highest is the skill to self-examination and self-correction (44,4% > above average).

4.4 - Results data analysis

The results of the data analysis are described in this paragraph and will be dealt with per sub-question. The Spearman's rank correlation test is used to answer the research questions and sub-questions.

Sub-question 1.1 What is the correlation between confidence in critical thinking and positive academic emotions?
The Spearman's rank correlation test is used to calculate the correlations between confidence in CT and the positive AE enjoyment, hope and pride. Table 9 (see Appendix G.) shows the correlations between CT and positive AE. As shown by the results there appears to be a strong positive correlation between the extent to which respondents have confidence in one's own CT skills and the extent to which they experience positive AE (r= 0,30; p < 0,01, one-tailed). This stems from a strong positive correlation between having confidence and experiencing pride before and during academic activities (r= 0,28; p < 0,05) and a strong positive correlation between having confidence and experiencing hope before and during academic activities (r= 0,26; p < 0,05). A weak positive correlation was found between confidence and enjoyment (r= 0,21; p > 0,05).

Sub-question 1.2 What is the correlation between valuing critical thinking and positive academic emotions?
To calculate the correlations between valuing CT and the positive AE enjoyment, hope and pride the Spearman's rank correlation test is used. The results of the test can be found in Table 9. Here, too, there seems to be a strong positive correlation between the extent of which students recognize the importance of CT and positive AE (r= 0,55; p < 0,01). The correlation between valuing CT and enjoyment is positive in nature and strongly present (r= 0,54; p < 0,01). Between seeing the

importance of CT and experiencing hope before and during academic activities, there appears to be a strong positive correlation as well (r= 0,23; p < 0,05). Between valuing CT and experiencing pride in education is also a strong correlation present (r= 0,58; p < 0,01). Valuing CT and pride seem to have the strongest correlation in the categories of CT and positive AE.

Sub-question 1.3 What is the correlation between misconceptions about critical thinking and positive academic emotions?
The Spearman's rank correlation test is also used to calculate the correlations between misconceptions about CT and the AE enjoyment, hope and pride. There appears to be a strong positive correlation between the avoidance and misconceptions of CT and experiencing joy before, during and after academic activities (r= 0,35; p < 0,01) as shown in Table 9. However, a weaker positive correlation seems to be present between misconceptions and on both the emotions of hope and pride (r= 0,03; p > 0,05, r= 0,13; p > 0,05). Even though the weaker correlations appear to exist, this is followed by a strongly positive relationship between the avoidance and misconceptions of CT and experiencing of positive AE before, during and after studying.

Sub-question 2.1 What is the correlation between confidence in critical thinking and negative academic emotions?
To calculate the correlations between confidence in CT and the negative AE anger, anxiety, shame, hopelessness and boredom, the Spearman's rank correlation test is used. Table 10 (see Appendix G.) shows the results of the analysis between CT and negative AE. The correlation between the extent to how self-efficient and confident in their own CT skills the respondents are and the extent to which they experience negative AE appears to be weak and negative (r= -0,02; p > 0,05). There seems to be a weak negative correlation between the extent to how confident they are and the extent to which they experience shame (r= -0,13; p > 0,05), hopelessness (r=-0,17; p > 0,05) and boredom (r=0,02; p > 0,05). A weak positive correlation seem to possibly be present between the extent to which respondents have confidence in one's own CT skills and the extent to which they experience anger (r= 0,01; p > 0,05) and anxiety (r=0,03; p > 0,05).

Sub-question 2.2 What is the correlation between valuing critical thinking and negative academic emotions?
The correlations between valuing CT and the negative AE anger, anxiety, shame, hopelessness and boredom is calculated with the Spearman's rank correlation test. There appears to be a weak positive correlation between the extent to which the importance of CT is seen and the extent to which they experience anger, anxiety and shame. The correlation for anger (r= 0,17; p > 0,05), for anxiety (r= 0,18; p > 0,05) and for shame (r= 0,19; p > 0,05).
Valuing CT seem to show a weak negative correlation with boredom and hopelessness (r= -0,02; p > 0,05, r= -0,11; p > 0,05). The overall correlation between recognizing the importance of CT and the extent of which the respondents experience negative AE before, during and after studying is positively weak (r= 0,09; p > 0,05). The results are shown in Table 10.

Sub-question 2.3 What is the correlation between misconceptions about critical thinking and negative academic emotions?
For this sub-question the Spearman's rank correlation test is used to calculate the correlations between misconceptions about CT and negative AE like anger, anxiety, shame, hopelessness and boredom. There appears to be a strong positive correlation between the avoidance and

misconceptions of CT and the experience negative AE of anger, anxiety and shame. As Table 10 shows, between misconceptions and feeling angry before, during or after studying ($r= 0,23$; $p < 0,05$), between avoidance of CT and feeling anxious before, during or after studying ($r= 0,24$; $p < 0,05$) and between misconceptions of CT and being ashamed ($r= 0,24$; $p < 0,05$). However, because there appears to be a weak correlation between avoidance and misconception and experiencing hopelessness and boredom ($r= 0,01$; $p > 0,05$, $r= 0,17$; $p > 0,05$) the overall correlation between misconceptions and negative AE about studying seems weak.

4.5 - Results qualitative analysis

The respondents answered 15 open-ended questions related to CT and AE (Appendix F.). Based on these questions a qualitative analysis is done.

The respondents define CT as analyzing and assessing information or a problem and as looking for better or other solutions (see Appendix H.). They mainly describe it as not simply accepting everything, first it has to be looked at from all aspects / all perspectives / all possibilities and then deciding whether the information is correct or incorrect. Some even used the word skill. They also describe CT with other names such as extra, further, interested, perfectionistic or objective thinking. A reasonable number have an idea of what CT is, however, there are gaps in the descriptions of CT, which leaves room for misconceptions.

> "Critical thinking is defined by analyzing a text well and looking at multiple sides and possibilities." (Second year student).
> "Critical thinking is extra thinking about certain assumptions." (Second year student).

According to the respondents, academic tasks that require CT are tasks such as writing reports, projects, reflecting and giving feedback. Writing research, such as literature, psychological, diagnostic and neuropsychological research, is also mentioned several times. These are indeed tasks that require the CT.

Negative emotions while doing tasks that require CT are boredom, frustration, uncertainty and fear (see Appendix H.). Especially frustration and boredom are often mentioned. Positive emotions while doing tasks that require CT are joy and interest.

> "To conduct research and write reports on it. requires critical thinking" (Second year student).
> "Tasks that require critical thinking are providing feedback and doing projects." (Second year student).

When asked whether CT can be learned, the vast majority said yes. The claims were that everything, including a skill such as CT, can be taught and some indicate that they already have experience with learning CT during their time at DUAS. However, their beliefs are that some will probably stay better than others.

> "You can learn to think critically through practice and awareness." (Second year student).
> "I think critical thinking can be learned because I believe it is a skill and skills we can all develop." (Second year student).

According to the qualitative data, to improve CT in education students need explanations, examples, discussions and exercises step by step. The idea of implementing it earlier in education has also been mentioned.

>"The best way to teach critical thinking is to show lots of examples and build up step by step." (Second year student).

If all the positive and negative emotions are placed next to each other, it appears that more different negative emotions are experienced while studying. However. positive emotions are experienced more frequently. Frustration and boredom are often mentioned. Fear, stress, anger and sadness are also mentioned but less often. When time pressure is felt, when they don't understand topics or information and around exams the respondents experience helplessness and anxiety. In situations where they are bothered by time pressure or they think they are going to fail they suffer from anxious feelings (see Appendix H.). However, some appear to don't experience anxiety at all. Boredom occurs mainly while studying uninteresting subjects.

>"Situations where I feel helpless while studying are when there is time pressure and I am behind and don't understand what to do." (Second year student).
>"I feel anxious when a deadline or exam is approaching and I haven't learned well yet." (Second year student).

How they cope with hopelessness, anxiety and boredom is through taking a pause or to shift attention when these emotions arise (see Appendix H.). This is done in the form of watching series, eating, listening to music and seeing friends. In the case of hopelessness, some rely on their perseverance, this is also often done in the event of boredom. In case of anxiety they may asks for help or they try to calm themselves by doing breathing exercises. In the event of boredom, they seek out distraction on purpose or they try to find the motivation for themselves again.

