Universiteit Utrecht

The Influence of emotional reasoning on fear through false biofeedback manipulation.

J.G. van der Lee

0438456

Masterthesis aan de Universiteit Utrecht

Faculteit Sociale Wetenschappen

Psychologie

Supervisor: Miriam Lommen

Index

Universiteit Utrecht

The Influence of emotional reasoning on fear through false biofeedback manipulation.

J.G. van der Lee
0438456
Masterthesis at the Universiteit Utrecht
Supervisor: Miriam Lommen

Abstract

The prevalence of anxiety disorders, both on its own as co-occurring with other disorders, makes it a subject welcome to research. Present study takes from the information-processing-theory (Beck & Clark, 1996) and focuses on the third, most cognitive stage leading to anxiety. For it is in this third stage that anxiety disorders originate. The cognitive bias that is central to this study concerns a higher validation of the emotional response compared to the objective information presented in a situation, leading to a vicious circle called: 'Ex-consequentia reasoning.' A study by Arntz (1995) shows emotional reasoning as a possible causal factor in the origination of anxiety disorders. Present study tests for a causal connection between emotional reasoning and anxiety. The study uses false bio-feedback of skin-conductance recordings to try and manipulate emotional reasoning. It is expected that S's presented with a false recording of increased skin-conductance will report higher anxiety levels then those presented with a false recording of normal skin-conductance. A total of 10 S's from the university of Utrecht were selected through a pretest measuring emotional reasoning (Arntz et al, 1995) and divided between a control condition and an experimental condition. A total of 80 scripts was presented auditory while two different computer screens showed a VAS-scale to rate the situation from very safe to very dangerous, and the false skin-conductance recording. A manipulation check equal to the pretest but with different scripts was presented after the 80 auditory scripts. State anxiety was measured at three different points in the study. Finally a paper stress task was presented in order to test for a difference in state anxiety under stress. Present study found no way to manipulate emotional reasoning with false biofeedback, higher levels of emotional reasoning were not related to higher levels of anxiety, there was no significant effect for anxiety within or between conditions and there was no significant difference within or between conditions between state anxiety after a stress task. In conclusion, no causal connection between emotional reasoning and anxiety was found.

Introduction

Anxiety is one of the most common mental health problems seen in the general medical setting. Population studies in the Netherlands show that in the year 2007 an estimated number of 79 out of 1000 men and 124 out of 1000 women suffered from at least one type of anxiety disorder, and every year 3,1% of the adult population develops an anxiety disorder for the first time (http://www.nationaalkompas.nl/gezondheid-en-ziekte/ziekten-en-aandoeningen/psychische-stoornissen/angststoornissen/hoe-vaak-komen-angststoornissen-voor/).

Anxiety often co-occurs with other pathology, such as schizophrenia (Cosoff & Hafner, 2007), bipolar depression, unipolar depression and dysthymia (Pini et.al., 1997). The high prevalence and co morbidity rates of anxiety disorders show that anxiety is still an important topic for research, especially research concerning traits which contribute to the development of anxiety disorders.

An early model has focused on the cognitive side of anxiety disorders. This model is called the information processing model, and was developed by Beck & Clark (1997). The information processing model describes three stages leading to anxiety. The first stage concerns the initial sensory registration of a treat stimulus while the second stage concerns activation of the primal threat mode. In the primal threat mode, primal responses are identified such as autonomic arousal (fight or flight response), behavioral mobilization and inhibition, primal thinking, a feeling of fear and hyper vigilance for threat cues. At the third stage, more elaborate and reflective modes of cognition are activated. This last stage is where anxiety disorders originate.

The persistence of fear despite disconfirmatory information causes anxiety patients to linger on or even get worse without treatment. There are several information processing biases involved in the onset and persistence of fear. The present study focuses on a bias concerning a higher validation of the emotional response compared to the objective information. Patients may interpreter this emotional response as a sign of danger. ‘ Danger will make me feel anxious, so if I feel anxious, there must be something to fear’; a vicious circle creating fear to persist, also described by Beck & Emery (1985). This kind of reasoning is also known as ‘ex-consequentia reasoning’.

A study by Arntz et.al. (1995) has demonstrated this tendency to infer danger based on an anxious emotional response, and not just on the presence of objective danger in anxiety

patients. As expected, this tendency has not been demonstrated in healthy controls. Another interesting result of the study was the similarity between several anxiety disorders. Emotional reasoning seems to be related to anxiety disorders in general, and seems to be a predictor for relapse of PTSD-patients post treatment. However, it is still unknown whether emotional reasoning plays a causal role in the development of anxiety. In the present study, we will investigate this possible causal role, by manipulating emotional reasoning using false biofeedback and examine the effects on anxiety.

