



universität
wien

MASTERARBEIT / MASTER'S THESIS

Titel der Masterarbeit / Title of the Master's Thesis

„The Emotional Egocentricity Bias -
Its relation with couple's relationship satisfaction and its
differentiation into dyadic and general“

verfasst von / submitted by

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angestrebter akademischer Grad / in partial fulfilment of the requirements for the degree of
Master of Science (MSc)

Wien, 2020 / Vienna 2020

Studienkennzahl lt. Studienblatt /
degree programme code as it appears on
the student record sheet:

UA 066 840

Studienrichtung lt. Studienblatt /
degree programme as it appears on
the student record sheet:

Masterstudium Psychologie UG2002

Betreut von / Supervisor:

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Acknowledgement

I would like to thank my master thesis supervisor Ass.-Prof. Giorgia Silani, PhD of the Faculty of Psychology at the University of Vienna. She helped me throughout the way of planning and writing my thesis. She kept me on track and made this thesis possible.

Another person I would like to thank is Julia Otter, with whom I conducted the behavioural task and discussed a lot about our studies. With her critical questions she ameliorated this study in all stages.

Finally, I need to thank my friends, family and my girlfriend for supporting me in times where I needed them the most. Without them I surely would have become lost in the depths of statistical analysis and theoretical investigations.

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1 Introduction

This thesis was written with the aim to clarify whether the so-called *Emotional Egocentricity Bias (EEB)* and couples' relationship satisfaction are related to each other. And whether couples show lower *EEB* than strangers.

EEB means that "one's own emotional state influences the judgment of someone else's affective state" (Preckel et al., 2018), especially "in case of incongruent emotional states between ourselves and the others" (Riva et al., 2016). This means that one's negative emotional state leads to an overall more negative judgement of the other's emotional state; the other's positive emotional state is considered less positive and the other's negative emotional state more negative as if one was in a positive or neutral emotional state. De facto, the opposite effect occurs if one is in a positive emotional state.

EEB is linked to an ability called *self-other distinction*, which is an essential part of the empathy construct. *Self-other distinction* is defined by the knowledge of the person experiencing *empathy* "that the source of his or her affect lies in the other." (Lamm et al., 2017). When *self-other distinction* increases, *EEB* should decrease. With a perfect *self-other distinction* there should be no *EEB*, because one's emotions would not influence one's judgement about the other's emotions.

Most likely a low *EEB* would be beneficial in any romantic relationship, as the understanding of the partner's emotions would be better and more independent of one's emotional state. This could lead to a more appropriate reaction and improve the couple's satisfaction. This is the reason why couples were tested for this thesis. Another reason why couples were used for this study is the question if the *EEB* differs between couples and between strangers. In this thesis a new terminology is introduced, the differentiation of dyadic and general *EEB*. Dyadic *EEB* is referring to the *EEB* between couples while general *EEB* is the *EEB* between anyone else.

In order to investigate the research question, a visuo-tactile behavioural task already used in prior studies (Riva et al., 2016; Silani et al., 2013) and several questionnaires were used. During the behavioural task participants were touched with an object that is either pleasant or unpleasant. They then had to rate either their own touch or judge how the other is feeling during their touch (depending on the instructions). The difference between incongruent and congruent trials is the *EEB*.

To estimate the couple satisfaction the Couples Satisfaction Index-32 (Funk & Rogge, 2007), which is a self-rating questionnaire, was used. Other questionnaires used were the Beck Depression Inventory II (Beck et al., 1996) and the Relationship Closeness Inventory (Berscheid et al., 1989).

After collecting the data, an independent samples t-test, a robust version of the latter and a Mann-Whitney U analysis were performed to check for differences between several group constellations. A Kendall's tau and a Pearson correlation were used to quantify the relationship between couple satisfaction and *EEB*, and relationship closeness and *EEB*.

The correlation analysis shows no significant correlation between *EEB* and CSI scores with $\tau = -.101$, 95% BCa CI [-.313, .096], $p = .279$. This thesis cannot prove that the *EEB* is significantly different between groups of love partners (Dyadic *EEB*) and strangers (General *EEB*), but given the results of the Mann-Whitney U test ($U = 488$, $z = 1.871$, $p = .061$) and a robust version of the t-test ($T = -1.854$, 95% CI [-1.474, 0.026], $p = 0.062$)(Yuen, 1974), one can speak of a trend which needs to be further investigated.

The data for this thesis has been collected with the help of Julia Otter, a psychology master student of the University of Vienna. She uses most of it for her own thesis investigating the relationship between the *EEB* and the quality of sex.

2 Theoretical Background

Empathy, a multi-dimensional construct, is an important factor in social life. Before demonstrating its importance, empathy needs to be defined clearly. Some definitions that can be applied for this work are presented below.

