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Cross-Cultural Comparisons of Empathy and its Influencing Factors in First-Year Medical Students

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1. Summary

The growing interest in examining empathy in the field of medicine results from the fact that being empathetic not only increases the patient's satisfaction in the physician-patient relationship but also facilitates the diagnostic process and improves the clinical outcome.

In 1977 empathy in medical students was measured for the first time in Australia; numerous investigations on empathy at medical schools all over the world followed. Most of them revealed a higher empathy score in females as well as a connection between the students' choice of future medical field and their empathy scores. Furthermore, a decline in empathy scores during medical school proceedings was repeatedly found out. So far, there have been no comparative studies on empathy which have taken into account a possible influence of cultural factors on medical students` empathy.

The main objectives of this study were to investigate and compare empathy in first-year undergraduate medical students of two different cultural areas focusing on the detection of new influencing factors such as cultural features and socio-demographic characteristics. Moreover, further research on known influencing factors such as gender and the future medical field was done.

In the academic year 2010/11, a total of 257 students from Jimma University, Ethiopia and Ludwig Maximilians University of Munich, Germany completed the Balanced Emotional Empathy Scale (BEES) as an instrument for the quantification of emotional empathy, the Reading the Mind in the Eyes Test (RME-R test) for measuring cognitive empathy as well as a questionnaire on socio-demographic and cultural characteristics. Furthermore, interviews on the definition of empathy and possible influencing factors were conducted.

The main findings of the study include the identification of religiosity, the choice of the future medical field and the gender as influencing factors on the BEES score. Participants who declared to be actively practicing their religion have higher BEES scores than participants who did not. Participants who prefer a medical field with continuity of patient care have

higher BEES scores than those preferring a field with less interpersonal contact. Compared to males, females have significantly higher scores in the BEES as well as in the RME-R test. Moreover, a positive correlation between the BEES and the performance in the RME-R test indicating a connection between emotional and cognitive empathy was detected.

2. Zusammenfassung

Ein empathischer Arzt hat nicht nur zufriedenere Patienten - es gelingt ihm auch leichter eine Diagnosestellung und er erzielt bessere klinische Ergebnisse. Diese Tatsachen führen zu einem stetig steigenden Interesse an der Erforschung der Empathie im medizinischen Bereich. Auf die ersten Empathie-Messungen bei Medizinstudenten im Jahr 1977 in Australien folgten zahlreiche Untersuchungen weltweit. Die Hauptergebnisse dieser Studien sind höhere Empathie-Werte bei Frauen, ein Zusammenhang mit der gewünschten Facharztrichtung, sowie eine Abnahme der Empathie-Werte im Laufe des Medizinstudiums.

Bisher gibt es noch keine Vergleichsstudien, die sich mit möglichen kulturellen Einflüssen auf die Empathie von Medizinstudenten befassen. Die Hauptziele dieser Studie waren es deshalb, die Empathie von Medizinstudenten aus dem ersten Studienjahr in zwei verschiedenen Kulturräumen zu untersuchen und zu vergleichen, wobei das Hauptaugenmerk auf die Identifikation neuer Einflussfaktoren auf die Empathie wie zum Beispiel kulturelle und soziodemographische Merkmale gelegt wurde. Außerdem wurden bereits bekannte Einflussfaktoren wie das Geschlecht und die gewünschte Facharztrichtung untersucht.

Während des Studienjahres 2010/11 wurden 257 Studenten von der Universität Jimma in Äthiopien und der Ludwig-Maximilians-Universität München in Deutschland untersucht. Im Rahmen der Studie füllten die Teilnehmer mehrere Fragebögen aus: Den „Balanced Emotional Empathy Scale“ (BEES), einen Fragebogen zur Messung der emotionalen Empathie, den „Reading the Mind in the Eyes Test“ (RME-R Test) zur Erfassung der

kognitiven Empathie, sowie einen Fragebogen zu kulturellen und soziodemographischen Merkmalen. Außerdem wurden Interviews mit der Frage nach der Definition des Begriffes „Empathie“ und Fragen zu möglichen Einflussfaktoren durchgeführt.

Zu den Hauptergebnissen der Studie zählen die Identifizierung der Religiosität, der gewünschten Facharztrichtung sowie des Geschlechts als Einflussfaktoren auf die Empathie: Dabei schneiden Studienteilnehmer, die angaben, sich aktiv religiös zu betätigen, beim BEES besser als jene, die dies verneinten. Studienteilnehmer, die später in eine Fachrichtung mit viel Patientenkontakt gehen wollen, haben höhere BEES Werte als jene, die eine Fachrichtung mit weniger Patientenkontakt bevorzugen und Frauen schneiden sowohl im BEES als auch im RME-R Test signifikant besser ab als Männer. Außerdem wurde ein positiver Zusammenhang zwischen dem BEES und dem RME-R Test und damit zwischen der emotionalen und der kognitiven Empathie gefunden.

3. Introduction

3.1 Definition of Empathy

The term *empathy* was a first attempt to translate the German word *Einfühlung*, meaning the "feeling within" a person, which the German philosopher and psychologist Theodor Lipps used in his works (1). Etymologically it originates from the Greek term *empátheia,* which means affection (2). Although there is wide variation in the understanding of the term empathy, to date, many authors use the terms *emotional* (affective) and *cognitive* empathy. There is a general agreement amongst scholars on the definition of these two constructs (3):

3.1.1 Emotional Empathy

Emotional empathy is understood as the ability to identify with other people, to share their emotional experiences and to react intuitively to their affective states (3).