>"I control my emotions with regard to boredom and hopelessness while studying through perseverance, otherwise if I really do not succeed I look for distraction (clean up, telephone or food)." (Second year student).
>"I take a lot of breaks when I'm studying and I'm bored." (Second year student).

Interest is most often mentioned as a positive emotion when studying. After that comes joy (see Appendix H.). A few appear to experience pride. The extent of which pride is experienced differ from rarely to often, it mainly happens when they have completed something. It is also experienced, but less, when they understand the material well, have achieved something or they scored high on a practice test, for example. Self-confidence or hope is rarely experienced. Those feelings appears especially when they feel they have enough knowledge or skills. Joy is the most present positive emotion compared to hope and pride. This is experienced when they understand the material well and find it interesting. Some experience it when they work with fellow students.

>"When I experience joy while performing academic tasks, it is usually related to contact with other students." (Second year student).
>"I experience a proud and confident feeling when I finish something or understand the material after a long time." (Second year student).

Chapter 5 - Conclusion, discussion and recommendation

In this chapter the conclusion, discussion and recommendations of the research are formulated. Firstly, the hypotheses are accepted or dismissed and the research and sub-questions are answered. Subsequently, the procedure and the conclusion of the study are discussed. Finally, based on the conclusion and discussion, recommendations are described.

5.1 - Conclusion

5.1.1 Sub-question 1.1

The first sub-question concerns the correlation between confidence in CT and positive AE is. Pride had the strongest correlation of the three positive AE. The results indicates that the more they are confident in their CT skills and self-efficient in their CT, the prouder they are of themselves and their accomplishments. Also the other way around, the prouder they are of themselves and their accomplishments, the more they are confident in their CT skills and self-efficient in their CT. It can be concluded that CT helps students accomplish their tasks, resulting in a positive studying outcome which they can be proud of. This finding is consistent with the literature of Götz et al. (2010) which suggest that self-efficacy corresponds positively with pleasant emotions like pride. With regard to hope it can be concluded that the more confidence and self-efficacy in CT, the more optimistic and confident students are about studying. Concerning confidence in CT and enjoyment, a conclusion that the more confident in CT a student is the more joy he or she experiences can't be drawn. This finding contradicts the literature that has been found. Which shows that in addition to pride, enjoyment is also positively related to self-efficacy (Götz et al., 2010). It can be concluded that the more a student experiences self-confidence and self-efficacy in CT, the more positive emotions he or she experiences about studying. The hypothesis can therefore be accepted. According to question 16 of the open-ended questions, most of the respondents rates themselves to be average at CT skills. Also a large part estimate their CT skills to be quite high. The smallest part rate themselves below average or poor when it comes to their CT skills. Question 6 of the open-ended questions shows that the positive emotions experienced during tasks that require CT are interest and pleasure. From this it can be concluded that when students rate themselves average or highly on their CT skills, interest and pleasure arise.

5.1.2 Sub-question 1.2

Secondly, the sub-question what the correlation between valuing CT and positive AE is will be answered here. It can be concluded that the more students recognize the importance of CT, the prouder they are of themselves and their achievements, the more students look forward to and enjoy studying and the more hopeful they are before and during their studies because of assuming a positive outcome. The hypothesis that there will be a positive correlation between valuing CT and positive AE is thereby accepted. This corresponds with the found literature. According to Celuch et al. (2009) the more CT is seen as important the higher the strength of CT related activity is. And when the CT activity is high students use their cognitive resources more appropriately, which inhibit experiencing negative AE and leaves more room for positive AE (Villavicencio, 2011).

5.1.3 Sub-question 1.3

The third sub-question is what the correlation between misconceptions about CT and positive AE is? The conclusion that the more students avoid CT or have misconceptions about CT, the more pleasure they experience about studying is drawn. The results indicated that the more students avoid CT or have misconceptions about CT, the more positive AE they experience before, during or after studying. However, this applies to the overall positive AE and not to the specific positive AE of hope and pride. This conclusion clashes with the hypothesis that there will be a negative correlation and therefore the hypothesis is rejected. This contradicts with the literature. According to Stupple et al. (2017) misconceptions correlates negative with the ability strength of arguments. So high avoidance results in a not really high ability to asses arguments strength, which is a CT skill. Villavicencio (2011) stated that when CT is low they use simple rehearsal strategies which has no regard to facilitate positive emotions.

5.1.4 Sub-question 2.1

Sub-question 2.1 researches the correlation between confidence in CT and negative AE. From question 6 and 16 of the open-ended questions it can be concluded that when students estimate themselves average or highly on their CT skills, boredom, frustration, fear and insecurity surface. No other conclusions can be drawn because there are no correlations, upon which the hypothesis is rejected. This contradicts with the research of Dehghani et al. (2011) that suggest that if there is a lack in confidence it becomes a negative attitude and thereby an obstacle to CT. Thinking critical about academic tasks can inhibit the experience of negative emotions. So maybe if not thinking critical there is no inhibition for the negative emotions to grow. Also, negative emotions reduce the chance that students will use cognitive strategies that result in deeper, more extensive processing of information. Negative emotions can interfere with the cognitive processing needed for CT (Villavicencio, 2011).

5.1.5 Sub-question 2.2

The second sub-question 2.2 was about what the correlation between valuing CT and negative AE is. As well as at sub-question 2.1 no significance is found between valuing CT and negative AE. The hypothesis is therefore rejected, because it is not possible to speak of a correlation if no significance is present. This contradicts with the findings of Villavicencio (2011) and (Celuch et al., 2009). If students see CT as more important the attitude strength of the CT related activity will be higher (Celuch et al., 2009). When CT is high, students' cognitive resources are used appropriately for the task to be completed. Making them less anxious and less hopeless according to Villavicencio (2011). This suggest that high scores in valuing CT should correlate with low scores in negative AE.

5.1.6 Sub-question 2.3

What is the correlation between misconceptions about CT and negative AE is the last sub-question in this research. A conclusion can be drawn that the more CT is avoided or misconceptions about CT arise, the more irritated or annoyed, anxious or nervous, ashamed or embarrassed they feel about studying. However, this is not the case with regard to feeling hopeless, bored and overall negative AE. For that reason, the hypothesis of sub-question 2.3 has also been rejected. This rejection doesn't correspond with the found literature. Avoidance and misconceptions correlate

negative with the ability strength of arguments. So high avoidance results in a not really high ability to asses arguments strength (Stupple et al., 2017). When CT is low students use simple rehearsal strategies that don't account for undermining negative emotions (Villavicencio, 2011). This indicates that when there is a high score in misconceptions there should be a high score for negative AE.

5.1.7 General conclusion

Following sub-questions 1.1, 1.2 and 1.3, it can be concluded that recognizing the importance of CT is the main attitude towards CT which can be linked to positive AE. Being confident and self-efficient in CT may also be of importance in connection to positive AE, because the more confident about their CT skills they are the more proud and optimistic students can be in relation to studying and vice versa. What is striking is that the more CT is avoided and misconceptions exist of CT, the more positive AE are experiences. It was expected that the more misconceptions of CT, the less positive emotions would occur. Maybe it can be explained that avoidance and misconceptions correspond with assessing and finishing things quickly instead of going through and considering everything carefully. CT takes more time, if this is not done it can maybe save the student some time, which can be a positive outcome.

Also can be concluded that CT has a positive effect on positive AE and vice versa, but there are also other factors that have influence. The respondents experience positive emotions when they have completed something, maybe even when it is done quickly. When they understand the material well, have enough knowledge or skills, have achieved something or find the material interesting are situations where the respondents experience positive emotions. Joy and interest are positive emotions that emerge during tasks that require CT. CT can provide a better understanding of the material, resulting in increasing pride, hope and joy.

Following sub-questions 2.1, 2.2 and 2.3 it can be concluded that only when students avoid CT or have misconceptions about CT they might experience more anger, anxiety or shame. And vice versa, students who experience more anger, anxiety or shame have more misconceptions and avoid CT more. For the other negative AE, hopelessness and boredom this doesn't apply. Misconceptions can be partly explained by the extent to which students experience anger, anxiety and shame. However, there are also other factors that contribute. The majority of the experienced emotions during studying, which in many cases requires CT, are negative in nature. Especially boredom and frustration are most experienced. Uncertainty and fear are also experienced but to a lesser extent. When time pressure is felt, when they don't understand topics or information and around exams the respondents experience helplessness and anxiety. Anxious feelings appear in situations where they run out of time or when they think they are going to fail. Perhaps a lack in CT contributes to not understanding information and topics completely. This can result in procrastination resulting in students experiencing time pressure.

