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Is empathy always a good thing?

The ability to regulate cognitive and affective empathy in a medical setting.

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Abstract

Professionals in the field of medicine are struggling to achieve an appropriate balance between medical distance and empathic concern. The current study tested whether it is possible to regulate cognitive and affective empathy by effectively turning them on and off in a medical setting. Gender is treated as a covariate. This 2 (high cognitive load, low cognitive load) X 2 (high empathy, low empathy) between subject design study included 71 participants. Photographs are used to induce empathy (high vs. low) and a Tetris game is used to manipulate cognitive load (high vs. low). The dependent variables in this study are stitching performance and The Reading the Mind in the Eyes Test (RMET) score. In this study affective empathy could not be regulated. Affective empathy results in a poorer stitching performance. Some significant evidence is found for cognitive empathy regulation. This study provides new insights in the ability to effectively switch between cognitive and affective empathy by actively turning them on and off in medical context.

Keywords: cognitive and affective empathy, medical field, medical performance, regulation, Reading the Mind in the Eyes Test, dehumanization

Is empathy always a good thing?

Professionals in the field of medicine are struggling to achieve an appropriate balance between medical distance and empathic concern. Empathy is essential to understand a patient and associated with increased patient satisfaction, adherence to treatment, and fewer malpractice complaints (Gleichgerrcht & Decety, 2013). Being empathic in medicine is challenging though, as health workers are dealing with the most emotionally distressing situations; diseases, death, suffering and anxiety is a matter of daily practice. These distressing emotions can result in an empathic person feeling overwhelmed, leading to numerous negative consequences, such as compassion fatigue, burnout, emotional exhaustion and a low sense of accomplishment (Gleichgerrcht & Decety, 2012). Understanding the way empathy relates to medical health care workers performances and their well-being, can benefit the medical world and protect them from negative psychological consequences (Gleichgerrcht & Decety, 2014). The current study will investigate the differences between cognitive and affective empathy and the ability to turn these components on and off. These terms are explained in more detail and literature on these topics is discussed.

Empathy

In social science, empathy has been described in various ways and covers a broad spectrum of definitions. There is little consensus about the specific definition of empathy. Some argue it is a personality trait (dispositional empathy), where others describe it as a motivational, cognitive or emotional state. Empathy refers to the capacity to share, know, experience or imagine feelings of others (Gleichgerrcht & Decety, 2013). Empathy creates the possibility to experience happiness when someone else is happy, or to feel suffering when others are suffering from pain. However, with empathy one still knows that the emotion one resonates is the emotion of another individual. If this self-other distinction is not present, we

deal with emotion contagion (Singer & Klimecki, 2014). In this study, empathy is considered to be a multidimensional construct consisting of two major components, affective (emotional) and cognitive empathy. On the one hand you have affective empathy (also called emotional resonance), which is the capacity to (un)consciously feel what another person is feeling (Gleichgerrcht & Decety, 2014). Whereas cognitive empathy, also referred to as theory of mind or social cognition, is described as 'consciously understanding other peoples' emotions' (Lamothe, Boujut, Zenasni & Sultan, 2014). These two components are interconnected, as affective empathy can only occur after experiencing cognitive empathy, whereas cognitive empathy can occur by itself. For example, it is possible to only think about your friends broken leg, without experiencing any emotions. Nevertheless, if you actually feel emotions after seeing your friends broken leg, a conscious thought must have passed your mind before feeling these emotions.

However, both forms contribute to various aspects of the experience of empathy. The use of these components occurs sometimes automatic and implicit, sometimes explicit and depending upon the intentional use of specific processes (McDonald & Messinger, 2011). Overall, individuals differ in their level of empathetic behavior and the explicit use of it. Although this variety, humans require a certain level of cognitive empathy to interact and understand each other, also in the medical field. In general, empathy in the medical field refers to the ability to understand another's thoughts and feelings and to communicate and confirm that understanding with the other person (Gleichgerrcht & Decety, 2012). This view emphasizes the cognitive component of empathy rather than the affective part. Nevertheless, empathy is also about the challenge to skillfully attune with patients feelings (Halpern, 2003).

Cognitive empathy. Many studies have focused on cognitive empathy in the medical field. Synonyms for cognitive empathy are Theory of mind or social cognition, which refers to the capacity to understand another's perspective or mental state (McDonald & Messinger,

2011). By moving into someone's mental states, people can better predict and understand other people's behavior. Cognitive empathy is crucial in the medical world and therefore often described as a good form of empathy. However, cognitive empathy can have both good and bad outcomes, depending on the situation.

Cognitive empathy will increase medical health care workers well-being and decrease the risk of burnout (Lamothe et al., 2014). Several studies have shown that the use of cognitive empathy makes practicing medicine more meaningful and satisfying (Halpern, 2003). Recent evidence has also shown that the behavioral expression of cognitive empathy is associated with higher levels of medical competence (Ogle, Bushnell & Caputi, 2013). Cognitive empathy directly enhances therapeutic efficacy and diagnostic accuracy (Neumann, Edelhauser, Tauschel, Fischer, Wirtz, Woopen, Haramati, & Scheffer, 2011). Furthermore it facilitates both trust and disclosure towards health care workers, which is associated with better treatment adherence. In addition, it leads to patients being more satisfied with the relationship, help and treatment they receive (Neumann et al., 2011). In general, cognitive empathic communication leads to a reduction in patients' anxiety, which results in a decrease of negative physiological effects.

On the other hand, cognitive empathy can be mentally exhausting and especially in the medical world. Cognitive empathy requires high levels of attention, mental focus, and might lead to ego depletion. Ego depletion describes the idea that self-control and other mental processes require conscious effort and draw upon a limited pool of energy (Baumeister, Bratslavsky, Muraven, & Tice, 1998). Ego depletion is a state when the energy for mental activity is low and self-control is impaired. Experiencing a state of ego depletion damages the ability to control oneself later on. In the medical world, self-control is required to fulfill all kind of medical tasks, where high levels of attention and focus are necessary (Baumeister et

al., 1998). Therefore, controlling yourself and avoiding ego depletion are crucial in medical practice (Halpern, 2003).

Affective empathy. Many studies regard affective empathy in the medical world as a bad thing. Nevertheless, affective empathy can also elicit good and bad outcomes, depending on situational factors. An essential element of affective empathy is resonance, which is also part of effective communication. Effective health care worker-patient communication is highly important, as patients can actually sense whether a medical health care worker is emotionally attuned or not (Teutsch, 2003). Affective empathy helps medical health care workers to gather more information and gain a deeper understanding of the problem. It further helps health care workers to focus and retain attention for the needs of their patients. Moreover, health care workers tend to be more effective healers and enjoy more professional satisfaction, if they engage in the process of affective empathy (Larson & Yao, 2005).

Contrarily, studies have found that perceiving pain elicits (emotional) distress within the perceiver (Lamothe et al., 2014). Therefore, engaging affective empathy is not helpful during painful medical tasks, but rather reduces health care workers well-being. Affective empathy hinders medical health care workers performance and affects medical decision-making (Lamothe et al., 2014). Like cognitive empathy, affective empathy is also associated with personal distress, compassion fatigue and burnout among medical health care workers (Gleichgerrcht & Decety, 2013). Affective empathy can lead to depression, medical errors, substance abuse, interpersonal difficulties, and suicide among health care workers. Ensuing in deterioration of patient health care (Lamothe et al, 2014). Therefore, some affective distance between medical health care workers and their patients is desirable to maintain health care workers' emotional balance and medical neutrality. Research also showed that affective empathy in general continues to decrease among medical students from the third year onwards (Neumann et al., 2011). Medical health care workers tend to down-regulate their affective

empathic response to the pain of others, in order to protect themselves from being emotionally overwhelmed.

From the patients point of view, when health care workers down-regulate their affective response, this would suggest that they receive a less humanized and empathic treatment. For example, underestimating the pain of someone does not only carry the risk of that person feeling misunderstood, but also the possibility of receiving inadequate health care (Goubert, Craig, Vervoort, Morleya, Sulivan, Williams, Cano, Crombez, 2005). Dehumanization is 'the denial of a distinctively human mind to another person', which refers to cognitive empathy (Haque, & Waytz, 2012). Dehumanization causes a decrease in cognitive empathy, which can continue in diminished affective empathy. Denying the feelings of a patient can result in treating them less like emotional beings and more like cold and unemotional objects (Haslam, 2007). Furthermore, dehumanization leads to deindividuation, impaired patient agency, and a perceived dissimilarity between patient and health care workers (Haque, & Waytz, 2012). Additionally, medical health care workers show an increase in self-perceived medical errors after dehumanizing, which implies a loss in cognitive empathy (West, Huschka, Novotny, Sloan, Kolars, Habermann & Shanafelt, 2006).