Baron-Cohen and Wheelwright (2004) have summarized some major definitional approaches in their paper. They point out that there exist two different streams to define empathy. One is the emotional and the other the cognitive stream. Three varieties of the emotional stream are especially important. The first definition states that the observer's feelings should match the feelings of the person being observed (e.g. one feels sad if one sees someone crying). The second definition states that the observer's feelings do not have to exactly match the observed person's feelings but just need to be appropriate (e.g. you feel sorry if someone else is sad). The third definitional approach states that the observer's feeling "must be one of concern or compassion to another's distress"(Baron-Cohen & Wheelwright,

2004, p.164). Historically researchers argue about which statement correspond the best to the construct of empathy. Baron-Cohen and Wheelwright (2004) argue that these three approaches are not mutually exclusive. So, they can be included in a useful definition of empathy.

These components, mentioned above, describe empathy on an emotional basis. But the cognitive domain is also important to recognise. The main terminology here is theory of mind which can be defined as follows: “Essentially, this involves setting aside one’s own current perspective, attributing a mental state (or “attitude”), and then inferring the likely content of their mental state, given the experience of that person.” (Baron-Cohen and Wheelwright, 2004, p.164) Empathy involves emotions as well as cognitions.

Preckel and colleagues (Preckel et al., 2018) introduce a specific factor as they define empathy as a “process of sharing feelings, that is, resonating with someone else’s feelings, regardless of valence (...), but with the explicit knowledge that the other person is the origin of this emotion.” The introduced factor is the explicit knowledge that the feelings one senses have their origin in the other person. This component is called *self-other distinction*.

The definition of Lamm and colleagues (2017) seems to be one of the most complex and complete ones. They mention three major aspects of empathy: *affect sharing*, *mentalizing*, and *self-other distinction*. *Mentalizing* is understood as the fact that the *affect sharing* can also be triggered through imagination, meaning that imagining the affective state of another person is enough to trigger the affect sharing process. *Self-other distinction* is defined by the knowledge of the person experiencing *empathy* “that the source of his or her affect lies in the other.” (Lamm et al., 2017) This definition applies to all mentions of empathy in this paper.

Many studies in the domain of *empathy* have suggested a positive correlation between empathy and *relationship satisfaction/quality* (Busby & Gardner, 2008; Cramer & Jowett, 2010; Davis & Oathout, 1987; Kimmes et al., 2014; Long et al., 1999; Péloquin & Lafontaine, 2010; Rosen et al., 2016; Ulloa et al., 2017).

Busby and Gardner (2008) used a longitudinal design to measure the effect of empathy, using self-ratings and partner ratings of 275 couples, on relationship satisfaction. What makes this study special is the fact that they gathered the satisfaction measures longitudinally (one year lies between the two measurements). They found that the partner’s ratings are equally important as the self-ratings when predicting relationship satisfaction and

that the empathy score, measured at time 1, also influenced relationship satisfaction at time 2 (one year later), even when they controlled for satisfaction at time 1.

Cramer and Jowett (2010) found that perceived empathy is significantly associated with relationship satisfaction, but accurate empathy showed no significant effect. Perceived empathy showed a negative association with depression and conflict.

Long and colleagues (1999) conducted a study about empathy training where 48 couples participated. The goal of the study was to examine if empathy training shows a benefit to couples' relationship satisfaction. The study involved a 10-hour empathy training, a pre-test and a post-test six months after the first testing. The training led to a change of the perception of the partner's empathy. This change was positively related to relationship satisfaction at the six-month follow-up. Although the self-rated empathy scores also changed there was no significant correlation to relationship satisfaction.

Using an online survey, Rosen, Mooney and Muise (Rosen et al., 2017) found that greater dyadic empathy (self-rated) in first-time mothers and fathers with a child aged between three and 12 months is significantly positively related to their own as well as their partner's relationship adjustment.

Ulloa and colleagues (2017) found a gender difference in how empathy is affecting relationship satisfaction. In their study, both, men's and women's empathy were positively related with their own relationship satisfaction. But just women's empathy was positively related with the relationship satisfaction of their partner.

Kimmes and colleagues (2014) investigated the potential effect of self and other rated dyadic empathy, and of the perceived dyadic empathic congruity on relationship satisfaction. Total perceived dyadic empathy as well as perceived dyadic empathic congruity showed a significant effect.

The relationship between empathy and couples' relationship satisfaction is more complex than a simple positive correlation. Some studies measured accurate empathy (Rosen et al., 2017; Ulloa et al., 2017), while others measured perceived empathy (Cramer & Jowett, 2010; Kimmes et al., 2014; Long et al., 1999) and one measured both (Busby & Gardner, 2008). Another difference is if the authors used general empathy (Ulloa et al., 2017), dyadic empathy (Cramer & Jowett, 2010; Kimmes et al., 2014; Long et al., 1999; Rosen et al., 2017) or again, both forms (Busby & Gardner, 2008). General empathy and dyadic empathy seem to be the same when compared superficially. But there is a fine contrast. General empathy refers

to empathic concern and perspective taking to theoretically every human being. While dyadic empathy only refers to one's love partner. Some authors suggest that dyadic empathy shows greater effects or is more relevant to everyday life because it is more likely to affect social behaviour (Kimmes et al., 2014; Péloquin & Lafontaine, 2010). Even though there are differences between these studies, they all show great evidence that there is a positive relationship between empathy and relationship satisfaction.