3.1.2 Cognitive Empathy

Cognitive empathy denotes the ability to grasp the mental perspective of others meaning understanding other people's thoughts and ideas as if they were their own, or in other words to see something from someone else's point of view - not necessarily including an emotional involvement (3). Cognitive empathy overlaps with the term *theory of mind*, which means the ability to transfer other people's mental states such as beliefs, intentions or desires to oneself and to understand that others have mental states that are different from one's own (4).

3.1.3 Selected Definitions

The American psychologist **Carl R. Rogers** (1902 – 1987) defined empathy as follows: "The state of empathy, or being empathic, is to perceive the internal frame of reference of another person with accuracy and with the emotional components and meanings which pertain thereto as if one were the person, but without ever losing the "as if" condition. Thus, it means to sense the hurt or the pleasure of another as he senses it and to perceive the causes

thereof as he perceives them, but without ever losing the recognition that it is as if I were hurt or pleased and so forth (5)." According to Rogers, in addition to unconditional positive regard and congruence, empathy is one of three core values needed to establish an effective physician-patient relationship (6).

The British psychologist **Simon Baron-Cohen** made another proposal on how to define empathy: "Empathy is about spontaneously and naturally tuning into the other person's thoughts and feelings, whatever these might be [...] there are two major elements to empathy. The first is the cognitive component: Understanding the others feelings and the ability to take their perspective [...] the second element to empathy is the affective component. This is an observer's appropriate emotional response to another person's emotional state (7)."

In her work "*What is clinical empathy?*" (8) the American psychiatrist, medical ethicist and philosopher **Jodi Halpern** suggested an answer to the question what the core of empathy in the field of medicine is. She asserts that understanding patients' emotions presupposes that physicians are emotionally attuned with them. Thereby she distances herself from a mere cognitive definition of the term *clinical empathy*. Halpern regards the main objective of empathy as focusing attention on the patient; however, this attention should not be unduly distracted by introspection and strong emotions in order to avoid the physician identifying too much with the patient, threatening thereby objectivity.

For this study the use of the term *empathy* was restricted to the two constructs of emotional and cognitive empathy, since they have been well-defined and they are measurable with psychological instruments. Although, in doing this, we had to accept that important areas of knowledge could not be considered.

3.2 Why is Empathy Important?

The empathy of physicians is generally regarded as important (9). Being empathetic increases the patient's satisfaction in the physician-patient relationship (10), it facilitates the

diagnostic process in the way that a patient feels more comfortable and gives more details when medical history is taken by an empathetic doctor (8, 11) and furthermore it improves the clinical outcome (12, 13). These facts clearly illustrate the growing interest in examining empathy in the field of medicine. In a review on the development of empathy in medical education (9) an increasing interest in empathy training in medical schools could also be noticed. Due to these developments, it can be expected that future research on empathy will make the concept of empathy more comprehensible and will possibly explore methods to educate empathetic physicians.

3.3 Methods of Measurement

There is an abundance of instruments available to quantify empathy (14). So far, cognitive empathy has repeatedly been displayed by the self-reported Jefferson Scale of Physician Empathy (JSPE) (15), whereas emotional empathy has been detected using the self-reported Balanced Emotional Empathy Scale (BEES) (16). For our investigation the BEES has been selected for the detection of emotional empathy. To evaluate cognitive empathy, the revised version for adults of the Reading the Mind in the Eyes Test (RME-R test) (17) has been used. This method has been chosen since gaze perception is assumed to play a crucial role in the ability to reason about the intentions and feelings of others (18). The RME-R test is an intuitive measurement not allowing the participants to answer in a socially desirable manner. In addition to the quantitative measurements, interviews were conducted to explore the views of the participants concerning possible influencing factors on empathy.

3.4 Current State of Research

In 1977, empathy was measured in Australian medical students for the first time (19). Since then, numerous investigations on empathy at medical schools all over the world have followed (20), the majority using the Jefferson Scale of Physician Empathy (JSPE) and the Balanced Emotional Empathy Scale (BEES). The main findings of these studies revealed a higher empathy score in females (21-28), a relationship between the students' choice of

future medical field and their empathy level scores (23, 25, 27, 28) and a decline in empathy score during medical school proceedings (21, 23-26, 29, 30). So far, there have been no comparative studies exploring a possible influence of cultural factors on empathy scores.

3.5 Objectives

The objectives of this study were to examine and compare empathy in first-year undergraduate medical students of two different cultural areas and to detect possible influencing factors such as gender, cultural features and socio-demographic characteristics. There is strong evidence that empathy has deep evolutionary, biochemical, and neurological underpinnings (31), which suggests empathy to be a universal skill (32) that does not depend on ethnicity. Therefore we expected people from different countries to basically have similar levels of empathy even though the empathy level might certainly be affected by a person's individual background and life experience (33).

3.6 Hypotheses

Our analysis was targeted at the following hypotheses:

1. People in different countries have similar scores of empathy.
2. The socio-demographic and cultural background of medical students influences their empathy scores.
3. Compared to males, females have higher empathy scores.
4. Emotional empathy and cognitive empathy are connected, i.e. there is a positive correlation between BEES scores and the performance in the RME-R test.

4. Methods

4.1 Participants

The study group consisted of 257 randomly chosen first-year undergraduate medical students from Ludwig Maximilians University of Munich (LMU), Germany, and Jimma University (JU), Ethiopia. The data for the study were gathered during the academic year 2010/11.These two medical schools were chosen due to cooperation between LMU and JU established in 2002, with the objective of improving medical education in Jimma and Munich. Assuming small to medium effect sizes (Cohen's d=0.4) and a power of 80%, a sample size of 100 participants per university was envisaged. Study participants included 257 first-year medical students: 131 of them - 16 women and 115 men - from JU and 126 - 36 women and 90 men - from LMU. For the qualitative analysis 10 participants from each university were randomly chosen. In Jimma, participants included 9 men and 1 woman aged 18 to 20; in Munich there were 8 men and 2 women aged 19 to 23. In a similar study by Tavakol et al. (34), a sample size of 10 subjects was considered sufficient.