In order to manipulate cognition based on physical sensations, several studies have successfully made use of false biofeedback. False biofeedback consists of manipulated feedback of bodily processes. The anxious response on which danger is inferred at higher levels of emotional reasoning, is accompanied by bodily sensations related to anxiety. Examples of these sensations are sweating, feeling light headed, goose bumps, skin conductance and a raising heart rate. All these sensations are forms of biofeedback. When patients infer danger based on an anxious response, they are also inferring danger based on bodily sensations. In order to manipulate cognition based on physical sensations, several studies have successfully made use of false biofeedback. False biofeedback consists of manipulated feedback of bodily processes. A study by Holroyd et.al. (1984) concerning the reduction of tension headache has shown that false EMG biofeedback is an effective method. The authors suggest that this positive effect is mediated by cognitive changes caused by false biofeedback. Also false biofeedback has shown to influence the arousal levels in social phobia patients. Instead of EMG levels, biofeedback of skin conductance levels was applied. Another physiological form of biofeedback, is through heart rate measures. Ehlers et.al. (1988) successfully used false heart rate feedback to patients with panic disorder. True heart rate feedback did not induce changes in anxiety, but false heart rate feedback of abrupt increasing heart rate caused increased anxiety levels and physiological arousal. Batson et.al (1999) conducted research using false biofeedback and successfully manipulated decision making.

There are several methods of presenting false biofeedback to *S's*. Allen et.al. (2001) used reward tones. Edmonds et. al. (2008) displayed a 9x9 affect grid in order to influence affective regulation. Agnihotri et.al. (2008) used a visual display with seventeen bars which positively influenced heart rates within General Anxiety Disorder patients. Batson et al (1998) displayed a galvanic skin response monitor with adjusted values during audio stimuli. This appeared to have a powerful influence on decisions based on values of freedom and equality.

The greatest difference in presenting stimuli concerning situations or images during biofeedback, seems to lie between verbal processing and mental imagery. Research has shown that when stimuli are presented auditory or lexical, instructing *S's* to form a mental image increases the emotional value of the stimuli. Holmes and Matthews (2005) found that *S's* who formed a mental image reported more anxiety and showed more emotional reactions then *S's* in the verbal condition. This effect was supported by Holmes et.al.(2008).

This information concerning biofeedback and imagery was used to manipulate emotional reasoning in the present study: false biofeedback of skin conductance levels during the visualization of situational scripts was applied in order to manipulate emotional reasoning to a higher level.

The main question in this study is: 'Is there a causal connection between emotional reasoning and anxiety?' It is expected that emotional reasoning can be manipulated by false biofeedback of skin conductance levels. It is hypothesized that higher levels of emotional reasoning are related to higher levels of anxiety. It is also expected, if manipulation is successful, that *S's* in the experimental condition will report an increase of state anxiety after manipulation, compared to controls skin conductance levels. Finally it is expected that *S's* in the experimental condition will report a stronger increase of state anxiety after a stress task, then *S's* in the control condition.

Methods

Subjects

A Total number of 10 *S's* participated in the study (3 men, 7 women). All *S's* where students of the University of Utrecht, selected by a pretest. *S's* where divided between two conditions (experimental vs control) by order of application. There were 5 *S's* in the experimental condition and 5 *S's* in the control condition.

Materials and selection

Selection

In order to select *S's*, students of the University of Utrecht filled out a pretest consisting of two out of four scripts of a questionnaire on Emotional Reasoning (Arntz et.al., 1995). The pretest selected *S's* based on their levels of Emotional Reasoning. First a pilot study was conducted to determine a maximum score above which people were excluded from the study. The upper 25% where excluded, and the top score of the remaining group was

adopted as the maximum score, which led to a maximum score of 4.20 (min. -4.20, max. 13.1, .*M*=2.7, *SD*=3.57). Scores were calculated by deducting within each script the version with objectively safe information and a non-anxious response from the version with objectively safe information and a anxious response, and deducting the version with objectively unsafe information and a non-anxious response from the version with objectively unsafe information and a anxious response. Possible scores ranged from -40 to 40. It was decided to adopt a maximum score of emotional reasoning since the study attempts to raise the level of Emotional Reasoning in *S's* scoring low to average on ER.