While many studies on empathy or couple satisfaction exist, very few point to the importance of *self-other distinction*. Presumably no study investigated the relationship between *self-other distinction* and relationship satisfaction, even though *self-other distinction* is a very important component of empathy since it allows the identification of the source of our feelings/affects. Or, to quote Lamm and colleagues (2016, p. 2): "Self-other distinction is referred to as a key mechanism in many fields of social cognition, and generally describes the ability to distinguish between the representations of our own actions, perceptions, sensations and emotions, and those of others."

Imagine seeing a little girl crying in the middle of a crowded place. Most people would arguably feel bad. With a proper *self-other distinction*, one would be conscious about the fact that this negative affect is provoked by the girl's crying and thus does not emerge from one's self. If wanted, one could take any action trying to reduce the girl's suffering. This action, again, is only possible because one knows that the upcoming affect in oneself is the result of the observation of the little girl's feelings.

This scenario shows the importance of *self-other distinction* in everyday life. It needs to be pointed out that empathy does not always lead to prosocial behaviour. Prosocial behaviour can be a result of *compassion/sympathy*, a possible but not a necessary outcome of empathy (Decety & Ickes, 2009). That becomes clear when the fact that even on a neural basis *empathy* and *compassion* differ is taken into account (Lamm et al., 2017; Preckel et al., 2018). Unlike the mere sharing of feelings ("feeling as"), which plays an important role in empathy, *compassion* or *sympathy* can best be described as a "feeling for" somebody (Lamm et al., 2017) which can be linked to the motivation to help (Preckel et al., 2018).

But what if *self-other distinction* was diminished or even absent? In a scenario like the above mentioned, one would simply not know the source of one's emotions. One would not appropriately understand that one's affect is a reaction to the emotions of another person. However, one would still feel those emotions, which is called *emotion contagion* (Lamm et

al., 2017). *Emotion contagion* differs from *sympathy* in the way that *emotion contagion* lacks the “comprehension of the other’s emotional state” (Decety & Ickes, 2009).

Another outcome of the absence of *self-other distinction* is that the other’s emotions are felt too intensely which leads to personal distress (Decety & Ickes, 2009) and thus a prioritization of one’s own relief before any help can be offered to the other (Decety & Meyer, 2008). Decety and Ickes describe it as follow: “experience of empathy can lead to [...] personal distress (i.e. an aversive, self-focused emotional reaction to the apprehension or comprehension of another’s emotional state or condition) when there is confusion between self and other.” (Decety & Ickes, 2009, p. 199) In such a condition relieving one’s own stress becomes more important than helping the other (Decety & Meyer, 2008).

A malfunction of *self-other distinction* can therefore have a big impact on our social life. Studies show that this ability is not the same for everyone and that it even shows a U-shaped correlation with age (Riva et al., 2016). Environmental changes can also influence *self-other distinction*. Especially *perspective taking* seems to be important for the proper functioning of *empathy*. In an empathy task, Batson, Early and Salvarini (Batson et al., 1997) changed the *perspective-taking* instructions of a task in which the participants listened to the story of Katie Banks, a young student ‘struggling to care for her younger brother and sister after the death of her parents’ (Batson et al., 1997). Participants who imagined being in the place of Katie Banks showed greater discomfort and personal stress than participants taking a more objective view.

Self-other distinction, because it is a complex construct, is prone to errors. Such an error or bias usually occurs when judging another person’s feelings, named *Emotional Egocentricity Bias (EEB)*.

Silani and colleagues (Silani et al., 2013) developed a visuo-tactile paradigm to measure the *EEB* in individuals. In order to do this, two participants are touched by either a pleasant or an unpleasant stimulus. While being touched participants judge the emotional state of the other. The participants do not see the objects touching them, they are hidden behind a curtain, and they do not see each other. During the experiment congruent affective states (i.e. both participants were touched with objects that elicit the same valence of emotions: negative/negative or positive/positive) and incongruent affect states (i.e. both participants are touched with objects that elicit the opposite valence of emotions: negative/positive or positive/negative) are created. The participants see two pictures of the respective objects touching them and the other participant on a personal screen. Right after the touch they must

rate how they think the other person was feeling during the touch. During incongruent trials an *EEB* can occur and this is measured by comparing the mean rating of congruent and incongruent trials.