4.2 Survey Instruments

Two different survey instruments were utilized to measure the students' empathy: The 30-item Balanced Emotional Empathy Scale (BEES) (16) and the revised 36-item version of the Reading the Mind in the Eyes Test (RME-R test) (17). In addition, a questionnaire on socio-demographic and cultural characteristics and a qualitative analysis in the form of a standardized interview were carried out.

4.2.1 The Balanced Emotional Empathy Scale (BEES)

The BEES is a reliable and valid instrument (35) consisting of 15 positively and 15 negatively worded items that measure emotional responses to fictitious situations and particular life events, e.g. "I cannot feel much sorrow for those who are responsible for their own misery". It probes the extent to which the respondent is able to feel the suffering of others or take

pleasure in their happiness. Study subjects report the degree of their agreement or disagreement for each of the 30 items using a 9-point Likert scale. Higher scores represent higher levels of emotional empathy. The stated norms provided in the Manual for the BEES (16) are 29 for the male and 60 for the female population.

4.2.2 The Reading the Mind in the Eyes Test (RME-R test)

The RME-R test consists of 36 photographs depicting only the eye region of Caucasian individuals. A rectangular area of approximately 5 x 2 inches delineates the eye region, encompassing the entire width of the face from midway up the nose to right above the brow. Four complex emotional states accompanying each stimulus (one target word and three foils) are presented at each corner of the photograph. Both the Jimma and Munich participants were given the English version of the RME-R test. To reduce linguistic difficulties, the test had a detailed glossary appended in which all adjectives were explained using synonyms and example sentences. The stated norms for general population controls for the RME-R test are 26.0 ± 4.2 for male and 26.4 ± 3.2 for female adults (17).

4.2.3 Questionnaire on Socio-demographic and Cultural Characteristics

A questionnaire was elaborated to record socio-demographic and cultural characteristics. It included questions on gender, age, major life impacts during childhood (divorce/illness/death of parents), number of close relationships (people with whom they feel at ease discussing very personal matters), active membership in a religious community, involvement in a social network e.g. Facebook® and interest in a medical field (field with continuity of patient care such as internal medicine, psychiatry and pediatrics versus field with less interpersonal contact such as surgery, radiology and pathology).

4.2.4 Qualitative Analysis

The participants were asked questions about ethnicity, religion and gender as possible influencing factors on empathy:

1. Is there a difference regarding empathy between Germany and Ethiopia?
2. Does religion have an influence on empathy?
3. Is there a difference regarding empathy when comparing women and men?

4.3 Procedures

Ethical approval for the study was obtained by the Ethics Committee of the LMU clinical centre and the Ethical Clearance Board of the JU. In December 2010, the questionnaires were assigned to the first-year medical students in Jimma. In February 2011, the data collection was accomplished in Munich. In between teaching units, a brief explanation of the study was given and questionnaires were filled out by the randomly chosen students who voluntarily decided to participate in the study. The principal investigators remained with the participants during the time they completed the questionnaires in order to clarify possible questions. Participants needed approximately 25 minutes for the completion of the questionnaires. In addition, 10 participants at each university were randomly selected for the qualitative interview which was recorded and transcribed later.

4.4 Statistical Analyses

Sample description: P-values for group comparison regarding the individual socio-demographic and cultural characteristics were evaluated by Fisher's exact test (categorical variables), Mann-Whitney test (ordinal variables) and t-tests (normally distributed variables).

BEES: To deal with missing values in the BEES, input of the individual average of the observed items was applied separately for the positively and the negatively worded items, in case the respective number of missing values did not exceed 5 (33%). Otherwise, the questionnaire was treated as insufficient and was excluded from the analyses.

RME-R test: In the RME-R test, missing answers were treated as "the participant did not recognize the emotion". However, if more than half of the RME-R questionnaire was not filled in, this was interpreted as insufficient motivation to complete the test, and the questionnaire was therefore excluded from the analyses.

Multivariate analyses: Apart from the usual descriptive statistics, which are reported as average ± standard deviation, associations of socio-demographic/cultural factors related to the BEES and the RME-R test were evaluated by Welch's t-test and F-tests (type II, two-way ANOVA), respectively. Because of the important gender effect and the small number of female participants in the study, these tests were only applied on the male subsample. Pearson correlations between the BEES and the RME-R test were also calculated. A p-value below 0.05 was termed significant. In order to identify socio-demographic/cultural characteristics that influence the emotional empathy as measured by the BEES, a regression tree was estimated. In this inferential approach, the study population is recursively partitioned into subsets resulting from binary splits, each according to the input variable with the strongest association to the response variable. In this analysis, associations were evaluated using permutation tests and a univariate significance level of 5%, where splits are only allowed when the resulting subsets both contain at least 10 respondents.

All analyses were performed using the statistical software environment R 2.11.1 (36).

5. Results

Most questionnaires were answered appropriately according to the authors' instructions (16, 17). For 25 participants from Jimma and 10 participants from Munich some items in the BEES were non-systematically missing and were imputed by the respective student's item average. One participant had to be excluded from BEES-related analyses because of too many missing BEES items, and one because of invalid data. For the RME-R-related analyses, two students had to be excluded due to insufficient participation.