Materials

The pretest consisted of two out of four scripts of a questionnaire on Emotional Reasoning (Arntz et.al., 1995). There were four versions of each script, containing safe or unsafe objective information of a given situation and a response to the situation, either with a physical sensation of anxiety or non-anxious reaction. Combining different types of objective information and responses, the four versions where; 1. Objectively safe, anxious response, 2. Objectively save, non-anxious response, 3. Objectively unsafe, anxious response and 4.objectively unsafe, non-anxious response. For example, objectively save information could be: you are standing on top of a ladder, your father is holding it tightly to prevent it from falling over. An example of objectively unsafe information could be: you are standing on top of an old ladder, which is highly unstable and starting to topple over. An anxious response would be: 'your heart starts to race and you start to sweat, you want to get down the ladder as soon as possible. A non-anxious response could be: you climb to the top and you do what has to be done. A neutral response could be: You wait until the ladder is stable again and then finish your work. After each script students filled in six 100mm Visual Analogue Scales (VAS), rating whether the situation was 1. Absolutely not dangerous – extremely dangerous, 2. Very safe – very unsafe, 3. being in control– not being in control, 4. Does not make me feel anxious at all – makes me feel very anxious, 5. Is pleasant – is very unpleasant, 6. Has a good outcome – has a bad outcome.

Because of the relatively new character of the study, there were no known materials available for the computer task, so new materials had to be developed. A Total of 80 Scripts from an earlier study by students of Maastricht University where selected and slightly adjusted. There were 20 different themes (scripts), all presented in four different versions, semi-randomized in a way that two scripts of the same theme or type did not follow each

other rapidly. The scripts contained objectively save-unsafe information and an anxious response versus a non-anxious response. The scripts where read out loud and recorded to enable presenting the scripts auditory. A task was then designed in the computer program Presentation (ref) which played each script on a speaker, after which *S's* had to rate the script as absolutely not dangerous – very dangerous by clicking on the 100mm VAS displayed on the computer screen for 8 seconds before the next script was played. Within these 8 seconds *S's* where able to click more than once to correct accidental or non accurate clicks.

While these 80 scripts were presented auditory, a manipulated skin conductance was presented on a second screen. Two versions where created; one for the manipulation condition and one for the control condition. The manipulation version showed higher skin conductance levels based on an anxious response, the control condition version showed higher skin conductance levels based on unsafe objective information.

A second computer task was created in presentation to present the manipulation check, consisting of the other two scripts of the questionnaire on Emotional Reasoning then those used in the pretest (Arntz et.al., 1995) Again containing objectively safe – unsafe information and an anxious response versus a non-anxious response, leading to the four versions described earlier. Similar to the selection questionnaire, *S's* had to rate these scripts on the same six different levels as described earlier.

To measure state anxiety, the Dutch version of the Spielberger's State-Trait Anxiety Inventory (STAI) (Spielberger et.al., 1983), called the STAI-DY-1 (van der Ploeg, 1984) was used. Spielberg et.al. (1970) defined state anxiety as 'a temporal cross section in the emotional stream of life in a person, consisting of subjective feelings of tension, apprehension, nervousness and worry, and activation of the autonomic (arousal) nervous system' (Spielberger et.al.,1994). State anxiety was assumed to vary in intensity and fluctuate over time as a function of perceived threat. The STAI-DY-1 contained instructions to answer the questions directed to the current state. The STAI-DY-1 contains 20 items with four possible answers; 1. Not at all, 2. A little, 3. Quite a lot, 4. Very much. Higher scores account for higher anxiety levels. Van der Ploeg (1982) reports a Crohnbach's Alpha of .90, which stands for a good reliability.

A paper version of a stress-task by Salemink et.al. (2007) was included. The task consisted of 5 very difficult word anagrams which had to be completed within 6 minutes. The instructions told the subject that in general, students perform very well on the task, and so a high score was expected.

Procedure:

Several students around the University were asked to fill out a pretest which took about ten minutes. On this pretest they also answered the question if they were willing to participate in the computer task. Students who fell within the score limits and who were willing to participate were then contacted by phone or email in order to make an appointment to participate in the computer task. After arrival, the subject filled in a consent form and where asked to shut down their mobile phone. Next, the subject was placed behind a computer in a separate (soundproof) room in the laboratory. A short explanation of the duration and index of the research was given, and *S's* were told that the goal of the study was to determine if the visualization of scenarios would affect physiological measurements, in this case skin conductance levels. *S's* were told that they could watch their own skin conductance levels on a second screen, and afterwards they would have to answer some questions concerning their skin conductance.