Using this paradigm it has been shown that the ability to overcome an *EEB* is connected to a brain area known as *right supramarginal gyrus (rSMG)* and that while disrupting this area with repetitive transcranial magnetic stimulation, the *EEB* is increased (Silani et al., 2013). In another study conducted by Riva and colleagues (2016) female participants were recruited to test the possible correlation between age and *EEB*. Results indicate that there exists a U-shaped relation between these variables. Young and middle-aged adults showed less *EEB* than adolescents and older adults.

Many researchers have investigated biases in the cognitive domain (Riva et al., 2016), but the research on the *EEB* and its effects is fairly new. Even though empathy does not always lead to prosocial behaviour, effective prosocial behaviour is very unlikely without it. More important is the fact that a lack in *self-other distinction* often leads to *distress*, which prevents people from exhibiting prosocial behaviour and affects well-being as well. As a lot of studies suggest that empathy correlates positively with relationship satisfaction, it seems to be a logical step to estimate a positive correlation between *self-other distinction* and relationship satisfaction.

The aim of this study is to show if there is a correlation between the *EEB* and relationship satisfaction. The probably greater influence of dyadic empathy to relationship satisfaction leads to the question if maybe there could also be made a differentiation when it comes to the *EEB*. Can we differentiate between dyadic *EEB* and general *EEB*? Here, general *EEB* means the *EEB* one person shows when performing the behavioural task with a stranger. Dyadic *EEB* is referring to the *EEB* when performing the task with one's partner. Till today it is not known if there is any difference between general and dyadic *EEB*. When there is a correlation between the *EEB* and relationship satisfaction, empathy trainings, sometimes used during couple therapy or marriage counselling, could be improved. Furthermore, we would know more about the precise mechanisms of empathy and how it affects our everyday life. This knowledge could be handy in many domains, like education, psychological/psychiatric treatments, any training where empathy is involved and many more. A potential differentiation between dyadic and general *EEB* would show that the *EEB* (and therefore also *self-other distinction*) has at least a minimal state component and is not just a trait.

For the *EEB* a slightly negative correlation with relationship satisfaction is assumed, as a low *EEB* means better *self-other distinction*.

3 Hypothesis and research questions

The aim of this thesis is to clarify whether *self-other distinction* is affected by the fact that one judges the emotions of one's partner instead of the emotions of a stranger and if this effect is modulated by couple satisfaction.

This paper has two main hypotheses, concluded from previous research. The first is that there exists a negative correlation between the *EEB* and relationship satisfaction. The second hypothesis is that there exists a differentiation between dyadic and general *EEB* and that the dyadic *EEB* is lower than the general *EEB*.

H1: It exists a negative correlation between the *EEB* and relationship satisfaction.

H2: The average dyadic *EEB* values are lower than the average general *EEB* values.

4 Procedure

4.1 Design of the behavioural task

The behavioural experiment used for this thesis is based on the aforementioned paradigm used by Riva and colleagues and Silani and colleagues (Riva et al., 2016; Silani et al., 2013). For this study two participants (one male and one female) undergo the experiment simultaneously sitting back to back on two desks. Once the task begins the participants have no possibility to see each other (a mobile wall is placed between the two participants). They have seen each other right before the experiment, so they are aware of the number of persons present in the room. Every participant faces a partition wall (on the desk) with just enough space underneath it to put half a hand through the space. The participants put the fingers of their left hand underneath the partition wall. The right hand is used to utilize a touchscreen which is placed on the right side of the partition wall. They are then touched by several objects while simultaneously seeing a picture of them on the touchscreen. They then rate their own experience. At the same time, another picture is shown to them on the touchscreen, which the participants believe is representing the object the other person is being touched with.



Figure 1. Approximation of how the behavioural task looks like for the participants

The touch and the depiction always occur simultaneously and last three seconds. Right after the touch the participants have another three seconds to rate either (depending on the run) their own sensation or that of the other participant. The rating is done by touching the screen with one finger. Above and below a vertical bar two female faces (the upper one happy, the lower one sad) indicate the valence. In the centre of the bar a horizontal line indicates the midpoint. Each position of the bar is associated with a value, ranging from -10 at the bottom to +10 at the highest point. After three seconds the bar disappears, even if no rating has happened in the meantime. A white screen with a little cross in the centre then shortly appears, indicating the end of the rating and the soon beginning of the next touch.