The results were also compared to the English reference group of the CriTT and the Canadian reference group of the AEQ. The mean score of the Dutch student did differ a little from the English group. Compared to the reference group, the Dutch students know less about CT, value CT less and are also less confident. This may result that they identify less as a critical thinker and therefore use CT less (Celuch et al., 2009).

The mean score of the DUAS students compared to the Canadian group differ on the fronts of enjoyment, anger, anxiety en shame. In comparison to the reference group, students from DUAS

experience less enjoyment, less anger, less anxiety and less shame in regards to their academic activities.

5.1.8 Additional question

The question *what are the characteristics of efficient critical thinking interventions* will be answered following literary academic sources and question 4 from the qualitative data. According to the respondents a skill like CT can be learned because everything can be learned. According to the respondents to improve CT in education students need explanations, examples, discussions and exercises step by step. In this data the idea of implementing it earlier in education is also mentioned. But even though it can be learned some will be better at it than others. The literature shows that interventions should be implemented as both teaching CT itself and that it should be acquired within the subject content. Also several variants for teaching CT must be used in combination with each other, such as dialogue, authentic or anchored instruction and mentoring. According to Abrami et al. (2015) this had the highest positive effect to improve CT. Dialogue is characterized by learning through discussion. Authentic or anchored instruction is characterized by an attempt to present students with real problems or issues that make sense to them, involve them and encourage them to inform. Mentoring is characterized by a one-to-one interaction in which error correction is applied between an expert and someone with less expertise. Having discussions, using (real) examples and providing guidance in explanations correspond to the data.

5.2 - Discussion

5.2.1. Reliability of this research

According to Verhoeven (2014) a research is reliable when it can be repeated and the same result is obtained. In this research, the instruments CriTT, AEQ and open-ended questions are used. CriTT is a fairly new developed questionnaire, and needs more testing with a wider population to better conclude whether it can be generalized outside the sample university. However, several significant correlations have been found between the CriTT and other tests that measure aspects of CT such as Argument Evaluation Test and the Cognitive Reflection Test (Stupple et al., 2017). The CriTT was translated from English to Dutch, a translated questionnaire doesn't guarantee reliability and validity. After translated all the scales went down in reliability, however it still indicates reliability based on internal consistency (Baarda et al., 2014).

Few questionnaires are available that measure AE as a direct variable. Actually, the AEQ is the only authentic questionnaire in this area, from which other variants have emerged. According to Pekrun et al. (2011) the reliability the AEQ scales range from good to excellent. For this research the Learning-related scales are translated into Dutch. Which also doesn't guarantee reliability and validity. There is a difference in homogeneity between the translated and the original version. In this research only eight scales were used, all eight scales indicate that the reliability of the AEQ Learning-related scales in this research range form good to excellent.

In the qualitative research emotions which are not necessarily considered AE were also discussed. Which gives even more information about which emotions are experienced. Questions 13, 14 and 15 start with 'how often'. This question doesn't explain in which time frame they had to answer the question, what makes it more difficult to make a statement about it. 'In what situations' would have been a better formulation of the questions. Now information is lost.

The inter-rater reliability can be questioned because only one researcher has processed the qualitative information and therefore no statement can be made about the degree of agreement of the collected data. The interpretation of the researcher can influence the qualitative data results (Verhoeven, 2014). Something can also be said about the time span in which the data was collected. Because it was collected over a period of more than a month, it could be the case that respondents experienced different emotions at a certain time of completion than at others at another time. For example, at a time when they just finished an assignment, they might indicated more pride than at a time when they are still busy in their studies. One may wonder why no correlation has been found in negative AE and CT even though the literature suggested it. Perhaps because other research did not measure attitudes and whether the questionnaires used were adequate. Villavicencio (2011) measured CT with the learning strategy scale of the Motivated Strategies for Learning Questionnaire (MSLQ), this scale measures students' use of different cognitive and metacognitive strategies and students' management of different resources. It is not the same as the CriTT. However, according to the literature more correlations should be present, the reliability of this research can be disputed.

5.2.2. Validity of this research

The validity examines to what extent the research is free from systematic errors (Verhoeven, 2014). Both the questionnaires are based on psychology students, this research is done with applied psychology students, these groups overlap and show reliability. The questionnaires are both self-reporting questionnaires which takes away objectivity what may lead to socially desirable behavior (Verhoeven, 2014). Also reliability has decreased after translation. This can question the validity. In other studies, different kinds of measuring instruments have been used to measure CT. As a result the content of this research doesn't quite correspond with other literature. Furthermore, the respondents in this research consisted of more women than men. There are also more women than men in the study of Applied Psychology. The age of the respondents is between 18 and 27 years old, this also corresponds with the estimate age between 17 and 30 years old in paragraph 1.2. This shows validity of the population. Because both quantitative and qualitative research has been done in this research, it increases the reliability and validity (Verhoeven, 2014). The usefulness of this research especially apply for DUAS because it can be generalized to their students. Because the respondents only exist out of DUAS students, this research can't be generalized to the population of other universities.

5.2.3. Limitations of this research

A limitation in this research is that is was supposed to be a cross-cultural research. But because no data could eventually be collected at the Russian location, this has been canceled. The reason for this is that when the questionnaires and open-ended questions were ultimately formulated and confirmed by the supervisors, the semester in Russia had already come to an end and too few students were present on campus. It was decided that a Russian lecturer would conduct the questionnaires at a later date, because there are also a limited number of second year students at RU. Due to the coronavirus, the process of translating, conducting and translating the questionnaires and open-ended questions back from Russian there was too much of a delay to be able to finish this research in time for the deadline of submission. Therefore, the choice was made to no longer conduct the Russian data for this research and to only use the data collected from DUAS. And another limitation is limited literature is known that correlates CT with AE.

5.3 - Recommendation

The main purpose is what CT can mean for education. Because this research also has the concept of AE, the purpose becomes broader and changes into how the two concepts, CT and AE, can be implemented in education.

Recommended is to implement CT more in education through interaction between theoretical and practical knowledge, also known as the mixed approach. This could be done by teaching CT as a specific subject and to teach within subject content, through dialogue, authentic or anchored instructions and mentoring. A example of a dialogue intervention is the Socratic Dialogue. The questions and comments from the instructor are intended to help the students see principles that underlay the public relations problems or solutions. See Appendix I. for an overview of some suggestions for using socratic discussion. Appendix J. shows the Interview of Ethics intervention. The objectives of this intervention are to examine aspects of students interview process, engage in Socratic discussion regarding ethics, identify belief systems and generate interview questions, practice Socratic discussion by conducting interviews and to evaluate interviews.

Doing so will increase knowledge and self-confidence in CT. The more confident they are about their CT skills the more positive emotions will be experienced during academic studying. Interventions that increase confidence in CT, like confidence building activities, and students' value of CT, think of demonstrating of the value of CT, should be used especially when positive emotions want to be facilitated. Interventions that reduce misconceptions and avoidance of CT should be used especially when negative emotions want to be inhibited. Also the implementation of emotion-oriented regulation, assessment-oriented regulation or competence-oriented regulation could be helpful. These interventions could contribute to facilitate positive emotions through to create cognitive openings, creating more self-confidence, self-effectiveness and appreciation for CT in itself.

What applied psychology (TP) professionals can do in this is to instruct lectures about strategies to teach CT and also to construct interventions of CT that include emotions. For example, to add relaxation techniques or retraining techniques when developing CT interventions.

In future research the correlation between CT and AE should be explored more, because only limited research has been done in this field. This can be done, for example, through collecting more data in upcoming academic years. As part of the partnership between RU and DUAS, in the next academic year data from RU can be collected as the research on CT will be continued. This can provide data from other cultures and the opportunity to compare the results. This project can also be complemented by additional focus on interventions.

Perhaps other CT measuring instruments can be used to clarify which specific aspects of CT and which aspects of AE are exactly related. What emerged from the qualitative research is that when students don't understand the material or tasks that require CT well, negative emotions come to light. Future research can examine how CT can help in better understanding materials. Also a lack in CT possibly contributes to not understanding information and topics completely. This can result in procrastination resulting in students experiencing time pressure. Perhaps future research can help researching CT in correlation with procrastination and AE.

Also because emotions are partially organized in domain specific ways, variants of the AEQ can be used for further research to measure domain specific emotions. If CT is to be taught domain-specifically, it can help to know which emotions are experienced per subject, so that this can be taken into account while learning CT.