Next the subject filled out the STAI-DY-1, and then the skin conductance electrodes were applied. Subject were asked whether they were left-handed or right-handed to make sure of the electrodes not being on the hand which the subject would have to operate the computer mouse with. The experimenter would then leave the room and check if the electrodes where connected and working by checking the signal. When everything worked well, the computer task started, playing 80 scripts combined with the display of the false biofeedback, which would be either the manipulation version or the control version.

When all 80 scripts were completed, another copy of the STAI-DY-1 was filled out. Next the electrodes were removed from the hand of the subject, and the manipulation-check. There was no false biofeedback during the manipulation check.

Following the manipulation check, *S's* were administered a stress task, and were left for 6 minutes to complete the stress task. After this a third copy of the STAI-DY-1 was filled out.

In order to see if any *S's* saw through the experiment *S's* were asked if they had any idea about what the study was trying to measure, also they were asked how they experienced seeing their own skin conductance. Also they were asked how they experienced taking part in the study and if they had any remarks or suggestions. Finally *S's* where debriefed about the goal of the study. *S's* left with either money or payment in lab hours.

Results

Analyses have been performed using a 2x2 repeated measures ANOVA design. The within subject factor was Time, measured by a pretest and a manipulation check. The between subject factor was the condition to which S´s were assigned, either control (no manipulation) or experimental (manipulated). Next a 2x3 repeated measures design was performed with Anxiety as a within subject factor measured by the STAI-DY-1 at three points in time. The between *S's* factor was condition. Finally another 2x2 repeated measures ANOVA was performed with state anxiety levels before and after the stress task as within subject factor, and condition as between subject factor. Actual skin conductance measurements have not been taken into account since a technical defect caused a failure to record the skin conductance accurately.

Emotional Reasoning:

A 2x2 repeated measures ANOVA was conducted in order to test whether emotional reasoning levels changed significantly before and after the computer task of 80 scripts and if this differed between the two conditions. This was done by comparing emotional reasoning before the computer task, measured by the pretest, and emotional reasoning after the computer task measured by the manipulation check. Analyses have shown a significant main effect of Time, $F(1,8)= 18.790$, $p =.002$, partial $\eta^2 = .70$. No main effect for condition was found $F(1,8)=.422$, $p=.534$, partial $\eta^2 = .05$. The results also show no interaction effect between Emotional reasoning and Condition, $F(1,8)= .354$, $p =.568$, partial $\eta^2 = .04$. This means that emotional reasoning overall increased significantly, but the conditions did not differ significantly and condition did not affect emotional reasoning scores (figure 1).