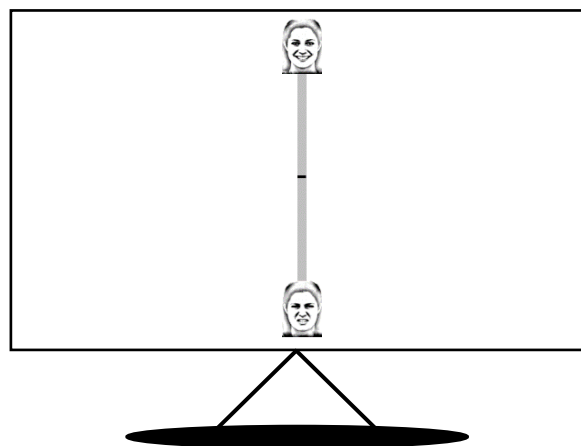


Figure 2. Showing the visual analogue scale used by the participants to judge the touches

4.2 Execution of the behavioural experiment

Before doing the actual task, participants undergo a trial task consisting of three distinct objects. The only difference between the trial and the real task is that in the trial only one object is depicted on the screen, whereas in the real task the participants see two objects, and that only self-ratings occur. When every participant has fully understood the task, the real trials begin.

The behavioural task consists of two runs. Each run consists of 40 times two pictures, one picture showing the object touching the participant and the other showing the object touching the other. In run A the participants must rate their own sensation and in run B they must estimate how the other person feels getting touched by their object. The starting run alternates between A and B with every group of participants, but within one group both participants start with the same run. Between the runs there is a brief pause allowing the experimenters to switch to the next round, which is done manually on MATLAB (MATLAB, 2010).

During the behavioural task participants are not allowed to talk and must wait until one of the experimenters communicates them the end of the task.

Each run consists of 20 pleasant and 20 unpleasant touches. The valence of the items that touch the participants have been tested in a previous study (Silani et al., 2013). As always two items are depicted on the touchscreen and because these items do not always have the same valence, four different conditions occur during each run in a pseudorandomized order. Half of the trials are congruent and half of them are incongruent. Congruent trials are trials where the depicted items are of the same valence. For example, participant 1 is touched by a positive connoted (pleasant) object and sees another positive connoted object on their screen showing the object participant 2 is touched with. The same is true for two unpleasant objects. Incongruent trials are all trials where the two depicted pictures do not share the same valence. For example, participant 1 is touched with a pleasant object and sees that participant 2 is being touched with an unpleasant one or vice versa. Therefore, two types of congruent and two types of incongruent trials exist (view table 1).

Table 1

The four different conditions that the participants will go through

Congruent Trials	Incongruent Trials
<u>Condition 1</u>	<u>Condition 2</u>
Pleasant-Pleasant	Pleasant-Unpleasant
<u>Condition 3</u>	<u>Condition 4</u>
Unpleasant-Unpleasant	Unpleasant-Pleasant

In every run the conditions are equally distributed, meaning that 10 item pairs of each condition are in each run. The items are listed in table 2.

Table 2

Objects used for the behavioural task with the related picture shown and the predicted valence

Pictures	Materials	Valence
Brush	Brush	Pleasant
Bunny	Synthetic fur	Pleasant
Cat	Synthetic fur	Pleasant
Chick	Synthetic feathers	Pleasant
Cottonplant	Cotton	Pleasant
Dog	Synthetic fur	Pleasant
Rose	Plush	Pleasant
Swan	Synthetic feathers	Pleasant
Sheep	Wool	Pleasant
Catfish	Toy slime	Unpleasant
Liver	Toy slime	Unpleasant
Maggots	Toy maggots (slime)	Unpleasant
Spider	Plastic spider	Unpleasant
Eel	Toy slime	Unpleasant
Slug	Toy slime	Unpleasant
Mushroom	Toy slime	Unpleasant
Centipede	Silicon centipede	Unpleasant
Stinkbug	Plastic spider	Unpleasant

Note. The pictures shown in table 1 and 2 slightly differ in some of the cases, as well as the silicon centipede (the differences were just minimal). The table above does not represent the exact order, which differed between the tables and runs, but is sorted by valence.

4.3 Computation of the *EEB*

To get a value of the *EEB*, the difference between the incongruent and congruent “other” trials needs to be calculated. The higher the difference between the two conditions the higher the *EEB* gets and the less distinct the *self-other distinction* ability is. The “self” conditions will be controlled out by subtracting the differences between congruent and

incongruent trials from the “other trials”. The calculation of the *EEB* follows the instruction of Silani and colleagues (2013).

Table 3

Formula for calculating the EEB

$[-1*(\Delta1 - \Delta2) + (\Delta3 - \Delta4)]/2$
<i>Note.</i> $\Delta1$ is the difference between congruent and incongruent pleasant trials in the ‘other’ judgement condition. $\Delta2$ is the difference between congruent and incongruent pleasant trials in the ‘self’ judgement condition. $\Delta3$ is the difference between congruent and incongruent pleasant trials in the ‘other’ judgement condition. $\Delta4$ is the difference between congruent and incongruent unpleasant trials in the ‘self’ judgement condition.

After the behavioural task, the participants receive four tests/questionnaires. Further information about the questionnaires used can be found under section 4.5.

4.4 Sample

In order to take part in the study participants had to match several criteria. First, no actual or former psychology students could take part, as they are very likely to be informed about the methods or materials used during the study.