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Appendix A - General introduction and demographic information in Dutch

Hallo mede studenten,

Ik ben een Toegepaste Psychologiestudent en voor mijn bachelorscriptie zou ik je willen vragen om deel te nemen aan een interculturele studie tussen Russische en Nederlandse studenten en twee vragenlijsten in te vullen. Een vragenlijst gaat over academische emoties, dit gaat over je ervaring met emoties die samenhangen met studeren. De andere vragenlijst gaat over kritisch denken, dit gaat over je houding en overtuigingen over kritisch denken. Er zijn ook open vragen toegevoegd over kritisch denken in combinatie met academische emoties. Er zijn geen goede of foute antwoorden.

De verzamelde informatie wordt gebruikt voor scriptie doeleinden en kan worden gebruikt voor een publicatie over kritisch denken en andere onderzoeks- en onderwijsprojecten. De oplevering duurt ongeveer 30 minuten en is volledig anoniem.

Bij voorbaat wil ik je graag bedanken dat je de tijd hebt genomen om de vragenlijsten in te vullen en open vragen te beantwoorden!

Met vriendelijke groet,

Birthe

Wat is uw geslacht?

❍ Man
❍ Vrouw

Wat is uw leeftijd?

_____

Wat is uw studiejaar?

❍ Eerstejaars
❍ Tweedejaars
❍ Derdejaars
❍ Vierdejaars

Appendix B - Critical Thinking Toolkit

Beantwoord alstublieft elke vraag. Vink het vakje aan dat uw mening het beste weergeeft en onthoud dat er geen goede of foute antwoorden zijn.

	Sterk mee oneens									Sterk mee eens
	1	2	3	4	5	6	7	8	9	10
1. Ik kan het gebruik van ongepaste emotionele taal in wetenschappelijke redeneringen detecteren										
2. Ik heb een goed gedefinieerd doel in gedachten als ik kritisch ben										
3. Ik kan de structuur van redeneringen identificeren zonder te worden afgeleid door hun inhoud										
4. Kritisch denken is vooral belangrijk in de psychologie										
5. Kritisch denken is essentieel in het hoger onderwijs										
6. Wanneer er een zeer sterke relatie is tussen twee variabelen kunnen we beweren dat de ene de andere veroorzaakt										
7. Kritisch denken ontwikkelt zich naarmate je verder studeert										
8. Ik kan mijn kritische denken goed uitdrukken in mijn geschreven werk										
9. Je kunt geen goede diploma behalen zonder goede kritische denkvaardigheden										
10. Ik doe het liefst dingen waar er een snel antwoord is										
11. Ik heb een gerichte en systematische manier van denken										
12. Alle relevante informatie moet worden gepresenteerd in dia's van colleges										
13. Over het algemeen ben ik een goede kritische denker										

	Sterk mee oneens								Sterk mee eens
14. Ik doe het goed in beoordelingen die om een kritische evaluatie vragen									
15. Ik denk kritisch tijdens het werken aan mijn opdrachten									
16. Al mijn docenten verwachten dat ik kritisch denk									
17. Ik weet hoe ik complexe problemen op verschillende manieren moet aanpakken									
18. Ik krijg hogere cijfers als ik kritisch denk									
19. Ik heb het vermogen om de waarde te beoordelen van nieuwe informatie of bewijzen die aan mij worden gepresenteerd									
20. Ik kan de redenering van anderen goed beoordelen									
21. Kritisch denken is wanneer je beschrijft wat er mis is met iets									
22. Ik ben goed in het afwegen van beide kanten van een redenering									
23. Ik kan analogieën tussen theorieën identificeren									
24. Bij het ontwerpen van experimenten kan ik ongerelateerde variabelen gemakkelijk elimineren									
25. Ik denk kritisch tijdens het lezen									
26. Ik kan de redeneringen van anderen gemakkelijk in mijn eigen woorden herformuleren									
27. Ik denk kritisch in colleges									

Appendix C - Achievement Emotions Questionnaire (AEQ)

Deze vragenlijst betreft uw overtuigingen en meningen over de tijd die u tot nu toe op de hogeschool heeft doorgebracht. Er zijn geen goede of foute antwoorden. De vragen zullen gaan over **hoe u zich voelt en hoe u denkt over uw studeer ervaring en vraagt naar u persoonlijke mening,** wees alsjeblieft openhartig in uw antwoorden. Uw identiteit en uw antwoorden worden **strikt vertrouwelijk** behandeld. De informatie wordt **alleen gebruikt voor onderzoeksdoeleinden** en is voor andere redenen niet beschikbaar.

De vragenlijst bestaat uit 75 items en verwijst naar emoties die u tijdens het studeren kunt ervaren. Voordat u de vragen beantwoordt, wilt u zich alstublieft enkele typische studie-situaties herinneren die u tot nu toe vaak heeft meegemaakt tijdens uw studie aan de hogeschool. Lees elk item aandachtig en REAGEER MET GEBRUIK VAN DE GEGEVEN SCHAAL.

Uw deelname aan deze studie is van vitaal belang voor het algehele succes ervan en uw tijd die u besteedt aan het invullen van deze vragenlijst wordt zeer op prijs gesteld.

Bedankt voor uw medewerking!

Voor het studeren
De volgende vragen hebben betrekking op gevoelens die u kunt ervaren **VOORDAT** u gaat studeren. Geef aan hoe u zich over het algemeen voelt voordat u begint met studeren.

	Sterk mee oneens				Sterk mee eens
	1	2	3	4	5
1. Ik kijk ernaar uit om te studeren.					
2. Ik word zo nerveus dat ik niet eens wil beginnen met studeren.					
3. Ik ben zelfverzekerd dat ik het lesmateriaal onder de knie zal krijgen					
4. Omdat ik zo overstuur raak door de hoeveelheid materiaal, wil ik niet eens beginnen met studeren.					
5. Wanneer ik moet studeren, begin ik mij misselijk te voelen.					
6. Wanneer ik naar de boeken kijk die ik nog moet lezen, wordt ik angstig.					
7. Omdat ik me verveel, heb ik niet het verlangen om te leren.					
8. Ik heb een optimistische kijk op studeren.					

	Sterk mee oneens				Sterk mee eens
9. Ik schaam me voor mijn constante uitstelgedrag.					
10. Ik word boos als ik moet studeren.					
11. Mijn gebrek aan vertrouwen maakt me uitgeput voordat ik zelfs maar begin.					
12. Ik ben geïrriteerd dat ik zoveel moet studeren.					
13. Ik stel dit saaie werk liever uit tot morgen.					
14. Ik voel me optimistisch dat ik goede vorderingen zal maken bij het studeren.					
15. Ik voel me hopeloos als ik denk aan studeren.					

Tijdens het studeren

De volgende vragen hebben betrekking op gevoelens die u **TIJDENS** het studeren kunt ervaren.

Geef aan hoe u zich meestal voelt tijdens het studeren.

	Sterk mee oneens				Sterk mee eens
	1	2	3	4	5
16. Ik maak me zorgen of ik al mijn werk aankan.					
17. Omdat ik me verveel, word ik moe achter mijn bureau.					
18. Ik voel me zelfverzekerd tijdens het studeren.					
19. Ik schaam me dat ik de eenvoudigste details niet kan absorberen.					
20. Ik word zo boos dat ik het leerboek uit het raam wil gooien.					
21. Mijn hopeloosheid ondermijnt al mijn energie.					
22. Tijdens het studeren heb ik zin om mezelf af te leiden om mijn angst te verminderen.					
23. Het lesmateriaal verveelt me zo erg dat ik me uitgeput voel.					