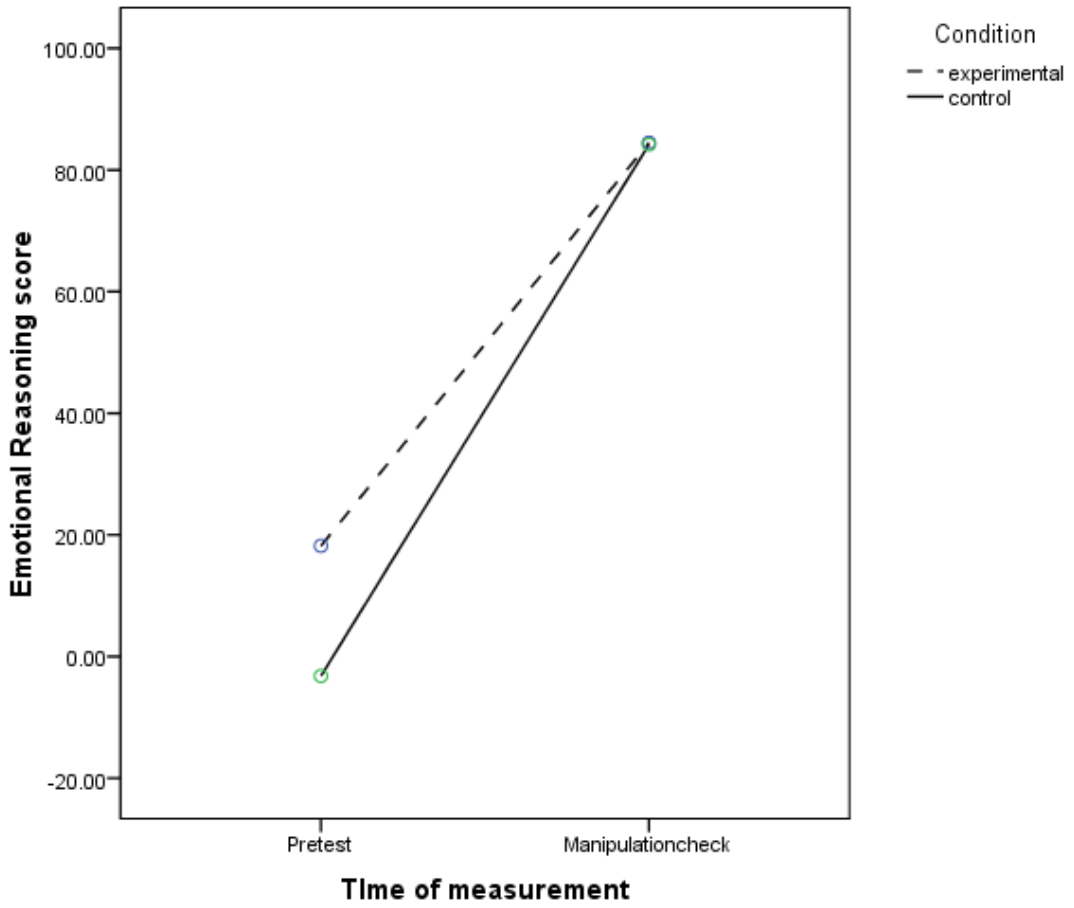

Figure1. A linear model of the Emotional Reasoning measurements at the pretest and the manipulation check in the control condition and the experimental condition

Anxiety increase before the stress task

A 2x2 repeated measures ANOVA was conducted in order to test whether anxiety levels changed significantly before and after the computer task and if this differed between the two conditions. This was done by comparing state anxiety before the computer task, measured by the STAI-DY-1 (STAI1) and state anxiety after the computer task which is before the stress task (STAI2). The analysis showed no significant main effect for anxiety, $F(1,8)=2,503$, $p = .152$, partial $\eta^2 = .238$, as well as no main effect for condition, $F(1,8)=.268$, $p= .619$, partial $\eta^2 = .032$. Also, no significant interaction effect between Condition and Anxiety was found, $F(1,8) =.003$, $p = .958$, partial $\eta^2 = .000$. This means that anxiety levels before and after the computer task did not differ significantly, there were no significant differences in anxiety levels between both conditions and there was no significant

relation between changes in anxiety levels and the condition to which S´s were assigned (figure 2).