5.1 Sample Description

Study participants included 257 first-year undergraduate medical students, 131 of whom (16 (12%) women, 115 (88%) men) were from JU and 126 (36 (29%) women, 90 (71%) men) from LMU. The participants in Jimma had a mean age of 19.3 years; the Munich participants were slightly older with a mean of 21.0 years. In Munich, 32% claimed to be actively practicing their religion, in Jimma it was 74%. Regarding the specialization choice, 59% of the participants from Jimma declared they were interested in continuing patient care compared to 41% of the participants in Munich (p=0.006). 53% of Munich participants affirmed they had at least five close relationships and no one declared having none. In Jimma, 9% of the participants had no close relationship and only 18% had at least five. In Munich, 90% of the participants were involved in social networking, e.g. Facebook®, in contrast to 40% in Jimma.

Table 1: sample description

	Munich	*Jimma*
n	126	131
average age	21	19,3
male/ female	71%/29%	88%/12%
active membership in a religious community	32%	74%
interest in a medical field with continuity of patient care	41%	59%

5.2 Hypothesis 1

People in different countries have similar levels of empathy.

5.2.1 BEES

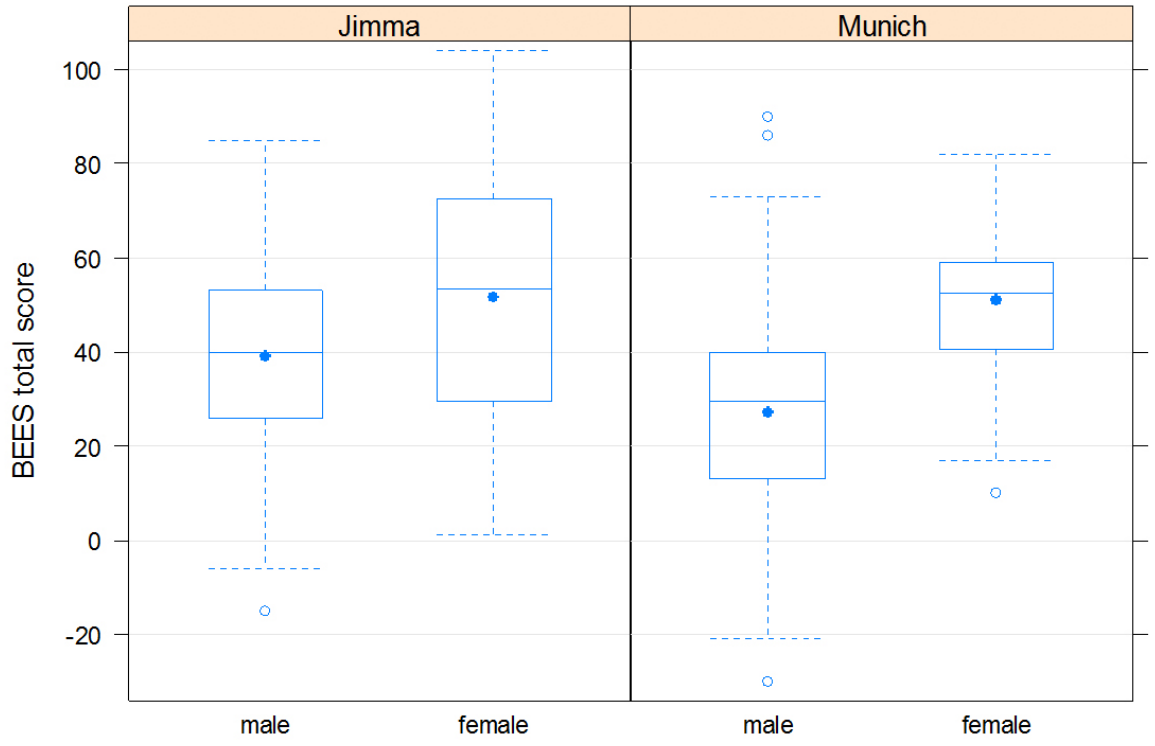

Figure 1: Comparison of the BEES total score in Jimma and Munich, stratified by gender.

Comparing the BEES, the male participants from Jimma (39.1 ± 22.3) scored significantly higher ($p = 0.0002$) than the male participants from Munich (27.2 ± 22.6). Hence, Munich participants had scores comparable to the male norm of 29, whereas Jimma participants scored significantly higher than the norm ($p<0.0001$). There was no significant difference between the BEES scores of the two female groups ($p=0.94$). The female participants from both Jimma (51.8 ± 30.6) and Munich (51.1 ± 17.1) had mean scores below the stated female norm of 60.