Inclusion criteria were heterosexuality, a monogamic relationship for at least 12 months without breaks, being aged between 18 and 35 and being a German native speaker (dialects were accepted).

Exclusion criteria were psychiatric or neurological disorders, a psychological or psychotherapeutic treatment within the last six months. If symptoms remain, one needs to be excluded as well. Other reasons for exclusion were the intake of psychotropic drugs or other drugs that influence general perception or emotions, any phobia that could occur during the experiment and not feeling comfortable being touched with objects on one’s hand.

An inclusion/exclusion questionnaire was sent to interested persons per e-mail and this questionnaire had to be sent back prior to the experiment (see appendix). Unfortunately, it was not possible to anonymize this questionnaire because the data had to be controlled and assigned to specific persons.

The recruiting was done through social media and peers. Every participant received 12,50 Euro as a compensation. This compensation was funded by the ‘Förderungsstipendium’ of the University of Vienna. The participants came either with their partner (experimental group) or without (control group). This way, 15 dyads as well as 30 individual persons participated in the study. Half (30) of the participants were male and the other half were female.

Unfortunately, five participants had to be excluded for various reasons. One participant misunderstood the instructions. This confounded the *EEB* data drastically. The other four participants must also have done some mistakes during the runs. Their *EEB* data shows strong discrepancies which lead to the assumption that they confounded their own pictures with the picture of the other person during one run. The valences of their ratings do not match the valence of the picture they should have rated. Some participants had only positive ratings, but the “negative” conditions were rated less positive than the “positive” ones. To be excluded one needed to have at least 50% unexpected valence of ratings in both incongruent conditions. For example, 50% unexpected ratings in the “Unpleasant-Pleasant” condition and 60% unexpected ratings in the “Pleasant-Unpleasant” condition. If just one condition comprised 50% or above unexpected ratings, while the other condition had less than 50% unexpected ratings, the participants were retained. The important criterion being the threshold of 50% in both conditions and not the mean value. After the removal of the biased participants, the sample consists of 55 participants in total (26 were male and 29 female). Table 4 shows some descriptive data about the sample.

Table 4*Descriptive data of the participants that were not excluded (N = 55)*

	General	Male	Female
<u>AGE</u>			
Range	19-31	20-31	19-28
Mean	23,80	24.62	23.07
SD	2,683	2,899	2.282
<u>EDUCATION</u>			
Highschool	38	16	22
Bachelor	14	9	5
Master	2	1	1
Apprenticeship	1	/	1
<u>PROFESSION</u>			
Student	39	19	20
Employee	6	3	3
Student + Employee	10	4	6
<u>RELATIONSHIP</u>			
<u>LENGTH</u>			
Range	12-128	12-96	12-128
Mean	44.53	44.46	44.59
SD	27.745	25.965	29.709

As we want to test if the *EEB* or *CSI* scores change if the partner is present, table 5 shows the distribution of the demographic data in both groups (test and control).

Table 5*Descriptive Data of the participants split into test and control group*

	Test Group	Control Group
<u>GENDER</u>		
Male	12	14
Female	14	15
<u>AGE</u>		
Range	19-27	21-31
Mean	22,69	24.79
SD	2,168	2,744
<u>EDUCATION</u>		
Highschool	19	19
Bachelor	7	7
Master	0	2
Apprenticeship	0	1
<u>PROFESSION</u>		
Student	19	20
Employee	3	3
Student + Employee	4	6
<u>RELATIONSHIP LENGTH</u>		
Range	12-96	13-128
Mean	38.04	50.34
SD	26,645	27,866

All participants are EU citizens and more importantly they are all German native speakers (dialects such as Luxembourgish [officially Luxembourgish is an official language, but linguistically it is a German dialect], South Tyrolean, any Austrian dialect etc. were allowed if the participant learned and used standard German in school). The day of the study every participant received an information sheet about the study and the usage of their data (access to the data, anonymization etc.). After they agreed that they had understood all

information they signed an informed consent form (see appendix). No participant that came to the experiment refused to take part.

4.5 Questionnaires and Tests

In this section the used questionnaires and tests will be explained as well as the reason why they were chosen. Four questionnaires have been used for this study. In addition to the following questionnaires the Quality of Sex Inventory (Shaw & Rogge, 2016) has been given to the participants. This questionnaire is not of further interest for this thesis.

4.5.1 Couples Satisfaction Index (CSI-32)

The Couples Satisfaction Index is the result of a comparison of eight self-report measures and 75 potential satisfaction items by using item-response theory and principal-components analysis done by Funk and Rogge (2007). This analysis of the *Marital Adjustment Test* (MAT; (Locke & Wallace, 1959) and the *Dyadic Adjustment Scale* (DAS; (Spanier, 1976) amongst six other measures showed that even though they have relative low precision, those tests are very popular. (Funk & Rogge, 2007). The tested measures were the MAT, DAS, the KMS (Nichols et al., 1983), the QMI (Norton, 1983), the RAS (Hendrick, 1988), the SMD (Karney & Bradbury, 1997), the MSI (Weiss & Cerreto, 1980). In addition to analysing those established tests they also tested 75 additional items (by giving them to 5315 online participants). The participants were at least 18 years old and in a romantic relationship. Three forms of the CSI were formed with 32, 16 and 4 items.