On the contrary, dehumanization has functional aspects too. For example, it helps medical health care workers reducing their level of affective empathy, resulting in their duties being more automatic and their work more productive (Haque, & Waytz, 2012). Dehumanization also helps health care workers either justify past or prospective harm they cause, even if this harm is necessary for treatment (Haque, & Waytz, 2012). Dehumanization occurs unconsciously, unintentionally, and is often a byproduct of dealing with stressful practices and the requirements of hospitals (Haque, & Waytz, 2012). Empathy regulation skills are therefore crucial in the field of medicine.

When is empathy good or bad? It is evident that empathy is a multidimensional construct consisting of two major inter-twinned components that can both elicit good and bad outcomes in medical practice. Bad empathy is often described as not helpful or an obstructing form of empathy. Medical health care workers suffer from both forms of empathy when situations are cognitively demanding and/or emotionally overwhelming, which can result in negative psychological and/or physical outcomes. When medical health care workers suffer from an overload of emotional distress, mental and physical problems start to arise, causing a vicious circle. Therefore, empathy is bad when the negative consequences of both affective and cognitive empathy arise.

However, a minimum level of both forms of empathy is essential to benefit the patient's outcomes and professional's quality of life (Gleichgerrcht & Decety, 2014). Good empathy means helpful empathetic responses allowing sophisticated interactions with others (Teutsch, 2003). Therefore, both forms of empathy are good when it enhances patient-health care worker communication, trust and results in more effective and qualitative medical treatment. Hence, both forms of empathy are good when it helps medical health care workers doing their work and feel satisfied about their medical performance. As a result of good empathy, patients feel more satisfied about their treatment and less anxious.

However, maintaining empathetic connections in stressful conditions requires lots of attention and self-regulation, draining limited cognitive and emotional resources. Therefore, particular skills like focused attention, self-regulation, and emotional awareness need to be taught in order to empathically respond in distressing situations (Haque, & Waytz, 2012). Maintaining empathetic connections in the medical world seems instrumental against the general trend of declining both forms of empathy that comes with age and experience (Handford, Lemon, Grimm, Vollmer-Conna, 2013). Research found that medical health care workers with less experience perceive pain of others more intensely than more experienced

health care workers (Cheng, Lin, Liu, Hsu, Lims, Hung & Decety, 2007). Empathy development is thus affected by medical practice, not by medical education. However, pain-induced emotional distress among health care workers is similar irrespective of experience. Prolonged exposure to the pain of others thus decreases empathic concern, as medical health care workers have learned to inhibit the affective empathy-pain response (Cheng et al., 2007). By inhibiting the affective empathy-pain response, regulating feelings of unpleasantness becomes easier.

Nonetheless, there is a difference between men and women regarding both forms of empathy. Perceiving pain of male patients is less intense than the pain of female patients, and this effect is more marked for female medical health care workers (Gleichgerrcht & Decety, 2014). In general, women are more receptive than men to emotional signals and therefore score higher on empathy tests. Compared to men, women develop more caregiving attitudes, spend more time with their patients, have fewer patients and act more patient-oriented (Hojat, Gonnella, Nasca, Mangione, Vergare, & Magee, 2002). There is a difference in health care worker-patient communication too, where female health care workers communicate more openly with their patients than male medical health care workers (Teutsch, 2003). Moreover, women bring more warmth and intimacy into a conversation, share more (personal) information and make more use of nonverbal communication (Teutsch, 2003). The result is that women are more vulnerable for the negative consequences of empathy and suffer more from burnout and compassion fatigue (Paro, Silveira, Perotta, Gannam, Enns, Giaxa, Bonito, Martins & Tempski, 2014). In general, it seems that women engage more in affective and cognitive empathy, but have also more difficulties with regulating their personal negative arousal. Perhaps women are less competent in lessening both forms of empathy when necessary, resulting in excellent communication skills for medical practice, yet the risk of being emotionally or cognitively overwhelmed. Hence, whether empathy turns out to be good

or bad depends on medical health care workers experience, gender, situational factors, emotional and cognitive resources, and the ability to regulate both forms of empathy.

Switching

Both cognitive and affective empathy are thus essential components in the medical world that both do have downsides. On the one hand, affective empathy is necessary to emotionally attune with a patient and to establish an effective doctor-patient relationship. On the other hand, cognitive empathy is needed to understand patients, to enhance medical performance and therapeutic efficiency, and to protect health care workers' well-being. Research suggests that both cognitive processes and emotional responses make use of the same limited mental resources (Van Dillen, 2009). Performing a cognitive task, like playing a Tetris game, competes with emotional processing for this limited resource. The more mental resources are depleted to perform a task, the more emotional responses will be reduced (Van Dillen, 2009). As cognitive processes and emotion processes compete over the same limited mental resources, it seems that people have to switch between these processes. Based on previous literature, this might be the same for cognitive and affective empathy, meaning that people might need to switch these two components on and off. This would suggest that health care workers constantly have to regulate both forms of empathy, in order to adapt effectively to different situations and protect themselves from being overwhelmed.

However, whether one can effectively regulate cognitive and affective empathy remains questionable. It is possible that medical health care workers that are vulnerable to compassion fatigue and emotional distress are those who are less able to regulate the two components of empathy. As a result, these health care workers may suffer more from the negative consequences of affective and cognitive empathy (Gleichgerrcht, & Decety, 2013). Since women are more affected by the negative consequences of both forms of empathy (Paro

et al., 2014), it could be that women are less able to regulate cognitive and affective empathy. Gender might modulate the effect of cognitive and affective empathy on medical performance. Therefore, it is highly relevant to find out the link between both components of empathy and the differences between sexes. A switching process creates the ability to deal with more complex and varying situations. If possible, this could be a huge gain for the medical world. Health care workers could be trained in this switching ability and be better prepared for the highly demanding and distressing medical situations. This leads to the question whether both forms of empathy can be regulated or not, for the interest of both patients and medical health care workers.

Current Study

The current study will test whether it is possible to regulate cognitive and affective empathy by effectively turning them on and off. In order to perform well on a medical motor task after experiencing affective empathy, health care workers have to effectively turn off affective empathy. It is therefore expected that participants who perform well on a medical motor task will be able to effectively turn off their affective empathy. Additionally, in order to perform well on a social task, for example conversing with a patient's family, health care workers have use cognitive empathy. It is therefore expected that participants who perform well on a social task will be able to effectively turn on cognitive empathy. Gender might be modulating the effect of cognitive and affective empathy on performance. Therefore the following is hypothesized:

1. It is possible to regulate affective empathy.
2. It is possible to regulate cognitive empathy.

The aim of this study is to gain knowledge about the two components of empathy and the ability to switch between them by effectively turning them on and off. This insight might help

to increase the health care workers' well-being, enhance medical performance and increase patient's satisfaction.

Method

Participants

In total 71 participants contributed to this study, of which 48 women and 23 men. All participants completed the research and there is no missing data to be excluded, resulting in a *N*=71 in all following analyses. Only participants between the ages of 18 and 30 are included. The average age of the participants is 21.96 years (SD=2.23). Irrespectively of nationality, participants are randomly assigned to one of the four study conditions. Medical students are excluded from this study, to control for possible knowledge advantage of medical students. The study met all criteria for approval by the Psychology Ethical Committee at Leiden University.

Materials

The current study measured performance on a medical motor task and social task, by manipulating cognitive load and empathy. The instruments used to measure these constructs are discussed below.

Distressing pictures. In order to manipulate empathy, 14 empathy inducing and distressing pictures are used. The aim of the pictures is to activate feelings of empathy within the viewer. This perspective taking manipulation is effectively used in empathy paradigms (Batson, Early & Salvarani, 1997). At the end of the experiment, a manipulation check is added to the questionnaire. The manipulation check consisted of two questions, which could be scored on a 5-point Likert-scale ranging from 1= not much to 5= very much. The questions '*how much did you concentrate while watching the pictures?*' and '*how much did you feel what the person in the picture felt'* are asked.