5.2.2 RME-R Test

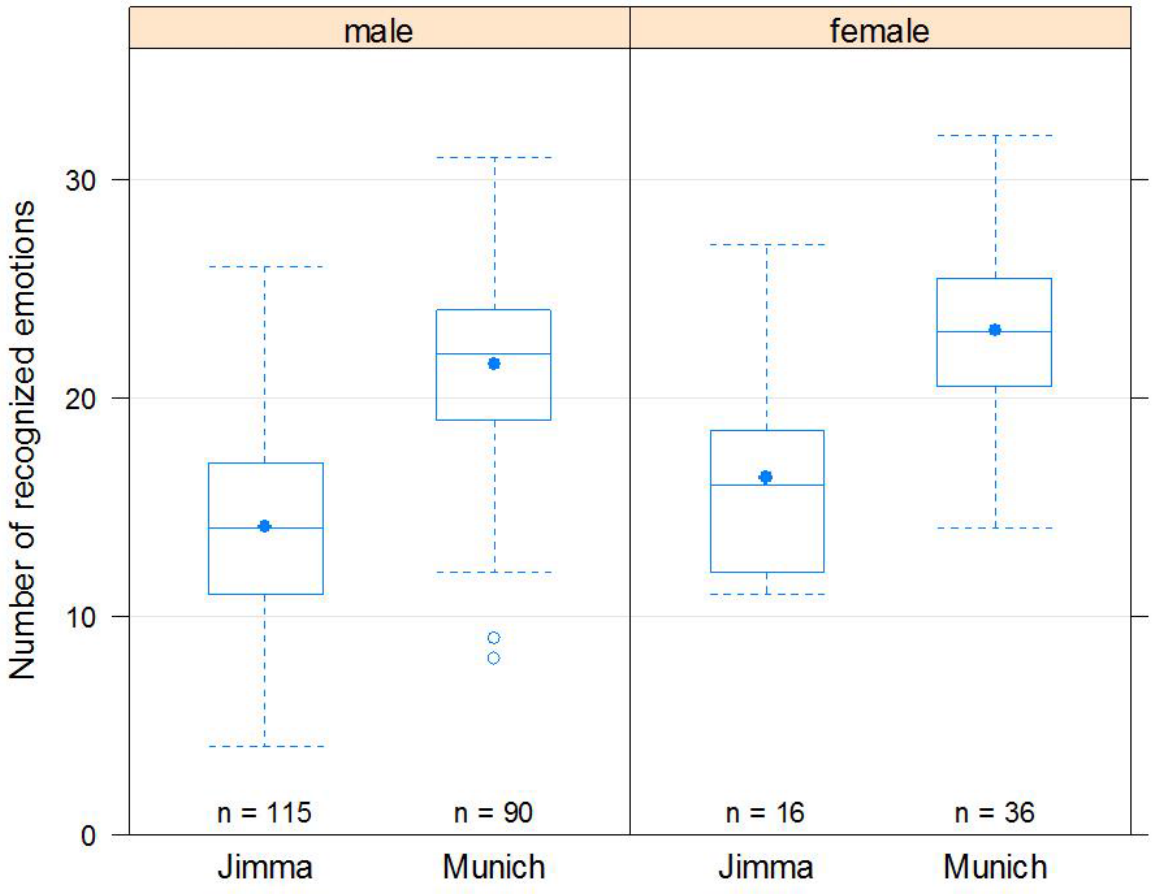

Figure 2: Number of recognized emotions comparing Jimma and Munich, stratified by gender.

The analyses of the RME-R test revealed significant differences between the two universities, with participants from Munich scoring significantly higher ($p<0.0001$). On average, Jimma participants ascribed 14.4 - males 14.1 and females 16.3 - of the 36 photographs to the correct mental state, whereas Munich participants were able to ascribe 22.0 - males 21.6 and females 23.1 - photographs correctly. The difference between Jimma and Munich participants was significant both for males and females ($p<0.0001$). On average, both male and female participants from Jimma produced lower scores than the stated norms - 26.0 ± 4.2 for male and 26.4 ± 3.2 for female.

Due to these results hypothesis 1 must be rejected.

5.3 Hypothesis 2

The socio-demographic and cultural background of medical students influences their empathy level.

Regression analysis

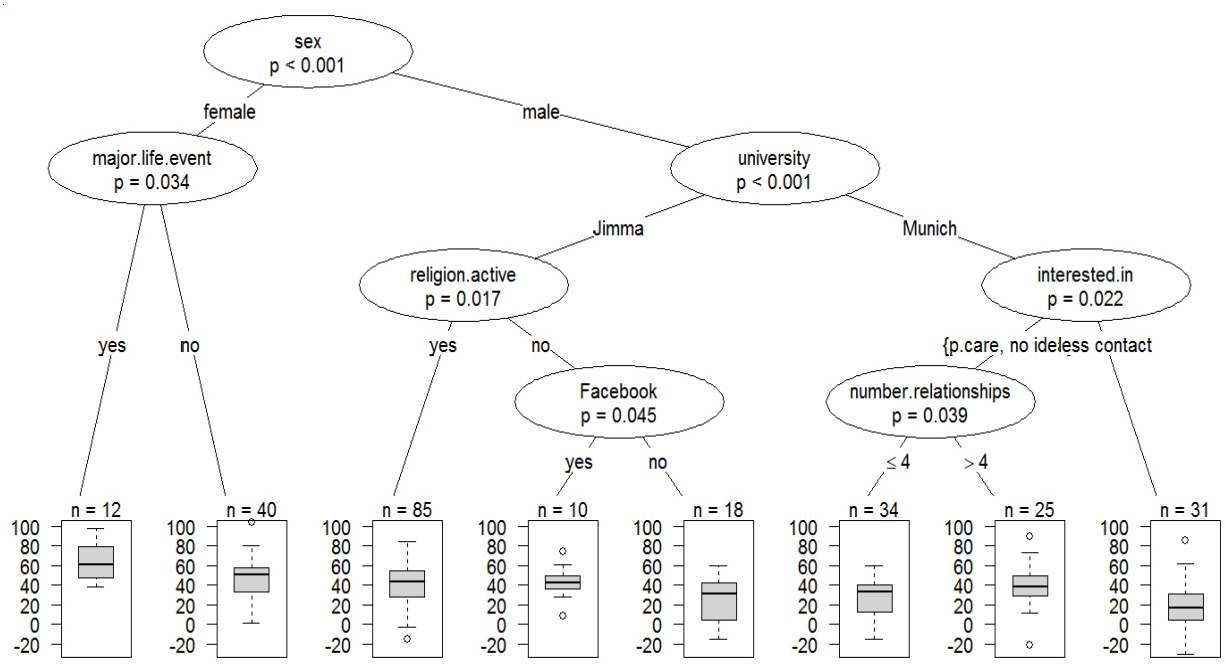

Figure 3: Regression tree for BEES based on socio-demographic and cultural characteristics. Here, a p-value corresponds to a permutation test on differences in the BEES with respect to the conducted binary split. The boxplots show the distributions of the BEES in the subgroups resulting from the recursive partitioning.