	Sterk mee oneens				Sterk mee eens
24. De gedachte om mijn leerdoelen te bereiken inspireert me.					
25. Ik schaam me omdat ik niet zo bedreven ben als anderen in het studeren.					
26. Als ik lange tijd achter mijn bureau zit, maakt mijn irritatie me rusteloos.					
27. Ik ben trots op mijn capaciteiten.					
28. Ik voel me zo hulpeloos dat ik mijn studeren niet mijn volledige inspanning kan geven.					
29. Ik merkt dat mijn gedachten afdwalen terwijl ik studeer.					
30. Ik studeer meer dan nodig is omdat ik er zoveel van geniet.					
31. Naarmate de tijd opraakt, begint mijn hart te racen.					
32. Het lesmateriaal verveelt me enorm.					
33. Mijn zelfvertrouwen motiveert me.					
34. Wanneer iemand merkt hoe weinig ik begrijp, vermijd ik oogcontact.					
35. Studeren maakt me geïrriteerd.					
36. Ik wou dat ik kon stoppen omdat ik er niet tegen kan.					
37. Als mijn studeren goed verloopt, geeft het mij een kick.					
38. Ik word gespannen en nerveus tijdens het studeren.					
39. Terwijl ik dit saaie lesmateriaal bestudeer, besteed ik mijn tijd aan het nadenken over hoe de tijd stilstaat.					
40. Ik word rood wanneer ik het antwoord op een vraag met betrekking tot de les niet weet.					
41. Ik word boos tijdens het studeren.					
42. Wanneer ik een moeilijk probleem tijdens mijn studie oplost, klopt mijn hart van trots.					
43. Ik heb me neergelegd bij het feit dat ik niet de capaciteit heb om dit lesmateriaal onder de knie te krijgen.					

	Sterk mee oneens				Sterk mee eens
44. Ik geniet van de uitdaging om het lesmateriaal te leren.					
45. Het onderwerp maakt me bang omdat ik het niet helemaal begrijp.					
46. Tijdens het studeren lijk ik te wegdrijven omdat het zo saai is.					
47. Ik schaam me.					
48. Ik raak geïrriteerd omdat ik moet studeren.					
49. Omdat ik trots wil zijn op mijn prestaties, ben ik zeer gemotiveerd.					
50. Ik voel me hulpeloos.					
51. Ik geniet van het omgaan met het lesmateriaal.					
52. Bezorgdheid over het niet voltooien van het lesmateriaal doet me zweten.					
53. Studeren voor mijn lessen verveelt me.					
54. Ik schaam me ervoor dat ik het lesmateriaal niet volledig aan anderen kan uitleggen.					
55. Als ik uitblink in mijn werk, word ik trots.					
56. Ik voel de adrenaline in mijn lichaam als mijn studeren goed verloopt.					
57. Studeren is saai en eentonig.					
58. Ik schaam me als ik besef dat ik een gebrek aan vermogen heb					
59. Ik geniet ervan nieuwe kennis op te doen.					
60. Het lesmateriaal is zo saai dat ik mezelf betrap op dagdromen.					

Na het studeren

De volgende vragen hebben betrekking op gevoelens die u **NA** het studeren kunt ervaren. Geef aan hoe u zich na een studie meestal voelt.

	Sterk mee oneens				Sterk mee eens
	1	2	3	4	5
61. Ik maak me zorgen of ik het lesmateriaal goed heb begrepen.					
62. Omdat ik zoveel problemen heb gehad met het opleiding materiaal, vermijd ik om het te bespreken.					
63. Na lang studeren ben ik zo boos dat ik gespannen word.					
64. Ik ben trots op mezelf.					
65. Na het studeren leg ik mij neer bij het feit dat ik het vermogen niet heb.					
66. Ik ben zo blij met de vooruitgang die ik heb geboekt dat ik gemotiveerd ben om verder te studeren.					
67. Als ik het studeren niet kan bijhouden, word ik bang.					
68. Mijn geheugengebreken brengen me in verlegenheid.					
69. Ik ben ontmoedigd over het feit dat ik het lesmateriaal nooit zal leren.					
70. Als ik nadenk over mijn vorderingen in de opleiding, word ik blij.					
71. Ik wil niet dat iemand weet wanneer ik iets niet heb kunnen begrijpen.					
72. Ik denk dat ik trots kan zijn op mijn prestaties bij het studeren.					
73. Het voelt alsof ik het heb opgegeven.					
74. Bepaalde onderwerpen zijn zo leuk dat ik gemotiveerd ben om er extra over te lezen.					
75. Ik maak me zorgen dat mijn capaciteiten niet voldoende zijn voor mijn studieprogramma.					

Appendix D - Sub scales CriTT

Item		Scale / Factor
1	I can detect the use of inappropriate emotional language in scientific arguments	Confidence in Critical Thinking
2	I have a well-defined goal in mind when I am critical	Confidence in Critical Thinking
3	I can identify the structure of arguments without being distracted by their content	Confidence in Critical Thinking
8	I can express my critical thinking well in my written work	Confidence in Critical Thinking
11	I have a focused and systematic way of thinking	Confidence in Critical Thinking
13	Generally I am a good critical thinker	Confidence in Critical Thinking
14	I do well in assessments that ask for critical evaluation	Confidence in Critical Thinking
15	I think critically while working on my assignments	Confidence in Critical Thinking
17	I know how to approach complex issues in a variety of ways 0.66	Confidence in Critical Thinking
19	I have the ability to judge the value of new information or evidence presented to me	Confidence in Critical Thinking
20	I can evaluate the arguments of others well	Confidence in Critical Thinking
22	I am good at weighing up both sides of an argument	Confidence in Critical Thinking
23	I can identify analogies between theories	Confidence in Critical Thinking
24	When designing experiments I can readily eliminate extraneous variables	Confidence in Critical Thinking
25	I think critically while reading	Confidence in Critical Thinking
26	I can rephrase the arguments of others in my own words easily	Confidence in Critical Thinking
27	I think critically in lectures	Confidence in Critical Thinking
4	Critically thinking is particularly important in psychology	Valuing Critical Thinking
5	Critical thinking is essential in higher education	Valuing Critical Thinking
7	Critical thinking develops as you progress through your degree	Valuing Critical Thinking
9	You cannot get a good degree without good critical thinking skills	Valuing Critical Thinking
16	All my lecturers expect me to think critically	Valuing Critical Thinking
18	I will get higher grades if I think critically	Valuing Critical Thinking
6	When there is a very strong relationship between two variables we can claim that one causes the other	Misconceptions
10	I prefer to do things where there is a quick answer	Misconceptions
12	All relevant information should be presented in lecture slides	Misconceptions
21	Critical thinking is when you describe what is wrong with something	Misconceptions

Appendix E - Learning-related emotion sub scales (AEQ)

LEARNING-RELATED ENJOYMENT (10)

Item

1 LJOA1B	I look forward to studying.
44 LJOA2D	I enjoy the challenge of learning the material.
59 LJOA3D	I enjoy acquiring new knowledge.
51 LJOC1D	I enjoy dealing with the course material.
70 LJOC2A	Reflecting on my progress in coursework makes me happy.
30 LJOM1D	I study more than required because I enjoy it so much.
66 LJOM2A	I am so happy about the progress I made that I am motivated to continue studying.
74 LJOM3A	Certain subjects are so enjoyable that I am motivated to do extra readings about them.
37 LJOP1D	When my studies are going well, it gives me a rush.
56 LJOP2D	I get physically excited when my studies are going well.

L = Learning-related	A = Affective	A = After studying
JO = Enjoyment	C = Cognitive	B = Before studying
	M = Motivational	D = During studying
	P = Physiological	

LEARNING-RELATED HOPE (6)

Item

8 LHOA1B	I have an optimistic view toward studying.
18 LHOA2D	I feel confident when studying.
3 LHOC1B	I feel confident that I will be able to master the material.
14 LHOC2B	I feel optimistic that I will make good progress at studying.
24 LHOM1D	The thought of achieving my learning objectives inspires me.
33 LHOM2D	My sense of confidence motivates me.

HO = Hope

LEARNING-RELATED PRIDE (6)

Item

64 LPRA1A	I'm proud of myself.
27 LPRC1D	I'm proud of my capacity.
72 LPRC2A	I think I can be proud of my accomplishments at studying.
49 LPRM1D	Because I want to be proud of my accomplishments, I am very motivated.
42 LPRP1D	When I solve a difficult problem in my studying, my heart beats with pride.
55 LPRP2D	When I excel at my work, I swell with pride.

PR = Pride

LEARNING-RELATED ANGER (9)

Item

10 LAGA1B	I get angry when I have to study.
35 LAGA2D	Studying makes me irritated.
41 LAGA3D	I get angry while studying.
12 LAGC1B	I'm annoyed that I have to study so much.
48 LAGC2D	I get annoyed about having to study.
4 LAGM1B	Because I get so upset over the amount of material, I don't even want to begin studying.
20 LAGM2D	I get so angry I feel like throwing the textbook out of the window.
26 LAGP1D	When I sit at my desk for a long time, my irritation makes me restless.
63 LAGP2A	After extended studying, I'm so angry that I get tense.