Tetris game. Tetris is a tile-matching puzzle video game, designed by Alexey Pajitnov (1984). The game is played online. Different shapes of blocks fall down from the top of the screen to the bottom one at a time. The goal is to line them up horizontally without gaps in between. While playing Tetris, there is an increase in brain functions and activity, especially in the cerebral cortex (cognitive functions). Tetris is a cognitive game, which intensively make use of the working memory. Tetris is added as an interruption between the empathy manipulation and the stitching task.

Fake arm. Participants ability to fulfill a medical motor task is measured by stitching lacerations on a fake arm. This fake arm is generally used for medical students and it has several cuts that can be stitched. Participants are told it is somebody's arm, which they have to stitch as quickly and good as possible. The motor task is evaluated by the amount of stitches, the distance between them and how fast they are able to stitch. The speed accuracy tradeoff is used to get several performance scores, consisting of combinations between time, distance between stitches and variability of the distance between stitches. In total 3 fake arms were available for this experiment.

Reading the mind in the eyes test. The 'Reading the Mind in the Eyes Test' (RMET) is develop by Simon Baron-Cohen (1997) and is an advanced test of theory of mind. It is widely used to assess individual differences in emotion recognition and cognitive empathy across different groups and cultures. In this study the test is used to measure cognitive empathy. The Revised version for adults is used and consists of 36 pictures of a set of eyes (Baron-Cohen, Wheelwright, Hill, Raste, & Plumb, 2001). Each set of eyes displayed an emotion. Participants are asked to "*describe what the person in the picture is thinking or feeling*" and identify which emotion belonged to the set of eyes. Four possible responses are shown in a multiple choice format. An example of multiple choice emotions is: *'irritated, anxious, hostile or happy'.* Participants are given a definitions list for the emotions that are

used which they could utilize when they were unfamiliar with an emotion. The test scores are not related to social desirability (Fernandez-Abascal, Cabello, Fernandez-Berocal, & Baron-Cohen, 2013).

Trait anxiety inventory. The State-Trait Anxiety Inventory (STAI) measures trait and state anxiety (Spielberger, Gorsuch, Lushene, Vagg, & Jacobs, 1983). The short version of the Trait Anxiety Inventory is used by another researcher and not for this study, though all the applicants had to complete this questionnaire. The Trait Anxiety Inventory has 20 items with a 4-point scale (1= *almost never*, 4= *almost always*). An example of a trait question is: "*I worry too much over something that really doesn't matter*". The reliability of the STAI has a Cronbach's alpha from 0.86 (Quek, Low, Razack, Loh, Chua, 2004).

Dependent Variables

This study consists of various dependent variables. Firstly, the RMET score is a dependent variable. Secondly, since there is not a standardized measure to score the medical motor task, a variety of different scores are computed from combinations between time, the number of stitches and variability of the distance between stitches. These dependent stitching task performance variables are explained in more detail below.

Time divided by the number of stitches (T/N): measures how long it took to stitch each time, such that the higher the score, the poorer the performance. *Distance between the stitches divided by the number of stitches (Dis/N)*: measures how far apart each stitch is, such that the higher the score, the poorer the performance. *Average time divided by the standard deviation of distance (efficiency distance):* measures how efficient the distance between stitches is within the time it took to stitch, such that the higher the score, the better the performance. The smaller the standard deviation, the more efficient the stitch is. *Average time divided by the standard deviation of the number of stitches (efficiency number of stitches):* measures the

efficiency of the amount of stitches within the time it took to stitch, such that the higher the score, the poorer the performance. *Standard deviation of distance*: the standard deviation of the distance between stitches, such that the higher the score, the poorer the performance. *Average time:* average time to stitch, such that the higher the score, the longer it took to stitch. *Average distance:* average distance between the stitches, such that the higher the score, the larger the distance between the stitches. *Average number of stitches:* the average number of stitches, such that the higher the score, the more stitches are used.

Procedure

Participants are recruited through flyers, social networks (Facebook and e-mail) and promotion talks during lectures. Participants received a scripted spoken briefing of the experiment to ensure consistency between experimenters. First, participants are exposed to the empathy manipulation; 14 photographs of people in distress are shown (Batson, Early, & Salvarani, 1997). A fixed order of photographs is used. In the high empathy condition, they are instructed to think about the thoughts and feelings of the people depicted; '*Focus all your attention on how the person(s) may feel.*' In the low empathy condition, they are instructed to view the pictures like a reporter covering the scene in a detached, unemotional manner; '*To remain objective and detached, do not start imagining what the person has gone through or what he or she must be feeling.'* Both conditions are asked to concentrate carefully. After the picture slideshow, participants are exposed to the cognitive load manipulation. Half of the participants (35 in total) has played the Tetris game for five minutes (high load), while the other 35 participants has waited and did not play the game (low load). The low load condition (waiting) is instructed to do nothing for 5 minutes. The introduction, picture slideshow and Tetris game lasted about 10 minutes.

Next, all participants are asked to complete the stitching task. This task required

participants to administer medical stitches to a fake arm with three lacerations. They are instructed to accomplish this task as quickly as possible, and to ensure that the stitches are close together and evenly spaced. Privacy is given by the experimenters by waiting outside the room while participants completed the task. When participants finished one laceration, they could open the lab door. The time it took participants to complete the task is recorded. A ruler is used to measure the distance between stitches to obtain the remaining two dependent variables. Subsequently, this process is repeated and participants had to stitch the other two lacerations. Upon completion of the stitching task, participants are asked to complete the Reading the mind in the eyes test on paper. The time it took participants to complete the RMET is recorded. The experimenters left the room again to give privacy. At the end of this social task, participants had to complete the Trait Anxiety Inventory, along with demographic details, including age, race/ethnicity, nationality, gender, and education. The Trait Anxiety Inventory is not used for this study. A manipulation check for the distressing empathy inducing photographs is added to the online questionnaire. After completing the questionnaire, participants are asked how they felt while watching the photographs and how they experienced the experiment, in order to receive additional information. They receive a debriefing letter and 2 credits, and are thanked for their participation. Table 1 shows an overview of the experimental design.

Table 1. Experimental Design

Empathy condition	Tetris Condition	Performance stitching task	Switching off affective empathy	Performance RMET	Switching on cognitive empathy
High Empathy	High load	Good	Yes	Good	Yes
		Good	Yes	Bad	No
		Bad	No	Good	Yes
		Bad	No	Bad	No
Low Empathy	High load	Good	No	Good	Yes
		Good	No	Bad	No
		Bad	No	Good	Yes
		Bad	No	Bad	No
High Empathy	Low load	Good	Yes	Good	Yes
		Good	Yes	Bad	No
		Bad	No	Good	Yes
		Bad	No	Bad	No
Low Empathy	Low load	Good	No	Good	Yes
		Good	No	Bad	No
		Bad	No	Good	Yes
		Bad	No	Bad	No

Results

Descriptive Statistics

The average score on the Reading the Mind in the Eyes test (RMET) was 26.01 (*SD*=3.43). RMET test scores did not differ between sexes (men *M*= 26.05, *SD*=.760; women *M*= 26.06, *SD*=.516). The average time to complete the RMET test was 8.40 minutes (SD=2.70).

Manipulation Check

Empathy manipulations are analyzed with a univariate ANOVA. The manipulation check consisted of two questions: *'How much did you empathize with the pictures?'* and *'How much did you concentrate?'.* The high and low empathy conditions did not differ in concentrating, $F(1,66) = 1{,}024$, $p = ,315$, or empathizing, $F(1,66) = 1{,}341$, $p = ,251$. The manipulation check shows that the two empathy conditions had no significantly effect on the

participants empathy levels. Gender of the participants had a significant effect on empathizing, $F(1,66) = 3,990$, $p = ,050$. In the high empathy condition, men empathized more than woman (men $M = 4,14$, $SD = ,690$; women $M = 4,14$, $SD = ,690$). In the following analysis empathy is regarded as a manipulated factor.