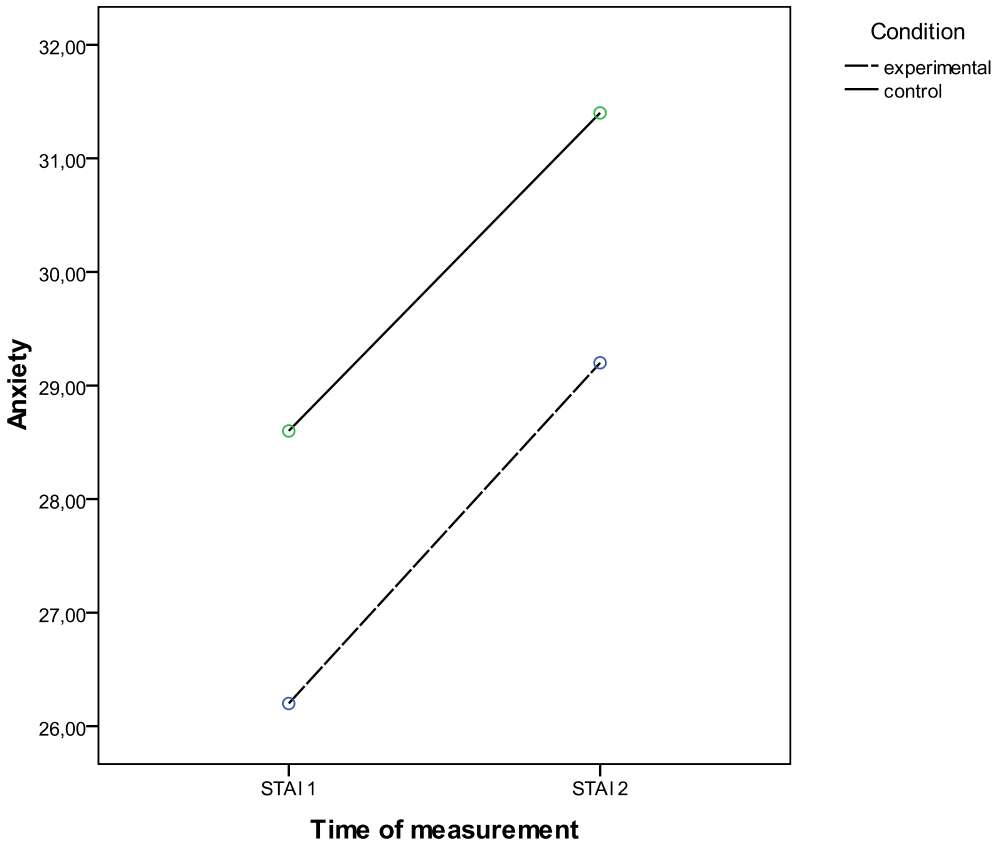

Figure 2. A linear model of the measurements of state anxiety before and after the computer task, which is before the stress task

Anxiety increase after the stress task

A 2x2 repeated measures ANOVA was conducted in order to test whether there was an effect of the stress task and if this differed between the two conditions. This was done by comparing state anxiety before the stress task, measured by the STAI-DY-1 (STAI2) and state anxiety after the stress task (STAI3). Figure 3 shows a linear model of the measurements of state anxiety before and after the stress task. Analyses have shown no main effect for both Time, $F(1,8)=.013$, $p=.912$, partial $\eta^2=.002$, and Condition, $F(1,8)=.175$, $p=.687$, partial $\eta^2=.021$. This means that there is no significant difference in state anxiety before and after the stress task, and there is no significant difference between conditions in either point of measurement. No interaction effect was found either $F(1,8)=2,958$, $p=.124$, partial $\eta^2=.27$,) the change in anxiety scores do not differ between the conditions (figure 4).

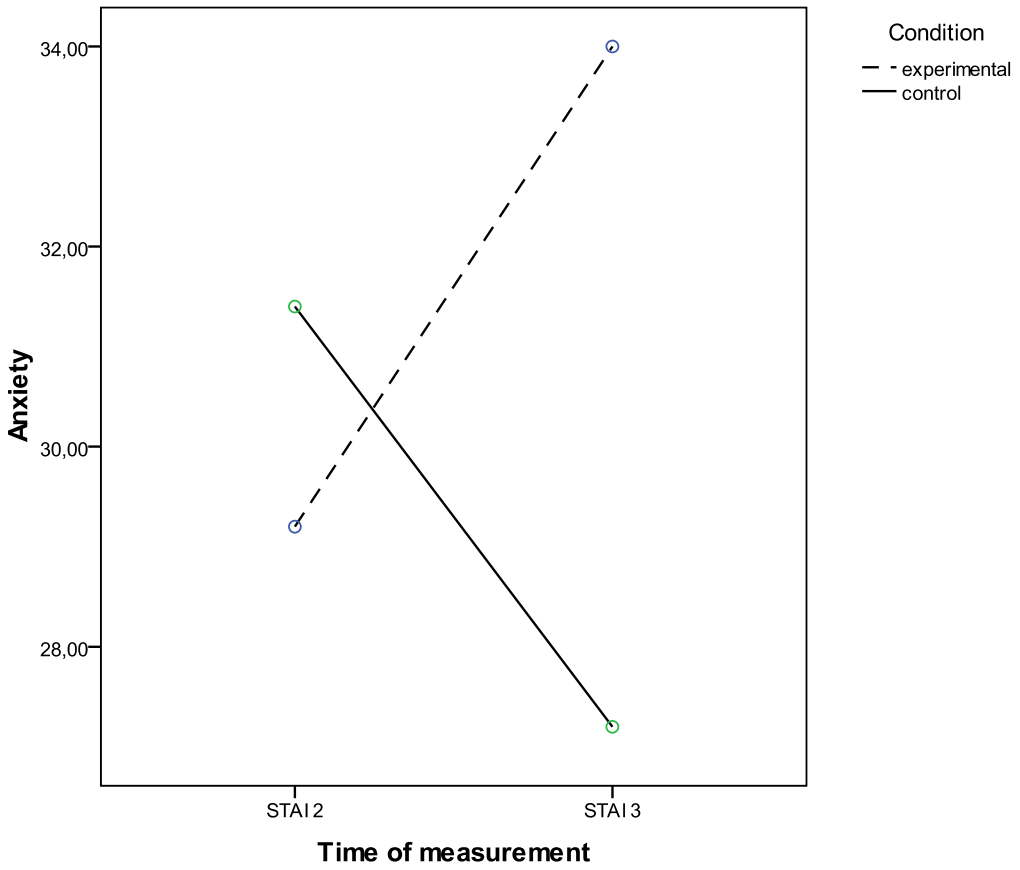

Figure 3. A linear model of the measurements of state anxiety before and after the stress task