The regression tree shows the association of the BEES with gender as well as socio-demographic and cultural characteristics. The main differentiation factor concerning the BEES score was the gender. Among female students, those having experienced a major life impact had higher BEES levels. Among males, university was the main differentiation factor: participants from JU had higher BEES levels than participants from LMU. In Jimma, religiosity and involvement in social networking were subsequently associated with higher BEES scores. In Munich, important characteristics associated with BEES scores were the

choice of the future medical field and the number of close relationships. The statement “I am interested in a medical field with continuity of patient care” was related to higher BEES scores as well as a larger number of close relationships.

Bivariate analyses between the BEES and socio-demographic and cultural characteristics

Because of the small number of female participants for the analyses of the socio-demographic and cultural characteristics, only the male participants have been taken into consideration. The analyses showed a significant association between the BEES and the two characteristics “activity in a religious community” and “specialization choice”:

Participants from Jimma who declared to be religious had higher BEES total scores (mean score=42.6) than participants who did not (mean score=31.0) ($p=0.022$, t-test, two-way ANOVA). No evidence for such an association was found in the Munich group ($p=0.94$).

Participants from Munich who preferred a medical field with continuity of patient care had higher BEES scores (mean score=33.3) than those preferring a field with less interpersonal contact (mean score=18.9) ($p=0.014$, t-test, two-way ANOVA). No evidence for such an association was found in the Jimma group ($p=0.94$).

These findings support hypothesis 2.

5.4 Hypothesis 3

Compared to males, females have higher scores in empathy measures.

The hypothesis of females scoring higher regarding empathy measures than males were confirmed both for the BEES ($p<0.0001$, F-test, two-way ANOVA) and the RME-R test ($p=0.015$, F-test, two-way ANOVA).

These results confirm hypothesis 3.

5.5 Hypothesis 4

Emotional empathy and cognitive empathy are connected, i.e. there is a positive correlation between BEES scores and the performance in the RME-R test.

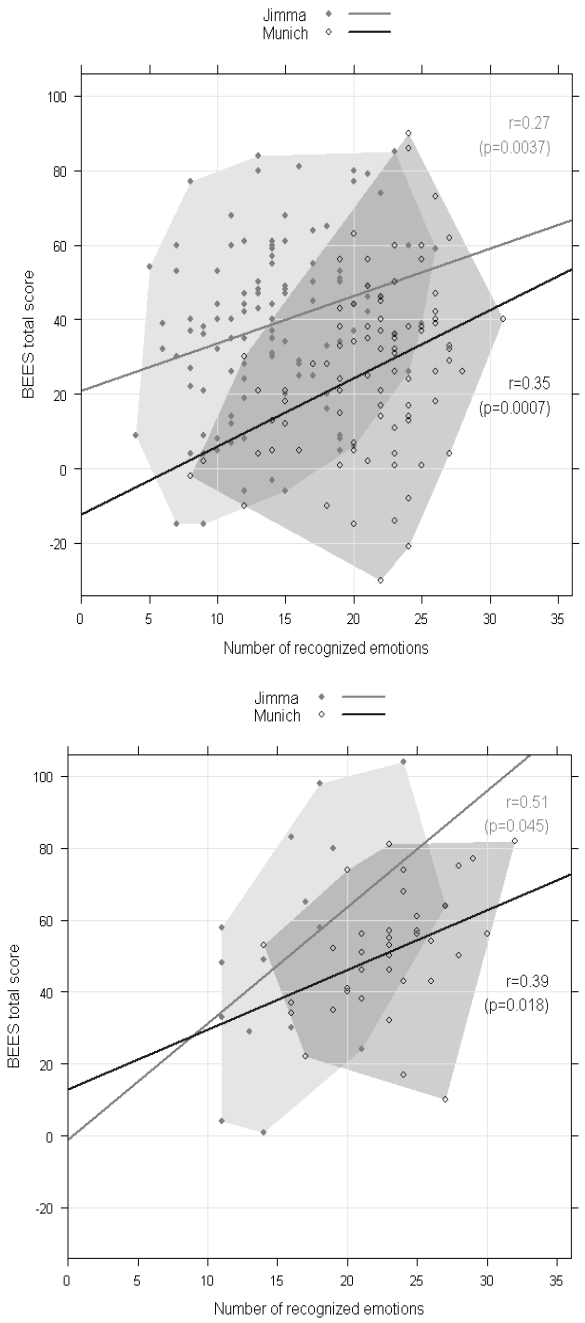

Figure 4: Pearson's correlation between emotional (BEES) and cognitive empathy (RME-R test), above: males, below: females. The values for the two variables "BEES total score" and "number of recognized emotions in the RME-R test" are displayed in scatter plots.

A moderate positive correlation between BEES scores and the performance in the RME-R test i.e. between emotional and cognitive empathy was found within the universities. This correlation was statistically significant ($p<0.05$) for both males and females in Jimma (males: $r=0.27$ and females: $r=0.51$) and Munich (females: $r=0.39$ and males: $r=0.35$). Hence, hypothesis 4 seems to be confirmed.