Test of Hypothesis 1

A two (high cognitive load, low cognitive load) by 2 (high empathy, low empathy) between subject ANOVA is used to test the first hypothesis that it is possible to regulate affective empathy. The univariate effects are shown in Table 2. None of the interaction effects empathy x Tetris is significant. Tetris as a cognitive interruption is not significant for none of the performance variables.

Several significant medical stitching task performance effects are found. A significant effect is found for empathy on the *distance between stitches divided by the number of stitches (Dis/N)* variable, $F(1,66) = 7,185$, $p = ,009$ and gender $F(1,66) = 8,991$, $p = ,004$. Participants in the high empathy condition ($M = 0,716$, $SD = 0,589$) had a higher ratio of distance to number of stitches compared to those in the low empathy condition ($M = 0,496$, $SD = 0,355$). Male participants ($M = 0,956$, $SD = 0,111$) had a higher ratio of distance to number of stitches compared to female participants ($M = 0,509$, $SD = 0,074$).

The Anova test shows a significant effect for empathy on the *efficiency distance* variable, $F(1,66) = 4,515$, $p = ,037$ and gender $F(1,66) = 6,144$, $p = ,016$. Participants in the high empathy condition ($M = 343,351$, $SD = 362,273$) had a lower ratio of average time to SD of distance compared to those in the low empathy condition ($M = 537.327$, $SD = 512,137$). Male participants ($M = 264,960$, $SD = 93,801$) had a lower ratio of average time to SD of distance compared to female participants ($M = 532,189$, $SD = 62,864$).

The test results for the variable *standard deviation of distance* shows one significant effect for empathy $F(1,66) = 4,349$, $p = ,041$. Participants in the high empathy condition ($M = 1,4417$, $SD = 0.982$) had a higher standard deviation of distance compared to the low empathy condition ($M = 1,050$, $SD = 0,971$).

For the dependent variable *average distance* two significant effects are found, for empathy $F(1,66) = 5,554$, $p = ,021$ and gender $F(1,66) = 10,123$, $p = ,002$. Participants in the high empathy condition ($M = 6,018$, $SD = 2,340$) had a larger distance between the stitches compared to the low empathy condition ($M = 5,393$, $SD = 2,047$). In addition, male participants ($M = 6,997$, $SD = ,487$) had a larger distance between the stitches compared to female participants ($M = 5,091$, $SD = ,326$).

The Anova test result for the *average number of stitches* shows two significant effects for empathy $F(1,66) = 4,765$, $p = ,033$ and gender $F(1,66) = 6,244$, $p = ,015$. Participants in the high empathy condition ($M = 11,722$, $SD = 5,451$) had a lower average number of stitches compared to the low empathy condition ($M = 13,569$, $SD = 4,184$). Male participants ($M = 10,052$, $SD = 1,091$) had a lower average number of stitches compared to female participants ($M = 13,353$, $SD = ,731$).

Since Tetris and the interaction effect of empathy x Tetris are not significant, the hypothesis that it is possible to regulate affective empathy, is not supported. The moderating effect of gender is several times significant, with women scoring higher on stitching performance.

Table 2. Univariate Test Results of Stitching Task Performance

Task performance variables	F-value	P-value
Time/Number of stitches (T/N)		
Empathy	2,593	,112
Tetris	,945	,334
Empathy x Tetris	,843	,362
Gender	1,676	,200
Distance/Number of stitches (Dis/N)		
Empathy	7,185	,009*
Tetris	,201	,655
Empathy x Tetris	,017	,896
Gender	8,991	,004*
Average time/SD distance (efficiency distance)		
Empathy	4,515	,037*
Tetris	,003	,959
Empathy x Tetris	,200	,656
Gender	6,144	,016*
Average time/SD number of stitches (efficiency number of stitches)		
Empathy	2,744	,102
Tetris	,000	,983
Empathy x Tetris	,239	,627
Gender	,000	,998
SD of distance		
Empathy	4,349	,041*
Tetris	,584	,447
Empathy x Tetris	,015	,902
Gender	1,250	,268
Average time		
Empathy	,747	,391
Tetris	,311	,579
Empathy x Tetris	1,161	,285
Gender	3,191	,079
Average distance		
Empathy	5,554	,021*
Tetris	,005	,942
Empathy x Tetris	,120	,730
Gender	10,123	,002*
Average number of stitches		
Empathy	4,765	,033*
Tetris	,363	,549
Empathy x Tetris	,001	,976
Gender	6,244	,015*

* $p < 0,05$

Test of Hypothesis 2

To test the hypothesis that it is possible to regulate cognitive empathy, bivariate correlations are conducted for RMET scores with stitching task performance. All Pearson's correlations can be seen in Table 3. Various significant correlations are found in the high empathy x low load condition. For the high empathy x low load condition, one significant positive correlation is found for RMET scores with the average number of stitches, r=.508*. The higher the RMET score, the more stitches are used. Additionally, a significant negative correlation is found for RMET scores with the distance between stitches divided by the number of stitches (Dis/N), r=-.502*. The higher the RMET score, the lower the ratio distance to number of stitches. A significant negative correlation is also found in the high empathy x low Tetris condition, for RMET scores with the average distance between stitches, r= -.574*. The higher the RMET score, the lower the average distance between the stitches. Scatterplots of the significant correlations can be found in Appendix G. These significant results together seems to support the a priori hypothesis that it is possible to regulate cognitive empathy, at least to the extent that there are correlations between stitching performance and RMET scores.

Table 3. Pearson's Correlations for RMET Scores with Stitching Performance

	RMET scores			
	High empathy x high load	Low empathy x high load	High empathy x low load	Low empathy x low load
Stitching performance				
T/N	-.092	-.209	-.246	-.162
Dis/N	-.059	-.129	-.502*	-.319
Efficiency distance	.029	-.172	.196	.189
Efficiency number of stitches	-.214	-.454	-.271	.094
SD of distance	-.110	.377	-.152	.082
Average time	-.106	-.100	.294	.174
Average distance	.155	.127	-.574*	-.265
Average number of stitches	-.186	.207	.508*	.307

*$p < 0.05$, **$p < 0.01$

Discussion

This study is conducted to provide new insights in the two inter-twinned components of empathy and whether it is possible to switch effectively between cognitive and affective empathy by turning them on and off in a medical setting. The empathy manipulation was not significant in this study, which shows that participants empathy levels did not differ between the empathy conditions. However, the results show a significant difference between the empathy conditions, suggesting that the empathy manipulation worked at least to some extent or the significant differences are due to other factors. Perhaps the manipulation check was not sufficient to investigate the efficiency of the empathy manipulation, since it only existed of two questions. It is therefore recommended to improve the empathy manipulation and/or the manipulation check in future research. Nevertheless, empathy is regarded as a manipulated factor in this study.

The first hypothesis investigated, that it is possible to regulate affective empathy, is not supported. Participants in the high empathy condition performed poorer compared with those in the low empathy condition, using fewer stitches and larger distance between stitches.

Experiencing affective empathy thus resulted in a decreased performance on the medical stitching task, which is supported by Lamothe et al. (2014). This suggests that participants are not able to effectively turn off affective empathy if necessary and are not able to regulate it. According to the discussed literature (Van Dillen, 2009), cognitive and emotional processes compete over the same limited resources. Since participants experienced affective empathy, they were not able to perform a cognitively demanding stitching task. The more emotional processes are active, the more cognitive processes will be reduced. However, it could be that health care workers require a certain time interval to process the empathic emotions before they can perform well on a medical stitching task. It is therefore recommend to study time interval between tasks in order to investigate whether time plays a role in this switching mechanism.

It is expected that Tetris would function as a cognitive interruption (Van Dillen, 2009). However, Tetris had no effect on any of the performance tasks. This implies that playing Tetris did not function as a cognitive interruption and did not influence performance significantly. There are several possible explanations. Perhaps the participants did not play Tetris for long enough for it to bare a sufficient cognitive load. However, it may also be possible that Tetris was not the appropriate game at all.

Furthermore, it is also investigated whether gender modulates the effect of affective empathy on stitching performance. Contrary to the expectations (Paro et al., 2014), male participants performed significantly poorer on the stitching task than women. This implies that men are less effective in turning affective empathy off compared to women. This could be explained by the manipulation check, which showed that male participants empathized more with the empathy pictures than women. If men indeed empathized more with the empathy pictures, perhaps men experienced more difficulties regulating affective empathy, which resulted in a poorer stitching performance.