Discussion

Anxiety disorders remain to be an important topic of research. Prevalence and incidence are high. Research concerning traits which contribute to the development of anxiety disorders can provide more insight in the matter. The current research focused on emotional reasoning and a possible causal connection with anxiety.

The first hypothesis was that emotional reasoning could be manipulated by false biofeedback of skin conductance levels. The main effect on emotional reasoning implies that there has been some manipulation. Though the effect of false biofeedback of skin conductance levels cannot be confirmed since there was no interaction effect between emotional reasoning and condition: both conditions showed an increase on ER after manipulation task.

Second, it was hypothesized that higher levels of emotional reasoning would be related to higher levels of anxiety. Although both conditions showed an increase in emotional reasoning between the pretest and the manipulation check, both conditions did not show an increase in anxiety. Therefore the expectancy of higher levels of emotional reasoning leading to higher levels of anxiety was not confirmed.

Finally, it was hypothesized that *S's* in the experimental condition would report a stronger increase of state anxiety after the stress task, then *S's* in the control condition. No significant difference was found in state anxiety scores in a relaxed state and in stress. No main effect was found and no interaction effect was found. Therefore, the hypothesis that S's in the experimental condition would report a stronger increase of state anxiety after the stress task was not confirmed either.

In conclusion, the goal of the present study was to test for a causal connection between Emotional Reasoning and Anxiety. The results of the current study have failed to proof a causal connection.

Despite the false biofeedback manipulation to have failed, emotional reasoning similarly increased in both conditions, so the conditions did not differ in emotional reasoning. Also all *S's* noticed the false biofeedback and next stopped paying attention to it, It can then be assumed that the increase of emotional reasoning was not caused by the skin conductance manipulation. Next to the biofeedback, all that was presented were the 80 auditory scripts, consisting of four different versions containing neutral or dangerous objective information of a given situation and a non-anxious or an anxious response to this situation. It might then be possible that the scripts by themselves would cause emotional reasoning levels to increase. More research would have to be done to confirm or reject this hypothesis. It is remarkable that an increase of emotional reasoning was found in both conditions, but no significant state anxiety differences were found between a relaxed state and stress after the stress task in either condition. It can then be hypothesized that emotional reasoning is not related to anxiety levels after induced stress. Future research could confirm or reject this hypothesis.

Limitations

A possible explanation for the lack of significance for condition in both emotional reasoning, anxiety analysis and stress task is the quality of the false skin conductance feedback. The nature of the presentation of false biofeedback caused all *S's* to notice the falseness of the biofeedback. Approximately all *S's* were suspicious of the biofeedback being

false since it did not correspond to the bodily sensations experienced at that very moment. *S's* experienced relaxation, many times even sleepiness during the 80 auditory presented scripts. *S's* reported the task to be 'rather boring'. These sensations did not match the skin conductance levels, which were raised at different points during the scripts in both the experimental condition and the control condition. Also, the program which presented the false skin conductance turned out to show the word 'sim' (an abbreviation of 'simulation') in small font in a lower corner of the window. Though hard to spot, the two *S's* who did notice realized immediately that the biofeedback was false.

In general this study has several limitations which might have affected the results. Several *S's* suggested including a break somewhere during the 80 auditory scripts to prevent sleepiness. Future research could limit the amount of scripts, e.g. to 50, in order to prevent *S's* from getting tired which led to the realization of the false nature of the skin conductance feedback.

Next, the lack of true skin conductance data due to technical difficulties, limited the results of the study. True skin conductance data, measured after each of the 80 scripts, could provide information concerning the arousal levels, the effect of certain scripts, and the relation to the presented false skin conductance. Future research could include true skin conductance.