The CSI scales (32-items and 16-items) proved to have a greater measurement precision (less noise) and are better suited to detecting differences than the DAS (compared to the CSI-32) and the MAT (compared to the CSI-16).

All CSI tests have very good internal consistency (CSI-32: $\alpha = .98$; CSI-16: $\alpha = .98$). In addition, the CSI scales show very good convergent validity with existing scales. As an example, the CSI-32 has a strong correlation with the DAS-32 (.91) and the MAT (.91). The CSI scales seem to measure the same construct as the DAS ($\alpha = .95$) and MAT ($\alpha = .88$) with a stronger precision. The IRT analysis shows that the CSI scales are superior at different satisfaction levels than the other scales, having a greater precision and power. The CSI-32 has

the best properties and still has only 32 items, so this scale is used in this study to measure the couple satisfaction level.

All questions are answered on 6-point scales, except the first one which is a 7-point scale. Most questions are about how much one agrees with a statement, ex. item number 7: “I still feel a strong connection with my partner”. The possible answers are: “Not at all true”, “A little true”, “Somewhat true”, “Mostly true”, “Almost Completely true” and “Completely true”. A point value corresponds to every answer (from zero to 5; or 6 for the first question). The participants do not see this value, which is important because the polarization of the items sometimes changes. Item one and items 26 to 32 are slightly different. Item one simply asks how satisfied one is with one’s relationship: “Please indicate the degree of happiness, all things considered, of your relationship.” The possible responses go from “Extremely Unhappy” (value of zero) to “Perfect” (value of 6). The last seven items are scales where only the extremes are labelled with contrary attributes. Item 26, for example, looks as follows:

INTERESTING	5	4	3	2	1	0	BORING
-------------	---	---	---	---	---	---	--------

Note that the participants do not see the point values. The numbers are replaced by bubbles.

To get the score, the values of each question are simply summed up. The *CSI-32* scores range from 0 to 161. Higher scores indicate more relationship satisfaction. Scores that fall below 104,5 indicate relationship dissatisfaction.

As this test only exists in English, a back to back translation has been done with the help of a native English speaker who is also fluent in German. For the forms, see appendix.

4.5.2 Beck-Depression-Inventory

The Beck-Depression-Inventory II (BDI-II; (Beck et al., 1996) is a self-assessment questionnaire which measures the severity of symptoms of a diagnosed depression. This questionnaire can be used on adults and adolescents.

The BDI-II is comprised of 21 questions which are related to the criteria of Major Depression of the DSM-IV. The following symptoms can be detected by the BDI-II: Sadness, pessimism, feelings of failing, loss of joy, feeling guilty, feelings of punishment, self-denial, self-criticism, suicidal thoughts, crying, unrest, loss of interests, inability to take decisions, sense of worthlessness, loss of energy, change in sleep patterns, irritability, change in appetite, concentration problems, tiredness and loss of sexual desire.

Nineteen items consist of four different answer possibilities with an intensity scale of 0-3. This means that the first answer has the value of zero points and the last answer the value of three points. Higher points indicate higher severity of symptoms. So, each of the 21 items consists of a 4-point scale. If more than one answer of an item is marked, the answer with the higher value is considered for the analysis. The score one can achieve ranges from 0 to 63. Two items (16: changes in sleep pattern; 18: changes in appetite) have 7 answers (0, 1a, 1b, 2a, 2b, 3a, 3b) instead of just 4. This is necessary because the test differentiates between an increase (“a” statements) and a decrease (“b” statements) of the particular behaviour or symptom. For the score this exception can be ignored because one cannot have an increase and a decrease in a specific symptom at the same time. As the BDI-II should not be used on its own to make any diagnosis, this complicates the interpretation. The Manual of the BDI-II suggests the following interpretations:

Table 6

Recommended interpretation linked to sum scores of the BDI-II

Sum Score (BDI-II)	Interpretation
0-8	No depression
9-13	Minimal depression
14-19	Mild depression
20-28	Moderate depression
29-63	Severe depression

This study uses the BDI II, as it enables a comparison of the symptom severity between participants and to check if the score correlates with the *EEB* or the *CSI* scores. It already has been reported that depression can have an impact on empathy, especially when paired with alexithymia (Banzhaf et al., 2018). The diagnosis of any participant is, however, not a goal of this study. Also, none of the participants have a diagnosed depression.