The second hypothesis investigated, whether it is possible to regulate cognitive empathy, is partly supported. Various significant correlations are found between RMET scores and stitching performance in the high empathy x low load condition. Especially the significant correlation between the RMET scores and the distance between stitches divided by the number of stitches (Dis/N), provides meaningful support for this question. As RMET scores increase, the ratio of distance between the stitches to the number of stitches decreases. As a low ratio is interpreted as better stitching performance, and this performance is associated with high scores on the RMET, this indicates that participants are able to turn on cognitive empathy effectively. This significant result supports the a priori hypothesis that it is possible to regulate cognitive empathy.

In addition, a significant correlation is found between RMET scores and the average number of stitches. The higher the RMET scores, the more stitches are used. However, it remains questionable whether more stitches actually implies a better stitching performance, since it is desirable to find an optimum ratio between the number of stitches and the distance between them. A significant correlation is also found between RMET scores and the average distance between the stitches. Here too it remains questionable whether a larger distance between the stitches implies a better performance, as it also concerns an optimum ratio.

However, the other dependent stitching performance variables in the high empathy x low load condition are not associated with higher RMET scores. Additionally, no significant correlations are found between stitching performance and RMET scores in the other conditions. This only provides minimal support for the second hypothesis. However, this study indicates that it could be possible to regulate cognitive empathy to some extent. Moreover, time between the motor- and social task could be a predictor for effective switching abilities. It is also here recommend to study this time interval between tasks in

order to investigate whether time plays a role in switching on cognitive empathy. Future research should study cognitive empathy regulation in more detail.

Furthermore, no significant difference is found between men and women on the RMET. This implies that gender does not modulate the effect of cognitive empathy on the social task performance. It could be that men and women are equally well in turning on cognitive empathy if necessary. Another explanation could be that the RMET is not the most appropriate test. Although cognitive empathy is required to fulfill this task successfully, it remains hard to distinguish emotions merely by a set of eyes. Many participants confessed to have guessed some of the answers. Mostly because they could not read the rest of the facial expressions. Therefore the RMET score is somewhat affected by chance, as the answers are chosen from multiple choice options. However, it remains challenging to find a more appropriate test that is sensitive enough to determine individual differences in cognitive empathy. Therefore future research should try to find a more applicable test for determining individual differences in cognitive empathy.

Limitations

The validity and generalizability of the results presented in this study may be limited by several methodological issues. First, to increase generalizability and to detect any possible switching effects, future studies would benefit by increasing the number of participants. The small sample size may account for the fact that no affective empathy switch is found in the results. Secondly, the recruitment procedure resulted in a population bias towards Psychology students. Future research should therefore be conducted in a real medical setting with actual health care workers. Conducting a study in such an environment could yield in more specific and accurate results and provide more meaningful insights. It might be possible that the environment is an important predictor whether someone is able to regulate both forms of

empathy or not. For example, medical health care workers could have learnt to switch their empathic behavior off when entering a hospital or operating room.

Additionally, the empathy manipulation in this study was not significant. Future research should therefore improve the empathy manipulation and/or the manipulation check to study any empathy regulation ability. In this study, medical motor task performance is measured by stitching lacerations on a fake arm. In a real medical setting, lacerations are done on actual (human) arms. Using similar settings would provide a better estimations of stitching performance. Moreover, medical needles are curved. Using such a curved needle requires training and practice. Therefore a different needle and thread are used in this study. To create a more realistic setting, future research should use a medical curved needle. Additionally, various measures of stitching performance are used in this study. Using a standardized measure to score stitching performance, that is also used in medical settings, would provide more meaningful results. This study does also not take esthetics into consideration. Future research could therefore aim to combine these two measures to score stitching performance of the participants. Furthermore, future research should try to find a more applicable social task for determining individual differences in cognitive empathy, since the RMET is somewhat affected by chance. Additionally, due to time limitations, only two tasks are used to measure empathy regulation. Future research could add more tasks in order to increase the reliability of the experimental design and to gain a better understanding of this potential empathy regulation mechanism.

Furthermore, emotion regulation skills and the ability to turn empathy on and off, seems to be connected and intertwined. Future research could, for example, investigate correlations between emotion regulation skills and the ability to regulate empathy. Medical health care workers' ability to deal with negative arousal could be a significant predictor for estimating when someone is going to be emotionally overwhelmed or not, ultimately resulting

in negative psychological and/or physical outcomes. Therefore, future research should not only focus on how people regulate cognitive and affective empathy, but also study which factors are important and why some medical health care workers are better than others in regulation their empathic behavior.

Societal Relevance

Empathy is a present-day topic in the medical field and often discussed by researchers, medical students, hospital personnel and so forth. The medical field is struggling to achieve an appropriate balance between medical distance and empathic concern. Both highly important, but it can also be very destructive for both health care workers and patients. This study gives an interesting insight in the construct of empathy and its influence on medical and social performance. Evidence suggests that experiencing high levels of affective empathy, without being able to regulate this effectively, can result in lower medical performance. This highlights the need for more research in this field. This study shows that it is possible to turn on cognitive empathy to some extent if necessary, which can be a huge gain for health care workers. This field of study can teach health care workers about the negative consequences of empathy and create awareness about the importance of preventive measures to fore come being cognitive and/or emotionally overwhelmed. Additionally, this study might be very useful and informative outside the medical field. Almost every individual has to deal with switching between cognitive and affective empathy in daily life. Therefore, this study attributes not only to the medical field, but can be also useful for other practices.

Although the debate remains on how the concept of empathy and its components should be defined and measured, this study provides new insights in empathy in the medical field. The fact that medical health care workers have to switch between different components

of empathy in daily practice, highlights the relevance of learning about how they do this and which factors contribute to a successful regulation.

Conclusion

Although the results of this study provides lots of evidence about empathy regulation, the hypotheses could not be confirmed completely. Future research is required to thoroughly investigate the mechanisms behind the ability to effectively switch between cognitive and affective empathy by actively turning them on and off in medical context. Knowledge about this phenomena could enhance the well-being of health care workers in the long run, improve medical performance and patient's satisfaction. Research on this topic could result in reduced numbers of professionals becoming cognitively and/or emotionally overwhelmed. Is empathy always a good thing? Certainly not. The answer depends on many different contextual and personal factors, but is also highly dependent on the personal ability to regulate empathy and effectively switch between cognitive and affective empathy by turning them on and off.

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Appendices

Appendix A. Dutch Informed Consent

Toestemmingsverklaringsformulier

Titel onderzoek: Emotie en Cognitie
Verantwoordelijke onderzoeker: ……. Handtekening:……

Dit onderzoek wordt uitgevoerd in het kader van een Masterscriptie van studenten Psychologie van de universiteit van Leiden. Het experiment waar u aan gaat deelnemen gaat over emoties en cognitie. U krijgt zo meteen een aantal foto's van stressvolle situaties te zien, waarna u een tweetal verschillende taken gaat uitvoeren. Aan het eind van het onderzoek hebben wij nog een aantal vragen voor u. Het onderzoek duurt ongeveer 1 uur, waarvoor u 2 credits.

In te vullen door de deelnemer

Ik verklaar op een voor mij duidelijke wijze te zijn ingelicht over de aard, methode, doel en belasting van het onderzoek. Ik weet dat de gegevens en resultaten van het onderzoek alleen anoniem en vertrouwelijk aan derden bekend gemaakt zullen worden. Mijn eventuele vragen zijn naar tevredenheid beantwoord.

Ik stem geheel vrijwillig in met deelname aan dit onderzoek. Ik behoud me daarbij het recht voor om op elk moment zonder opgaaf van redenen mijn deelname aan dit onderzoek te beëindigen.

Door dit formulier te ondertekenen gaat u akkoord met deelname aan het onderzoek naar emotie en cognitie.

Ik heb het informatieformulier gelezen en begrepen en geef toestemming voor deelname aan het onderzoek.

Naam: ……. Plaats: ……..

Datum: …… Handtekening: …….