Finally, the number of *S's* was limited to a mere 10 (of which two were excluded). A higher number of *S's* could have greatly increased the power of the research and would have made it less susceptible to invalid trials (e.g. noticing the false feedback). However due to the technical difficulties, the testing stage wasn't reached until the national holiday-season, which accounts for the low response rate.

In conclusion, since higher levels of emotional reasoning were not related to higher levels of anxiety and no differences were found between the experimental condition and the control condition, no causal connection between emotional reasoning and anxiety was found in the current study. However, these conclusions should be interpreted with caution, as the study was a pilot study with a small population size of N=10.

Future research could further investigate the possibility that emotional reasoning is influenced by scripts consisting of objectively neutral or dangerous information about a given situation, combined with an either neutral or anxious response. Other ways of manipulating emotional reasoning by false biofeedback without causing *S's* to notice the false nature could also be explored.

References:

Agnihotri, H., Paul. M., & Sandhu. J. S. (2008). Heart rate changes associated with biofeedback training. *Calicut Medical Journal, 6,* (3).

Allen, J. J. B., Harmon-Jones, E., & Cavender, J. H. (2001). Manipulation of frontal EEG asymmetry through biofeedback alters self-reported emotional responses and facial EMG. *Psychophysiology, 38,* 685–693.

Arntz, A., Rauner, M., & Hout, M. van den. (1995). "If I feel anxious, there must be danger": Ex-consequentia reasoning in inferring danger in anxiety disorders. *Behavior Research and Therapy, 33,* 917-925.

Batson, C. D., Engel, C. L., & Fridell. S. R. (1999). Value Judgments: Testing the Somatic-Marker Hypothesis Using False Physiological Feedback. *Personality and Social Psychology Bulletin, 25,* 1021-1031.

Beck, A. T., & Clark. D. A. (1997). An information processing model of anxiety: Automatic and strategic processes. *Behavior Research and Therapy, 35,* 49-58.

Beck, A.T. & Emery, G., (1985). Anxiety disorders and phobias: A cognitive perspective. *Basic Books*, New York.

Cosoff, S. J. & Hafner, R. J. (1998). The prevalence of comorbid anxiety in schizophrenia, schizoaffective disorder and bipolar disorder. *Australasian Psychiatry, 32,* 67-72.

Edmonds, W. A., Tenenbaum, G., Mann, D. T. Y., Johnson, M., & Kamata, A. (2008). The effect of biofeedback training on affective regulation and simulated car-racing performance: A multiple case study analysis. *Journal of Sport Sciences, 26,* 761-773.

Ehlers, A., Margraf, J., Roth, W. T., Taylor, C. B., & Birbaumer, N. (1988) Anxiety induced by false heart rate feedback in patients with panic disorder. *Behavior Research and Therapy, 26,* 1-11.

Holmes, E. A., Mathews, A., Dalgleish, T. & Mackintosh, B. (2006) Positive Interpretation Training: Effects of Mental Imagery Versus Verbal Training on Positive Mood. *Behavior Therapy, 37,* 237-247.

Holmes, E. A., & Mathews, A. (2005). Mental Imagery and Emotion: A Special Relationship?. *Emotion, 5,* 489-497.

Holroyd, K. A., Penzien, D. B., Hursey, K. G., Tobin, D. L., Rogers, L., Holm, J. E., et al. (1984). Change Mechanisms in EMG Biofeedback Training: Cognitive Changes Underlying Improvements in Tension Headache. *Journal of Consulting and Clinical Psychology, 52,* 1039-1053.

Pini, S., Cassano, G. B., Simonini, E., Savino, M., Russo, A., & Montgomery, S. A. (1997). Prevalence of anxiety disorders comorbidity in bipolar depression, unipolar depression and dysthymia. *Journal of Affective Disorders, 42,* 145-153.

Van der Ploeg, H.M., (1982), De Zelf-Beoordelings Vragenlijst (STAI-DY). *Tijdschrift voor psychiatrie,24.*

Salemink, E., Hout, M. A. van den., & Kindt, M. (2007). Trained interpretive bias and anxiety. *Behaviour Research and Therapy, 45,* 329-340.

Spielber, C. D.; Gorsuch, R. L.; Lushene, R. E. (1970). Manual for the state-trait anxiety inventory. Consultant Psychologist *Press; 1970*

Spielberger CD. 1983. Manual for the State-Trait Anxiety Inventory
STAI (Form Y).: *Mind Garden*.

Spielberger, C. D., & Sydeman, S. J. (1994) State-Trait Anxiety Inventory and State-Trait Anger Expression Inventory