AG = Anger

LEARNING-RELATED ANXIETY (11)
Item

6 LAXA1B	When I look at the books I still have to read, I get anxious.
38 LAXA2D	I get tense and nervous while studying.
67 LAXA3A	When I can't keep up with my studies it makes me fearful.
16 LAXC1D	I worry whether I'm able to cope with all my work.
45 LAXC2D	The subject scares me since I don't fully understand it.
61 LAXC3A	I worry whether I have properly understood the material.
2 LAXM1B	I get so nervous that I don't even want to begin to study.
22 LAXM2D	While studying I feel like distracting myself in order to reduce my anxiety.
5 LAXP1B	When I have to study I start to feel queasy.
31 LAXP2D	As time runs out my heart begins to race.
52 LAXP3D	Worry about not completing the material makes me sweat.

AX = Anxiety

LEARNING-RELATED SHAME (11)
Item

127 LSHA1D	I feel ashamed.
89 LSHC1B	I feel ashamed about my constant procrastination.
99 LSHC2D	I feel ashamed that I can't absorb the simplest of details.
105 LSHC3D	I feel ashamed because I am not as adept as others in studying.
134 LSHC4D	I feel embarrassed about not being able to fully explain the material to others.
138 LSHC5D	I feel ashamed when I realize that I lack ability.
148 LSHC6A	My memory gaps embarrass me.
142 LSHM1A	Because I have had so much troubles with the course material, I avoid discussing it.
151 LSHM2A	I don't want anybody to know when I haven't been able to understand something.
114 LSHP1D	When somebody notices how little I understand I avoid eye contact.
120 LSHP2D	I turn red when I don't know the answer to a question relating to the course material.

SH = Shame

LEARNING-RELATED HOPELESSNESS (11)
Item

15 LHLA1B	I feel hopeless when I think about studying.
50 LHLA2D	I feel helpless.
73 LHLA3A	I feel resigned.
43 LHLC1D	I'm resigned to the fact that I don't have the capacity to master this material.
65 LHLC2A	After studying I'm resigned to the fact that I haven't got the ability.
69 LHLC3A	I'm discouraged about the fact that I'll never learn the material.
75 LHLC4A	I worry because my abilities are not sufficient for my program of studies.
28 LHLM1D	I feel so helpless that I can't give my studies my full efforts.
36 LHLM2D	I wish I could quit because I can't cope with it.
11 LHLP1B	My lack of confidence makes me exhausted before I even start.
21 LHLP2D	My hopelessness undermines all my energy.

HL = Hopelessness

LEARNING-RELATED BOREDOM (11)
Item

32 LBOA1D	The material bores me to death.
53 LBOA2D	Studying for my courses bores me.
57 LBOA3D	Studying is dull and monotonous.
39 LBOC1D	While studying this boring material, I spend my time thinking of how time stands still.
60 LBOC2D	The material is so boring that I find myself daydreaming.
29 LBOC3D	I find my mind wandering while I study.
7 LBOM1B	Because I'm bored I have no desire to learn.
13 LBOM2B	I would rather put off this boring work till tomorrow.
17 LBOP1D	Because I'm bored I get tired sitting at my desk.
23 LBOP2D	The material bores me so much that I feel depleted.
46 LBOP3D	While studying I seem to drift off because it's so boring.

BO = Boredom

Appendix F - Open-ended questions in Dutch

1. Hoe definieert u kritisch denken?
2. Geef alstublieft een voorbeeld van twee academische taken die kritisch denken vereisen.
3. Denkt u dat kritisch denken kan worden aangeleerd? Geef alstublieft uitleg over uw antwoord.
4. Zo ja, wat zou dan de beste manier zijn om kritisch denken te onderwijzen?
5. Wat voor soort emoties ervaart u tijdens het studeren?
6. Wat voor emoties ervaart u tijdens het uitvoeren van taken waarvoor kritisch denken nodig is, zoals het schrijven van een literatuuronderzoek?
7. Hoe vaak en in welke situaties voelt u zich hulpeloos tijdens het studeren?
8. Hoe beheert u uw emoties met betrekking tot hopeloosheid tijdens het studeren? Bijvoorbeeld, terwijl u studeert of werkt aan academische taken en u zich hopeloos voelt, wat doet u?
9. Hoe vaak en in welke situaties voelt u zich angstig tijdens het studeren?
10. Hoe beheert u uw emoties met betrekking tot angst tijdens het studeren? Bijvoorbeeld, terwijl u studeert of werkt aan academische taken en u zich angstig voelt, wat doet u?
11. Hoe vaak en in welke situaties verveelt u zich tijdens het studeren?
12. Hoe beheert u uw emoties met betrekking tot verveling tijdens het studeren? Bijvoorbeeld, terwijl u studeert of werkt aan academische taken en u zich verveelt, wat doet u?
13. Hoe vaak ervaart u een trots gevoel tijdens het studeren of het uitvoeren van academische taken?
14. Hoe vaak ervaart u een zelfverzekerd gevoel tijdens het studeren of het uitvoeren van academische taken?
15. Hoe vaak ervaart u plezier tijdens het studeren of het uitvoeren van academische taken?
16. Beoordeel uw vaardigheden op het gebied van kritisch denken betrekkend op het studeren aan u hogeschool in de onderstaande tabel
    1= zeer slecht
    2= ondergemiddeld
    3= gemiddeld
    4= bovengemiddeld
    5= uitstekend

		1	2	3	4	5
1.	**Interpretatie** (het vermogen om te categoriseren, betekenis te decoderen en betekenis te verduidelijken)					
2.	**Analyse** (het vermogen om ideeën te onderzoeken, redeneringen te identificeren en redeneringen te analyseren)					
3.	**Evaluatie** (het vermogen om beweringen te beoordelen en rederingen te beoordelen)					
4.	**Gevolgtrekking** (het vermogen om bewijs te vragen, alternatieven te veronderstellen en conclusies te trekken)					
5.	**Uitleg** (het vermogen om resultaten te vermelden, procedures te rechtvaardigen en argumenten te presenteren					
6.	**Zelfregulering** (zelfonderzoek en zelfcorrectie)					

Appendix G - Tables

Table 1

Response by gender and age

	N	Gender			Age	
		Male	Female	SD	Mean	SD
DUAS students	54	11 (20,4%)	43 (79,6%)	0,41	21,07	2,22

N=54. age (range: 18-27).

Table 2

Reliability analysis of the CriTT and AEQ

Questionnaire	Sub scale	N of items	Cronbach's Alpha
CriTT	Confidence in CT	17	0,88
	Valuing CT	6	0,69
	Misconceptions	4	0,53
AEQ	Learning-related Enjoyment	10	0,83
	Learning-related Hope	6	0,78
	Learning-related Pride	6	0,79
	Learning-related Anger	9	0,89
	Learning-related Anxiety	11	0,91
	Learning-related Shame	11	0,90
	Learning-related Hopelessness	11	0,93
	Learning-related Boredom	11	0,85

Table 3

Descriptive statistics of CriTT of total score

Sub scale	M	SD	Minimum	Maximum
Confidence in CT	108,04	1,82	75	131
Valuing CT	41,43	0,80	27	55
Misconceptions	15,87	0,58	8	25

N=54.

Table 4

Descriptive statistics of CriTT of mean score

Sub scale	M	SD	Minimum	Maximum
Confidence in CT	5,29	1,43	2,67	8,33
Valuing CT	6,90	0,99	4,50	9,17
Misconceptions	6,36	0,79	4,41	7,71

N=54. These scales are measured on a scale from 1 to 10.

Table 5

Descriptive statistics of AEQ of total score

Sub scale	M	SD	Minimum	Maximum
Learning-related Enjoyment	29,59	6,22	17	41
Learning-related Hope	19,65	3,68	11	27
Learning-related Pride	21,39	4,02	10	29
Learning-related Anger	17,93	6,87	9	41
Learning-related Anxiety	25,65	9,53	13	46
Learning-related Shame	24,65	9,24	11	49
Learning-related Hopelessness	20,74	8,86	11	47
Learning-related Boredom	29,02	7,91	11	46

N=54.