Appendix B. English Informed Consent

Title research: Emotion and Cognition

Responsible researcher: ……. Signature:……

This research is carried out for the thesis of Psychology Master students from the University of Leiden. The research you are going to participate is about emotions and cognition. Firstly, you will see some pictures of stressful situations, after which you will perform a variety of tasks. At the end of the study, we have a short questionnaire for you. The research will take about 30 minutes, for which you get 2 credits.

To be completed by the participant

I declare to be clearly informed about the nature, method, target and load of this research. I have understood that the data and results will be anonymous and confidential. The data and results will only be used for this study. I received satisfying answers to my (possible) questions.

By signing this form you agree to voluntary participate in the research about emotion and cognition. You have the right to terminate the research at any time, without giving any reason.

I have read and understood the information form and give permission to participate.

Name: ……. Place: ……..

Date: …… Signature: …….

Appendix C. Dutch Debriefing Letter

Beste deelnemer,

Je hebt zojuist deelgenomen aan het onderzoek naar emotie en cognitie, hartelijk bedankt hiervoor! Uitleg over het echte doel van dit onderzoek konden we je van te voren niet geven, aangezien dit je manier van handelen en antwoorden had kunnen beïnvloeden. Het doel van dit onderzoek is om te kijken naar de invloed van empathie op motorische en sociale vaardigheden. Hierbij kijken we of men empathie kan reguleren en of angst daarbij een rol bij speelt.

Met behulp van de foto's hebben we empathie opgewekt, waarna we hebben gekeken naar je prestatie op de motorische taak (hechten van een nep arm) en sociale taak (lees de ogen test). Sommigen hebben ook Tetris gespeeld, dat diende als cognitieve interruptie. Degene die goed scoren op de taken zijn in staat empathie te reguleren. Aan de hand van de vragenlijst kunnen we kijken of angst hierbij een rol speelt.

De uitkomsten van dit onderzoek zullen anoniem verwerkt worden en alle informatie wordt vertrouwelijk behandeld. Er zal voor worden gezorgd dat onbevoegden geen inzage krijgen en dat de gegevens niet tot personen zijn terug te leiden. Er zijn geen risico's of nadelige effecten aan dit onderzoek verbonden.

Dit scriptieonderzoek wordt vanuit de afdeling psychologie van de universiteit Leiden gecoördineerd. Mocht je na afloop van dit experiment nog vragen hebben en/of negatieve gevolgen denkt te ondervinden, dan kun je ten alle tijden contact opnemen met de coördinator van dit onderzoek: L. T. Harris (email: l.t.harris@fsw.leidenuniv.nl.).

Nogmaals hartelijk bedankt voor je deelname!

Met vriendelijke groet,
Floor Peters en Lara Migchelbrink

Appendix D: English Debriefing Letter

Dear participant,

You just participated in the research about emotion and cognition, thank you very much for your participation! We could not give an explanation about the real purpose of this research, since that could affect your behavior and/or answers. The aim of this study is to look at the influence of empathy on a motor task (stitching a fake arm) and social task (Reading the Mind in the Eyes test). Hereby we investigate whether people are able to regulate cognitive and affective empathy and if anxiety plays a role in here.

The stressful pictures are used to generate empathy, after which we looked at your performance on the motor task (stitching the fake arm) and social task (Reading the mind in the eyes test). Some of you played Tetris, which functioned as a cognitive interruption. In this way, we can investigate whether people are able to regulate cognitive and affective empathy. Additionally, with the questionnaire we explore if anxiety plays a role in here.

The results of this study will be treated anonymously and all the information will be kept confidential. We ensure that unauthorized persons do not have access to the data and participants identity cannot be discovered. There are no risks or negative consequences related to this research.

This thesis research is coordinated by the Psychology Department of the University of Leiden. If you have questions about this research and/or encounter any negative consequences, you may contact the coordinator of this study at any time: L. T. Harris (email: l.t.harris@fsw.leidenuniv.nl).

Once again, thank you very much for participating!

Kind regards,
Floor Peters and Lara Migchelbrink

Appendix E: Dutch Script

→ Aankomst participant

"Hallo, ben je hier voor de studie: Emotie en cognitie?' Dat is mooi, dan mag je plaats nemen in hokje…

→ Zorg dat de participant plaats neemt achter de computer en ga erbij staan.

Je zult straks een aantal foto's op het beeldscherm te zien krijgen en daarna wordt je gevraagd een aantal taken uit te voeren. Tot slot krijg je een korte vragenlijst die je dient te beantwoorden. Het onderzoek duurt ongeveer een halfuur en je krijgt hier 2 credits voor mocht je die nodig hebben. Voordat we het onderzoek starten wil ik je vragen om een toestemmingsverklaringsformulier te ondertekenen waarin je verklaart dat je vrijwillig deelneemt aan dit onderzoek.

→ Overhandig de papieren en wacht tot de participant deze gelezen en ondertekend heeft. Zorg dat de participant goed achter de computer zit. Start foto's op.

<u>Empathie groep</u>
Je zult zo meteen op dit beeldscherm een aantal foto's te zien krijgen van personen in stressvolle situaties. De foto's zullen achter elkaar worden weergegeven in een diavoorstelling. *Probeer je tijdens het bekijken van de foto's zo goed mogelijk te concentreren. Het is van belang dat je, je zo goed mogelijk in probeert te leven, en probeert te voelen wat de persoon op de foto voelt.* Wanneer alle foto's zijn getoond mag je de deur openen en mij roepen. Is dit duidelijk?

<u>Controle groep</u>
Je zult zo meteen op dit beeldscherm een aantal foto's te zien krijgen van personen in stressvolle situaties. De foto's zullen achter elkaar worden weergegeven in een diavoorstelling. *Probeer je tijdens het bekijken van de foto's zo goed mogelijk te concentreren. Het is van belang dat je op een objectieve en afstandelijke manier naar de foto's kijkt. Probeer geen betekenis te geven aan de foto's*. Wanneer alle foto's zijn getoond mag je de deur openen en mij roepen. Is dit duidelijk?

→ Na paar seconden is participant klaar en start je Tetris op
→ Als proefpersoon niet in de Tetris conditie zit, laat hem wachten gedurende 5 minuten, zorg ervoor dat hij ondertussen niks anders gaat doen

Je gaat nu 5 minuten Tetris spelen. Ken je dit spel? Het doel van dit spel is de vallende blokken zo te stapelen dat er geen ruimte tussen komt en de blokken aan elkaar sluiten. Dit kan door de blokken horizontaal en verticaal te roteren met de pijltjes op het toetsenbord. Zodra de blokken beneden zijn kun je ze niet meer draaien. Als je dood gaat kun je weer opnieuw beginnen. Je gaat dit in totaal 5 minuten spelen en als de tijd voorbij is klop ik op je deur. Ik houd dus de tijd voor je in de gaten. Is dit duidelijk? Je kunt beginnen met spelen zodra je er klaar voor bent.

→ Tetris aanzetten voor proefpersoon en tijd starten

→Als de participant Tetris aan het spelen is, zorg je dat alle spullen voor de taak klaar liggen zodat je hierna meteen kan beginnen met het geven van de instructies over de taak.

→Wanneer de participant klaar is vervolg je het onderzoek met de nep arm

Ik wil je nu vragen om een hechtingstaak uit te voeren. Deze nep arm die je hier voor je ziet wordt gebruikt door geneeskunde studenten om te oefenen met het hechten van wonden. Ik wil je nu vragen om met deze naald en dit hechtingsdraad alle drie de wonden op de nep arm zo goed mogelijk te hechten. Je mag zelf weten in welke volgorde je de wonden hecht. Er zijn twee criteria waarop je dient te letten tijdens het hechten. 1. De ruimte tussen de hechtingen moet zo klein mogelijk blijven. 2. Tegelijkertijd moet je proberen zo min mogelijk hechtingen te gebruiken. Het gaat er dus om dat je zelf een goed evenwicht vindt tussen het aantal hechtingen en de ruimte die je er tussen laat.

Zodra je 1 snee hebt gehecht, open je de deur en roep je mij. Dan geef ik vervolgens het signaal als je aan de 2e snee mag beginnen, waarna je weer de deur opent en mij roept. Dus iedere keer als je een snee hebt gehecht roep je mij. Is dit duidelijk? (Indien nee, probeer de instructies nogmaals duidelijk uit te leggen). Ik zal de kamer nu verlaten, als je klaar bent met de 1e snee hechten kun je me roepen.