5.6 Qualitative Analysis

5.6.1 Is there a difference regarding empathy between Germany and Ethiopia?

In Jimma, most of the participants were of the opinion that there is a difference regarding empathy in Germany and Ethiopia; more than three-quarters of them said that Ethiopians would be more empathetic. The following comment illustrates this point: 'There is more empathy in Ethiopia. What I know from movies, people in Europe are more or less selfish. The interpersonal competition is so high, and the people are so busy on doing their things, that they have no time. Everyone lives his own life.' (male, 19 of age)

One of the participants held the opposite view: 'Empathy is stronger in Germany. The low-standard of our living conditions makes the people in Ethiopia feel risky. When poverty dominates the mind, the ability to feel for others gets lost.' (male, 20 of age)

In Munich, the opinions regarding this topic diverge: more than half of the participants said that there would be a difference; most of them considered Ethiopians to be more empathetic than Germans. One of the participants suggested: 'People from developing countries are more empathetic. Here, the people are focused on their career, human relations lose their importance.' (male, 21 on age)

Another participant argued: 'I think regional provenance has nothing to do with empathy. There are empathetic people all over the world.' (male, 22 on age).

5.6.2 Does religion have an influence on empathy?

In Jimma, all of the participants were of the opinion that religion leads to higher empathy. Some statements illustrating are as follows:

‘Religion encourages empathy. For example, in the Muslim religion, you pay the “sekad” for the poor and disabled.’ (male, 20 on age)

‘The more you visit the church or the mosque, the more your empathy will increase.’ (male, 19 on age)

In Munich, opinions were divided: more than half of the participants were of the opinion that religion would have a positive effect on empathy; the rest said that there would be no association between religion and empathy. The following comments illustrate this topic:

‘There is an association between empathy and religiousness; charity is a basic principle of many religions.’ (male, 21 on age)

‘Religion has nothing to do with empathy.’ (male, 23 on age)

5.6.3 Is there a difference regarding empathy when comparing women and men?

In Jimma, three-quarters of the participants interviewed expressed the opinion that females would have higher empathy levels compared to males, one of the participants perceived males as being more empathetic and one student did not assume gender would have an influence on empathy.

‘Women have higher empathy levels. When I left home to start my medical studies, my mother and my brothers held a “bye-bye program” (mesenabecha fonoghan) for me with prayers and giving me advice. While my mother was crying, my brothers did not show their internal sadness.’ (male, 18 on age)

‘It is stronger in women because they need more sense of empathy to be mother.’ (male, 18 on age)

‘In Ethiopia, females are more empathetic than males. For example, if you are walking and you fall down, a female will shout ‘ouh’, feel for you and help you. A man will simply help you.’ (male, 20 on age)

In Munich, half the participants ascribed higher empathy levels to females, one of the participants said that there would be a difference, not giving any details about which sex he considers to be more empathetic and the rest of the participants did not assume that there would be an association at all. For example, one participant stated: ‘Women are more empathetic than men because they talk more and get on well with each other.’ (male, 21 on age)

Another student reflected: ‘I think empathy is something human, which has nothing to do with gender.’ (male, 21 on age)

6. Discussion

6.1 Hypothesis 1

People in different countries have equal levels of empathy.

6.1.1 BEES

Comparing the BEES, the male participants from Jimma scored significantly higher than the males from Munich. In this context, Munich participants had scores comparable to the male norm, whereas Jimma participants scored significantly higher than the norm. These results were unexpected, as they contradict the first hypothesis of empathy being the same in different countries, since it is supposed to be a universal skill (31) which is not influenced by ethnicity. Nevertheless, they are in accordance with the opinion of most participants in the interviews. What could be the possible causes for the considerable differences between the two male groups in the BEES? The finding that more participants in Jimma preferred a continuity of patient care (59%) compared to Munich (41%), could be discussed as one reason for the different BEES scores, as the wish for a close relationship with future patients is correlated to higher BEES scores (23, 25, 27, 28). However, it must be considered that due to the lack of continuing educational opportunities, Jimma participants might have less choice of specialization alternatives, particularly those alternatives with a high demand for technical equipment such as radiology. Furthermore, the content of the BEES items might contribute to the differences observed between Jimma and Munich. Some of the situations and emotional reactions presented in the BEES might be differently accepted in different countries. For example, males in Ethiopia have usually more body contact with each other than males in Germany, in terms that Ethiopians walk hand in hand, hug and hand-feed one another in public. These behaviors might lead to higher BEES scores since the BEES is very much focused on emotionality.

By contrast, the results of the female participants are in line with hypothesis 1 since there was no significant difference between the BEES scores of the two female groups.

6.1.2 RME-R Test

In the RME-R test both the participants from Jimma (14.4 ± 4.8) and Munich (22.0 ± 4.3) scored below the stated norms for general population controls (26.2 ± 3.6) (17). However, the participants from Munich scored just slightly below the general average noted, and significantly higher than Jimma participants, whereas Jimma participants scored significantly below the norms. Considering the high BEES scores in Jimma, these results are surprising: A mean of 14.4 out of 36 correct answers corresponds to no more than a 40% success rate.

The comparatively low scores in Jimma would seem to suggest that the RME-R test is not applicable when comparing cognitive empathy between various cultures, or more precisely between Caucasian and non-Caucasian people, as the RME-R test employs pictures showing Caucasian eyes, which might be more difficult to read for non-Caucasians and was validated with Caucasian people from Oxford, Great Britain. As the RME-R test has never been used in Africans before (37), we cannot refer to other investigations. However, it could be assumed that the participants in Jimma had difficulties in “reading” in Caucasian people’s eyes. According to Paladino et al. (38), people are prone to ascribe more complex mental states to members of their own ethnic group rather than to others and Adams et al. (39) confirmed that emotions are better perceived when the observer and the observed person belong to the same ethnicity.

These findings support the presumption that the RME-R test is not applicable when comparing cognitive empathy between Caucasian and non-Caucasian people. Another reason for the comparatively low results in both groups could be the English language which eventually made the test somewhat more difficult for the participants, since English is neither the mother tongue for the German nor for the Ethiopian participants.