Table 6

Descriptive statistics of AEQ of mean score

Sub scale	M	SD	Minimum	Maximum
Learning-related Enjoyment	2,96	0,62	1,70	4,10
Learning-related Hope	3,27	0,61	1,83	4,50
Learning-related Pride	3,56	0,67	1,67	4,83
Learning-related Anger	1,99	0,76	1,00	4,56
Learning-related Anxiety	2,33	0,87	1,18	4,18
Learning-related Shame	2,24	0,84	1,00	4,45
Learning-related Hopelessness	1,89	0,81	1,00	4,27
Learning-related Boredom	2,64	0,72	1,00	4,18

N=54. These scales are measured on a scale from 1 to 5.

Table 7

Difference in mean score of CriTT and AEQ

Questionnaire	Sub scale	M	M sample group	Difference
CriTT	Confidence in CT	5,29	6,75	1,46
	Valuing CT	6,90	8,33	1,43
	Misconceptions	6,36	5,75	0,61
AEQ	Learning-related Enjoyment	29,59	33.09	4,31
	Learning-related Hope	19,65	20,27	0,62
	Learning-related Pride	21,39	21,59	0,2
	Learning-related Anger	17,93	22	4,07
	Learning-related Anxiety	25,65	30,69	5,04
	Learning-related Shame	24,65	29	4,35
	Learning-related Hopelessness	20,74	23,06	2,32
	Learning-related Boredom	29,02	30,69	1,67

N=54. M sample group CriTT N=133 psychology students from the United Kingdom. M sample group AEQ N=389 psychology students from a midwestern Canadian university.

Table 8

Cumulative percent per critical thinking skill question 16 (open-ended question)

	Cumulative % < below average	Cumulative % average	Cumulative % > above average
Interpretation		57,4%	42,6%
Analysis	13%	59,3%	27,8%
Evaluation	9,3%	50%	40,7%
Inference	24,1%	38,9%	37%
Explanation	1,9%	51,9%	27,8%
Self-regulation	1,9%	44,4%	44,4%

N=54.

Table 9

Results of analysis between CT and positive AE, calculated with a Spearman's rank correlation.

		Confidence in CT	Valuing CT	Misconceptions
Joy	r	0,21	0,54	0,35
	p-waarde	0,07	0,00**	0,01**
Hope	r	0,26	0,23	0,03
	p-waarde	0,03*	0,05*	0,43
Pride	r	0,28	0,58	0,13
	p-waarde	0,02*	0,00**	0,18
Postitive AE	r	0,30	0,55	0,23
	p-waarde	0,01**	0,00**	0,04*

N=54, *p < 0,05. **p < 0,01

Table 10

Results of analysis between CT and negative AE, calculated with a Spearman's rank correlation.

		Confidence in CT	Valuing CT	Misconceptions
Anger	r	0,01	0,17	0,23
	p-waarde	0,48	0,11	0,05*
Anxiety	r	0,03	0,18	0,24
	p-waarde	0,41	0,09	0,04*
Shame	r	-0,13	0,19	0,24
	p-waarde	0,17	0,08	0,04*
Hopelessness	r	-0,17	-0,11	0,20
	p-waarde	0,10	0,21	0,08
Boredom	r	-0,07	-0,02	0,01
	p-waarde	0,32	0,46	0,49
Negative AE	r	-0,02	0,09	0,17
	p-waarde	0,45	0,25	0,12

N=54, *$p < 0,05$. **$p < 0,01$

Appendix H - Qualitative analysis mindmap

(1) Analyzing and assessing information
(2) better and other solutions

Skill

Tasks like (1) doing research and (2) writing reports

CT

Can be taught

(1) Frustration, (2) boredom, (3) interest, (4) anxiety, (5) joy and (6) uncertainty

(1) Interest

(2) Joy

AE

(3) Frustration

(4) Boredom

Joy

Pride

Hope

Anxiety

Boredom

Hopeless-ness

(1)Interesting material
(2) understanding the material
(3) Fellow students

(1) Assignment finished
(2) understanding the material
(3) passing something

Having enough knowledge or skill

(1) Time pressure
(2) not experienced
(3) thinking won't pass

(1) While learning
(2) uninteresting

(1) Around test
(2) not understanding the material
(3) time pressure

(1) Break or shift attention
(2) to calm down
(3) asking for help

(1) Break or shift attention
(2) pushing through
(3) find motivation

(1) Break or shift attention
(2) pushing through
(3) to calm down

Appendix I - Socratic Discussion Intervention

Some Suggestions for Using Socratic Discussion:
- Have an initial exploratory discussion about a complex issue in which students break it down into simpler parts. Students can then chose the aspects they want to explore or research. Then have an issue-specific discussion where students share, analyze, evaluate, and synthesize their work.
- The class could have a "fishbowl" discussion. One third of the class, siting in a circle, discusses a topic. The rest of the class, in a circle around the others, listens, takes notes, then discusses the discussion.
- Assign an essay asking students to respond to a point of interest made in a discussion.
- Have students write summaries of their discussions immediately afterwards. They could also add new thoughts or examples, provide further clarification, etc. They could later share these notes.

Questions of Clarification
- What do you mean by ___?
- What is your main point?
- How does ___ relate to ___?
- Could you put that another way?
- What do you think is the main issue here?
- Is your basic point ___ or ___?
- Let me see if I understand you; do you mean ___ or ___?
- How does this relate to our discussion / problem / issue?
- What do you think John meant by his remark? What did you take John to mean?
- Jane, would you summarize in your own words what Richard has said? … Richard, is that what you meant?
- Could you give me an example?
- Would this be an example: ___?
- Could you explain that further?
- Would you say more about that?
- Why do you say that?

Figure A.1. Question of Clarification. Reprinted from *Critical Thinking Handbook: High School. A Guide for Redesigning Instruction* (p. 29) by R. Paul, 1989, Rohnert Park, CA. Copyright 1989, by Center for Critical Thinking and Moral Critique, Sonoma State University.

Questions that Probe Assumptions
- What are you assuming?
- What is Karen assuming?
- What could we assume instead?
- You seem to be assuming ___. Do I understand you correctly?
- All of you reasoning is dependent on the idea that ___. Why have you based your reasoning on ___ rather than ___?
- You seem to be assuming ___. How would you justify taking this for granted?
- Is it always the case? Why do you think the assumption holds here?

Figure A.2. Question of that Probe Assumptions. Reprinted from *Critical Thinking Handbook: High School. A Guide for Redesigning Instruction* (p. 29) by R. Paul, 1989, Rohnert Park, CA. Copyright 1989, by Center for Critical Thinking and Moral Critique, Sonoma State University.

Questions that Probe Reasons and Evidence

- What would be an example?
- What are your reasons for saying that?
- What other information do we need to know?
- Could you explain your reasons to us?
- But is that good evidence to believe that?
- Are those reasons adequate?
- Is there reason to doubt that evidence?
- Who is in a position to know if that is the case?
- What would you say to someone who said ____?
- Can someone else give evidence to support that response?
- By what reasoning did you come to that conclusion?
- How could we go about finding out whether that is true?
- How do you know?
- Why did you say that?
- Why do you think that is true?
- What led you to that belief?
- Do you have any evidence for that?
- How does that apply to this case?
- What difference does that make?
- What would convince you otherwise?

Figure A.3. Question that Probe Reasons and Evidence. Reprinted from Critical Thinking Handbook: High School. A Guide for Redesigning Instruction (p. 29) by R. Paul, 1989, Rohnert Park, CA. Copyright 1989, by Center for Critical Thinking and Moral Critique, Sonoma State University.

Questions About Viewpoints or Perspectives

- You seem to be approaching this issue from ____ perspective. Why have you chosen this weather than that perspective?
- How would other groups/types of people respond? Why? What would influence them?
- How could you answer that objection that ____ would make?
- Can/did anyone see this another way?
- What would someone who disagrees say?
- What is an alternative?
- How are Richard's and Karen's ideas alike? Different?

Figure A.4. Question about Viewpoints or Perspectives. Reprinted from *Critical Thinking Handbook: High School. A Guide for Redesigning Instruction* (p. 29) by R. Paul, 1989, Rohnert Park, CA. Copyright 1989, by Center for Critical Thinking and Moral Critique, Sonoma State University.

Questions that Probe Implications and Consequences
- What are you implying by that?
- When you say ____, are you implying ____?
- But if that happens, what else would also happen as a result? Why?
- What effect would that have?
- Would that necessarily happen or only probably happen?
- What is an alternative?
- If this and this are the case, then what else must also be true?

Figure A.5. Question that Probe Implications and Consequences. Reprinted from *Critical Thinking Handbook: High School. A Guide for Redesigning Instruction* (p. 29-30) by R. Paul, 1989, Rohnert Park, CA. Copyright 1989, by Center for Critical Thinking and Moral Critique, Sonoma State University.