→ Tijd opnemen dat de participant doet over 1 snee hechten
→ Participant is klaar met het uitvoeren van de taak

Is het allemaal gelukt met de arm hechten? Hoe ging het? (Indien vragen en/of moeilijkheden noteer deze).

→ Participant gaat nu de sociale taak uitvoeren

Je gaat nu een opdracht maken die ‘lees de ogen test’ heet. Hierbij krijg je steeds een paar ogen te zien, waarbij er vier verschillende emoties om heen staan geschreven. Het is aan jou de taak om te kiezen welke van de vier emoties het beste beschrijft wat de persoon op de foto voelt, denkt of met zijn ogen uit drukt. Er is geen tijdslimiet, maar probeer het zo snel mogelijk te doen. In totaal zijn er 36 foto’s, probeer deze in chronologische volgorde te beoordelen. Het goede antwoord noteer je op het antwoordblad. Voordat je begint krijg je een oefenitem. Is deze opdracht duidelijk? (Indien nee, probeer de instructies nogmaals duidelijk uit te leggen). Ik zal de kamer nu verlaten, als je klaar bent met de opdracht kun je mij roepen.

→ Participant maakt Reading the mind in the eyes test op papier

→ Ondertussen noteer je het aantal hechtingen en meet je de afstand tussen de hechtingen op de arm. Noteer de tijd, hechtingen en afstand op het papier!

→ Participant is klaar met Reading the mind in the eyes test

Is het allemaal gelukt? Hoe ging het? (Indien vragen en/of moeilijkheden noteer deze). Ik wil je als laatste vragen om een korte online vragenlijst in te vullen, die duurt max 5 minuten en daarna ben je klaar. Mocht je iets niet snappen kun je dit ten alle tijden vragen. Ik zal nu de kamer verlaten. Wanneer je hiermee klaar bent kun je naar buiten komen.

→ Participant gaat vragenlijst op Qualtrics invullen en komt daarna naar buiten

Is het gelukt met invullen? Dit is het einde van het onderzoek. Als je nog vragen hebt over het onderzoek is er nu gelegenheid om dit te vragen. Verder heb je hier een brief met informatie over het onderzoek dat je zojuist hebt gedaan. Dit mag je mee nemen en lezen als je erin geïnteresseerd bent. Het kan zijn dat je ontevreden bent of je niet comfortabel voelt na het doen van dit onderzoek. Mocht je klachten en/of vragen hebben, dan staan de contactgegevens van onze begeleider in de informatiebrief. Verder krijg je voor je deelname 2 credits en mag je iets lekkers uitzoeken. Heb je de 2 credits nodig? Zo ja, vraag studentnummer!

→ Participant debriefing overhandigen en lekkers/credits

Dan wil ik je nu hartelijk bedanken voor het deelnemen aan ons onderzoek!

→ Vul alle gegevens in bij SPSS en geef de student zijn credits via SONA

Appendix F: English Script

→ Aankomst participant

"Hi, are you here for the study: emotion and cognition? Great, you can take a seat at cubicle..

→ Zorg dat de participant plaats neemt achter de computer en ga erbij staan.

You will be seeing several pictures of people in distressing situation, after which you will be asked to carry out several tasks. Finally, you have to fill in a short questionnaire. Before we start the experiment, I want to ask you to fill out this informed consent. This means that your participation for this study is voluntarily.

→ Overhandig de papieren en wacht tot de participant deze gelezen en ondertekend heeft. Zorg dat de participant goed achter de computer zit. Start foto's op.

Empathy Group
In a minute, a few distressing pictures will be shown on the screen. These are pictures of persons in stressful situations. The pictures will be shown one after another in a slide show. While looking at the pictures, *try to focus as much as you can. It is important to empathize as much as you can and try to feel what the person feels on the pictures.* When the slideshow is over, you can open the door and call me.

Control group
In a minute, a few distressing pictures will be shown on this screen. These are pictures of persons in stressful situations. The pictures will be showed one after another in a slide show. *While looking at the pictures, it is important to look as objective and detached as possible. Do not try to give any meaning to the pictures.* When the slideshow is over, you can open the door and call me.

→ Na paar seconden is participant klaar en start je Tetris op
→ Als proefpersoon niet in de Tetris conditie zit, laat hem wachten gedurende 5 minuten, zorg ervoor dat hij ondertussen niks anders gaat doen

You will be playing Tetris now for 5 minutes. Are you familiar with this game? The goal of this game is to pile up to blocks who are falling down, in a way that there is no space between the blocks. The blocks have to connect with each other. You can turn the blocks horizontal and vertical with the arrows on your keyboard. If the blocks fall down, you won't be able to turn the blocks anymore. You have to play the game in time and if you die, you can start again. After 5 minutes I will come back to you. Is this clear? You can start the game if you are ready.

→ Tetris aanzetten voor proefpersoon

→Als de participant Tetris aan het spelen is, zorg dat alle spullen voor de taak klaar liggen zodat je hierna meteen kan beginnen met het geven van de instructies over de taak.

→Wanneer de participant klaar is vervolg je het onderzoek met de nep arm

I will now ask you to carry out a stitching task. This fake arm here, is normally used for medical students to practice stitching wounds. I will ask you to stich the three wounds on this arm as good as possible, with this needle and thread. There are two criteria that you should pay attention to. 1: de space between the stitches has to be as small as possible. 2: At the same time, you have to try to use as little as stitches as possible. You have to find a good balance between the number of stitches and the space between the stitches.

After you finished stitching one cut, you can open the door and call me. Then again, you can start with stitching laceration 2 and again after the door when you finished. Is this clear? (Indien nee, probeer de instructies nogmaals duidelijk uit te leggen). I will leave the room, if you are ready with stitching the first cut you can call me.

→ Tijd opnemen dat de participant doet over 1 snee hechten
→ Participant is klaar met het uitvoeren van de taak

How did it go? (Indien vragen en/of moeilijkheden noteer deze).

→ Participant gaat nu de social task uitvoeren

Next, you will make an assignment which is called: "reading the mind in the eyes test". In this test you see a pair of eyes. You can choose four different emotions, described around the eyes. It is up to you to choose which of the four emotions will be the best description what the person on the picture feels, thinks or expresses with his or her eyes. There is no time limit, but try to do this task as fast as possible. Each picture will be showed once, there are 36 pictures in total. Before you start you will have one example. At the end you get a score of how many correct answers you had, *please remember this score.* Is this clear? (Indien nee, probeer de instructies nogmaals duidelijk uit te leggen). I will leave the room, if you are ready you can call me.

→ Reading the mind in the eyes test achter de computer ipv papier!

→ Ondertussen noteer je het aantal hechtingen en meet je de afstand tussen de hechtingen op de arm. Noteer de tijd, hechtingen en afstand op het papier!

→ Participant is klaar met Reading the Mind in the Eyes test

How did it go? (Indien vragen en/of moeilijkheden noteer deze). Finally, I will ask you to fill out a short online questionnaire, which only takes about 5 minutes. This is the last part of the experiment. In case you don't understand a question, you can call me. I will leave the room now. When you are ready with the questionnaire, you leave the cubicle and come to me.

→ Participant gaat vragenlijst op Qualtrics invullen en komt daarna naar buiten

Did you complete the questionnaire? This is the end of the experiment. In case you have any questions, you can ask me now. Furthermore, I have a debriefing letter for you with information about the experiment you just did. You can take it with you if you want and read it if you are interested. In case you are dissatisfied or uncomfortable after doing this experiment, or if you have questions or complaints, you can find the contact information from our supervisor in this letter. For your participation you earn two credits if you need them and

you can take a candy.

→ Participant debriefing overhandigen en lekkers/credits

Thank you very much for your participation!