6.2 Hypothesis 2

The socio-demographic and cultural background of medical students influences their empathy level.

Our findings suggest that the level of empathy measured in participants was influenced by cultural and socio-demographic characteristics. Significant associations between the BEES and the degree of religiosity in Jimma and between the BEES and future medical specialization in Munich were found.

As empathy is supposed to be a strong motive in eliciting prosocial behavior (31) and, furthermore, religions are assumed to facilitate prosocial behaviors (40), a correlation between religiosity and empathy might appear reasonable. This result is also in line with the students' utterances in the qualitative analysis.

The association between empathy and specialization choice was a common finding in previous studies on empathy in medical students (23, 25, 27, 28). Hojat et al. (41) suggest that the differences in empathy scores might be a reflection of the students' interpersonal orientation which was developed prior to medical school. They assume that students with high degrees of interpersonal skills are more likely to be attracted to a medical field that requires a close interpersonal relationship with the patients.

6.3 Hypothesis 3

Compared to males, females have higher scores in empathy measures.

The hypothesis of females scoring higher in empathy measures than males could be confirmed both for the BEES and the RME-R test. This is a common finding in studies on empathy in medical students (21-28).

As for the BEES, Newton et al. (25) were able to show a gender difference in empathy with women scoring higher than men. Regarding the RME-R test, our findings are supported by Baron Cohen (42) who also noticed a trend towards higher scores in females.

The participants interviewed for the qualitative analysis had different opinions regarding this topic. However, the majority of the participants ascribed higher empathy levels to females.

A possible explanation for the gender difference concerning empathy could be that women, as potential mothers, in the course of evolution needed to empathize more with their offspring than men, as it was the women's responsibility to raise the children. In contrast, the men who had to provide for their families and to ensure that they survived needed to be self-centered rather than empathetic in order to perform these tasks. In publications on the topic, the gender difference in empathy has been ascribed to intrinsic factors, e.g. evolutionary gender characteristics as well as to extrinsic factors, e.g. the gender role expectations. For example, it has been assumed that women are more receptive than men to emotional signals (43), which can contribute to better understanding, and thus to better empathetic relationships (44). Moreover, it has been supposed that women develop more caregiving attitudes toward their offspring than men (45). However, until now there is no final agreement on how gender and empathy are related (41).

6.4 Hypothesis 4

Emotional empathy and cognitive empathy are connected, i.e. there is a positive correlation between BEES scores and the performance in the RME-R test.

In this study, a moderate positive correlation between the results from the BEES and the RME-R test could be detected ($p<0.05$). Participants with higher BEES scores recognized more items in the RME-R test correctly. This result can be interpreted as an association between emotional and cognitive empathy.

From the neurobiological point of view, the emotional and the cognitive system work independently, meaning that they are represented in different brain areas, or in other words that their activation can be detected in different brain regions (46). Nevertheless, it can be assumed that they interact, since it is likely that every empathetic response evokes both components to a certain extent (3). According to Cox et al. (47), emotional and cognitive

empathy constitute a normal human empathetic experience - even if the balance between the two components varies from one individual to another (48). So far, the relationship between these two systems and the conditions in which each one is activated are still under discussion (3).

6.5 Qualitative Analysis

It is striking that a large part of the participants interviewed for the qualitative analysis had a vague understanding of the term *empathy*. For example, empathy was mistaken for compassion, altruism, or sympathy. Moreover, some participants confused it with the concepts of individualism and collectivism. They defined empathy as a necessary precondition for collectivism, and a lack of it as a cause for individualism. In this context, collectivism was defined as something positive, as a social form where solidarity is an important value, whereas individualism was identified with selfishness and egoism. When the participants were asked about their opinions on how empathy and religion are linked, some of them misinterpreted empathy as the religious duty to help the poor, confused it with charity, or even treated the two concepts as being the same. Concerning the question of how gender and empathy are related, being empathetic was confused with the stereotypic female behavior e.g. the tendency to care for children or the stronger tendency to cry compared to males.

6.6 Limitations

The interpretation could be limited by the fact that neither the BEES nor the RME-R test were specifically designed for medical students. Furthermore, the use of the English language might have made the test somewhat more complicated for the participants, even though synonyms and explanatory sentences were provided. Moreover, the BEES did not exclude answers that were socially desirable. However, fortunately, the nonverbal and intuitive structure of the RME-R test reduced suggestibility and decreased the risk of participants

trying to meet the expectations of society. The problem of the applicability of the RME-R test in the African study population has already been discussed.

6.7 Conclusion

More in-depth work will be required to make the concept of *clinical empathy* (8) more comprehensible. The development of tools to investigate empathy in medical students should also be object of further research. Moreover, future research on empathy in the field of medicine ought to focus on the evaluation of existing measuring methods regarding their applicability for measuring clinical empathy and for making cross-cultural comparisons.

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9. Eidesstattliche Versicherung

Ich, Sarah Gasperi, erkläre hiermit an Eides statt, dass ich die vorliegende Dissertation mit dem Thema „*Cross-Cultural Comparisons of Empathy and its Influencing Factors in First-Year Medical Students"* selbstständig verfasst, mich außer der angegebenen keiner weiteren Hilfsmittel bedient und alle Erkenntnisse, die aus dem Schrifttum ganz oder annähernd übernommen sind, als solche kenntlich gemacht und nach ihrer Herkunft unter Bezeichnung der Fundstelle einzeln nachgewiesen habe. Ich erkläre des Weiteren, dass die hier vorgelegte Dissertation nicht in gleicher oder in ähnlicher Form bei einer anderen Stelle zur Erlangung eines akademischen Grades eingereicht wurde.

Frankfurt am Main, am 28.10.2014

Sarah Gasperi