Questions About the Question
- How can we find out?
- How could someone settle this question?
- Is the question clear? Do we understand it?
- Is this question easy or hard to answer? Why?
- Would ____ put the question differently?
- Does this question ask us to evaluate something?
- Do we all agree that this is the question?
- To answer this question, what questions would we have to answer first?
- I'm not sure I understand how you are interpreting the main question at issue.
- Is this the same issue as ____?
- Can we break this question down at all?
- How would ____ put the issue?
- What does this question assume?
- Why is this question important?

Figure A.6. Question About the Question. Reprinted from *Critical Thinking Handbook: High School. A Guide for Redesigning Instruction* (p. 30) by R. Paul, 1989, Rohnert Park, CA. Copyright 1989, by Center for Critical Thinking and Moral Critique, Sonoma State University.

Appendix J - Interview Ethics

Texts address the design of interview questions, i.e., what types of questions can be asked to elicit the desired information, for example,biographical. They also recommend how the interview can be written up in one of two desired formats, question and answer, or in this case, biographical essay or story format, which allows the student more creative embellishment. Some questions considered in this lesson might be: "What were you like as a child? What was it like to grow up in such-and-such a time period? How were you similar to or different from other children?"

Introduction

The teacher can begin this lesson by asking how an interview differs from ordinary conversation. (A conversation with an individual is unstructured; may take several turns and cover any number of topics; is two-way since usually — or, at least, ideally — both participant offer their ideas. One may have a vague objective in mind like. "Getting to know Mr. Williams." Interviews are more structured insofar as they begin with a prescribed set of questions; are one-way, insofar as one participant answers, the other asks; often have a narrower purpose.

Then, ask the students to think of different types of interviews. They may offer such responses as these: college interviews, job interviews, celebrity interviews or interviews which probe the position of those running for elected office. Some of these interviews have specific objectives.

The teacher could then assign cooperative groups the task of composing questions that would accomplish these tasks. Afterwards, one person of the group could serve as the interviewer (admissions director, employer, newspaper, reporter) and another as the interviewee. The mock interviews should be conducted in front of the entire class. When the interview is over, the class should critique the process by pointing out which questions provided the best information and adding any questions that were left out.

Students could study some printed interviews, evaluate them, and formulate probing questions and follow-up questions which could have been asked.

By now the class has begun to think about the interview process. They have witnessed a few models and have had some experience composing questions. They also will have seen how the type of questions asked depends on the objective of the interview.

Figure B.1. Introduction Interview Ethics. Reprinted from *Critical Thinking Handbook: High School. A Guide for Redesigning Instruction* (p. 141) by R. Paul, 1989, Rohnert Park, CA. Copyright 1989, by Center for Critical Thinking and Moral Critique, Sonoma State University.

Preparation for the Interview

To introduce the students to their interview assignment, the teacher may ask students to consider how many different points of view on questions of right and wrong are represented in the class. Someone could take notes on the following Socratic discussion, or it could be taped.

Ask:

- How do you know when something is right or wrong?
- When is it hard to tell what is right?
- Why do people do wrong?
- When do you blame people for doing something wrong? Not blame them?
- When did you first learn right from wrong? How?
- What do your beliefs assume about human nature? How does this assumption affect how you act?
- How you judge others?
- Should people have their own ideas of right and wrong, or should they accept the judgment of authorities?
- Can you think of something that would be wrong in one instance and right in another?
- Can you think of something that is absolutely wrong, regardless of the circumstances?

The teacher could then ask the students to frame more specific questions about what they believe. Recap the main points made in the above discussion. The idea of organized belief systems can now be raised. The class could group the responses by similarities among the perspectives. Asks students to think about which views expressed by the others most resemble their own and which differ most from their own. Have them try to characterize the similarities an differences among these perspectives, distinguishing major from minor differences.

By now the students have begun to identify their own belief systems and are now ready to begin the interview assignment. They can begin by thinking about how the questions will be framed for a "Belief System Interview." Suggest that they use some of the questions previously posed: How do you know when something is right or wrong? When did you first learn right from wrong? Did someone teach you?

The students should know that a good interviewer will ask clarifying questions like,"What exactly do you mean by that? Can you give me an example? How would you respond to this idea (give an opposing view)? What led you to that belief?"etc.

Next, the students can frame more questions. The entire class may work on this project and then chose the best of the lot. By practicing on other students first, students may better develop a sense of good follow-up questions.

Assign the interview. You may want students to tape record the interview (with permission of the interviewee). Or you may want them to develop note-taking skills and record the responses that way. The class could evaluate various ways of presenting their interviews.

Students could show their work to the interviewees for confirmation and further clarification and then revise their reports.

When the interviews have been shared, the class can relate points made in them to the previous discussions by comparing the perspectives expressed in them with their own, and evaluating the questions raised.

The interview process requires careful preparation in the classroom with specific instructor intervention regarding the types of questions asked, as well as the process of clarifying information. The students not only learn to examine their own beliefs, they learn to analyze the types of questions asked, consider conflicting opinions, and evaluate the answers given. The value in this lesson is not only the interview process, but the critical evaluation of the topic. The students gain confidence in there critical thinking skills and enjoy the process as well.

Figure B.2. Preparation for the interview. Reprinted from *Critical Thinking Handbook: High School. A Guide for Redesigning Instruction* (p. 142) by R. Paul, 1989, Rohnert Park, CA. Copyright 1989, by Center for Critical Thinking and Moral Critique, Sonoma State University.

If the teacher wishes to repeat the lesson, other topics which interest students and lend themselves to analysis could be chosen:

Religion
- How would you define 'religion'?
- Do religions have anything in common? If so, what?
- How do religious authorities decide what is right / wrong?
- Can a person know right from wrong without religion? How?
- Are all religions equal? If not, why not?
- How much does religion affect what you believe?
- Does a person have to accept religious laws without question? Why or why not?

Prejudice
- How is it defined?
- Does it exist in our community, school, home?
- When were you first aware of prejudice?
- Why do you think prejudice exists?
- How could we solve some of our race problems?

Sex Education
- What should sex education consist of?
- At what age should it be taught?
- When did you first learn about sex? Was this a good way to get information?
- Should birth control be taught? Why or why not?
- What issues are most relevant for sex education today?
- Can yo think of ways of discouraging teenage pregnancies?

Figure B.3. Other interview topics. Reprinted from *Critical Thinking Handbook: High School. A Guide for Redesigning Instruction* (p. 143) by R. Paul, 1989, Rohnert Park, CA. Copyright 1989, by Center for Critical Thinking and Moral Critique, Sonoma State University.

Appendix K - Form submission five proposals in Dutch

FORMULIER AANLEVEREN VIJF STELLINGEN

N.B. Je levert vijf uitdagende stellingen aan, je hoeft het hier niet persé mee eens te zijn

Studennummer   **: 416506**

Naam student   **: Birthe Bruin**

Onderwerp scriptie : kritisch denken en academische emoties

Stelling 1: Onderwijzen in het kritisch denken zou standaard vanaf het eerste studiejaar in het curriculum opgenomen moeten worden.

Stelling 2: Plezier hebben tijdens het studeren heeft een positief effect op het kritisch denken.

Stelling 3: Het ervaren van angst tijdens het studeren zorgt er voor dat studenten slechter kritisch kunnen denken

Stelling 4: De druk van school zorgt voor het hebben van negatieve emoties, zoals frustratie en angst.

Stelling 5: Er moet meer onderzoek gedaan worden naar de correlatie tussen kritisch denken en academisch emoties

Appendix L - Eigen werkverklaring

Ondergetekende:

Birthe Bruin (416506)

verklaart ondubbelzinnig dat:

1) dit werkstuk eigen werk is en daarom geen inbreuk maakt op het auteursrecht van een ander,

2) alle gebruikte bronnen (waaronder internetpagina's) zijn voorzien van bronvermelding,

3) het verslag voor niet meer dan 5 % aan overgenomen passages uit ' werk van anderen' bevat.

4) dit verslag ook digitaal is ingeleverd via Safe Assign (Blackboard).

Plaats: Deventer

Datum: 02-06-2020

Handtekening:

N.B. Schending van bovengenoemde 'Eigen werkverklaring ' wordt als fraude aangemerkt als bedoeld in Art. 19 OER.