→ Vul alle gegevens in bij SPSS en geef de student zijn credits via SONA

Appendix G: Scatterplots

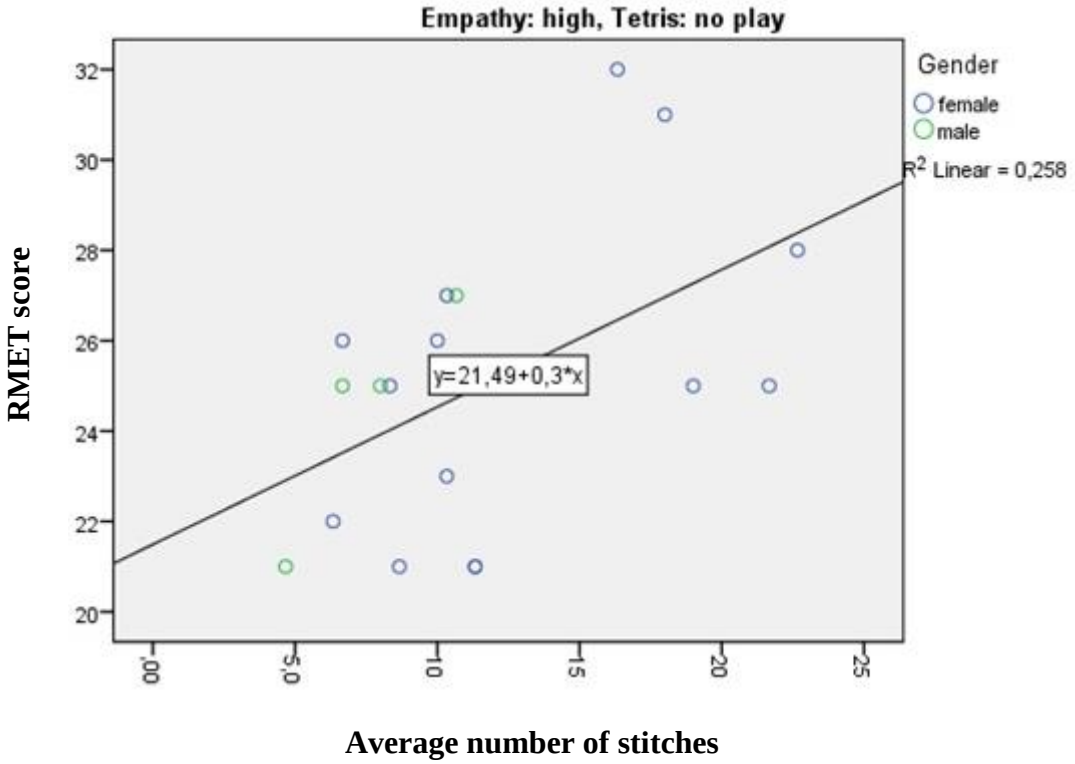

Figure G1. Scatterplot of RMET scores with the average number of stitches in the high empathy x low load condition.

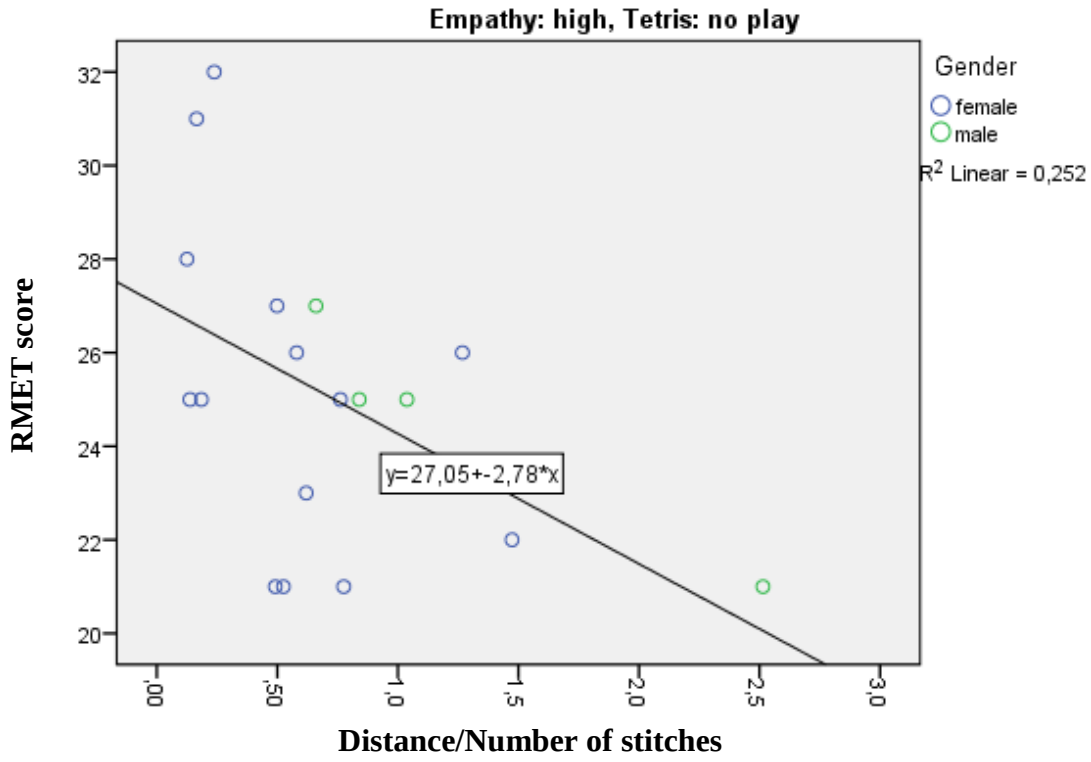

Figure G2. Scatterplot of RMET scores and distance between the stitches divided by the number of stitches (Dis/N) in the high empathy x low load condition.

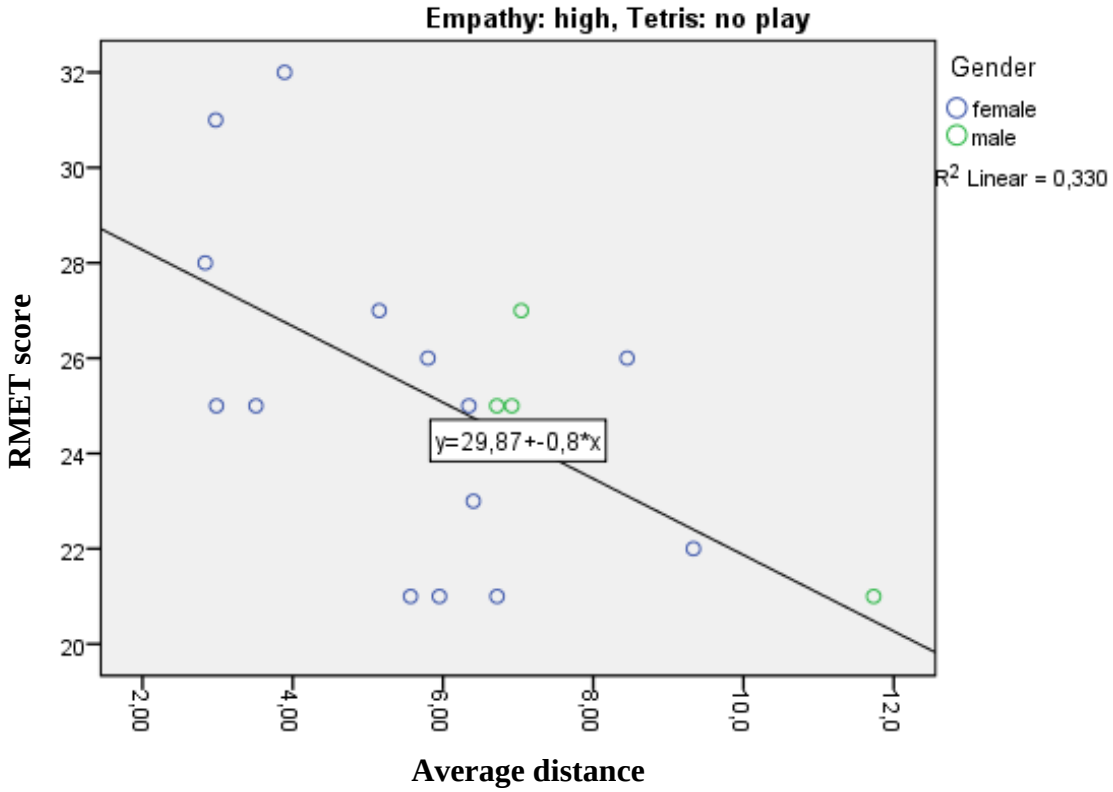

Figure G3. Scatterplot of RMET scores and the average distance between stitches in the high empathy x low load condition.