4.5.2.1 Psychometric criteria

4.5.2.1.1 Objectivity

The written instructions and the questionnaire-format ensure the objectivity of application. The fact that the scores must only be summed up facilitates evaluation objectivity. As the manual enlists possible interpretations linked to each score range the interpretation objectivity is also guaranteed.

4.5.2.1.2 Reliability

The internal consistency (Cronbach's alpha) for the healthy sample is .90. The retest reliability over a three-week and a five-month interval is $r = .78$ (non-clinical population).

4.5.2.1.3 Validity

The correlation between the BDI-II and the BDI scores is between $r = .84$ and $r = .93$. The average score of the BDI-II is slightly higher (2-3 points) than the average score of the BDI. The BDI-II shows decent correlations with other depression scales of $r = .68$ to $r = .89$.

4.5.3 Relationship Closeness Inventory (RCI)

The RCI (Berscheid et al., 1989) claims to measure the closeness between two individuals, defined as "high interdependence between two people's activities". Closeness can be measured in several types of relationship such as romantic, friendship or family. The RCI consists of three subscales: Frequency, Diversity and Strength.

The subscale Frequency is about how much time, on average, one has spent with the referenced person in the morning, afternoon and evening. The participants write an estimated number of hours and minutes on the questionnaire. The question if the past week was typical or not completes this subscale. If the answer is no, a short, written explanation is asked of the participants. Berscheid and colleagues believe that face-to-face interaction is not enough to explain the impact one person has on the other. However, they consider it as useful information. The more time two individuals spend together, the more occasions exist where they could potentially influence one another. Another reason why this measure is not optimal is the fact that even partners in a very close relationship do not necessarily live together or frequently see each other during the week. The authors reasoned that even though the Frequency measure might be an underestimation, two individuals who spend a lot of time

together have a higher closeness potential than a couple that spends little time together. Nevertheless, there exists no causality between Frequency and closeness, and even couples with low Frequency can be very close. To make comparisons between individuals easier, the authors first defined a (theoretical) maximum time one can achieve for one day, set to 1200 minutes or 20 hours. The possible range therefor is 0-1200 minutes. As the frequencies (raw time) of the initial sample were skewed, the authors used a square-root transformation. This resulted in a higher distinction between the lower scores and a lesser distinction between the higher scores. This transformation and the creation of a 10-point scale facilitate the comparison of the values. The 10-point scale was calculated by dividing the square root by 10. The result is defined as the interval of each point in the new scale.

The subscale Diversity is about the number of different activities one has done with the referenced person in the past week. A total of 38 different activities are listed in this questionnaire and one has simply to tick the activities done. Some examples of activities are “did laundry”, “watched TV”, “discussed things of a personal nature”, “engaged in sexual activities” and “attended a sporting event”.

This subscale is relatively independent from the subscale Frequency. The authors tried to produce a nearly exhaustive list of 38 activities one could do during a week. They implemented day-to-day activities such as doing laundry with more exceptional ones such as doing a “wilderness activity”. The theoretical score of this subscale ranges from 0 to 38. The internal consistency of this scale is good, with an alpha of .87.

Like the Frequency scale, the Diversity scale was highly skewed. No participant of the sample reported more than 25 activities. Therefor another square root has been performed before creating a 10-point scale with equal intervals.

The subscale Strength is subdivided into two sets of questions. The first 27 questions are about how much the referenced person influences one’s “thoughts, feelings, and behaviour”. A 7-point scale is used to measure how strong one agrees with the 27 assumptions. The scale shows point values from 1 to 7. The numbers one and seven are labelled “I strongly disagree” (number one) and “I strongly agree” (number seven). An example: “SP influences important things in life”. SP means spouse/partner.

The second set comprises six questions about how much the other influences one’s “future plans and goals”. A 7-point scale is used again, with only the labels being different. The number one is labelled “not at all” and the number seven “a great extent”. An example is

the following statement: “my plans to have children”. Together those two sets of questions form the subscale “Strength”.

In sum the subscale Strength has 34 items. Again, the authors created mundane items (“what one watches on TV”) and more important ones (“my plans to have children”). This subscale has a high internal consistency ($\alpha = .90$). The Strength subscale has a range of 34-238. For better comparison these raw points are converted to 1-10 values. Each point corresponds to a 20-point interval, except the last point (10) which corresponds to a 24-point interval. Higher raw points mean higher converted points.

As no other study is known using both measures (*EEB* and *RCI* or closeness in general) it is interesting to see if, and in what way they correlate. A potential way of interaction is the influence of how much time one spends with someone on the ability to rightly judge their feelings without having a great bias. In the moment of writing this study, it is not known if the *EEB* changes over time depending on how well one knows the other. In this study the control group, in which the two participants do not know each other, serves to control for the difference in *EEB* if one knows the other well (partner) versus one does not know the other at all.

In this study, a German version of this questionnaire is used. The translation has been done by the University of Vienna.

5. Testing Procedure

All testings have been made at the testroom TRK-2 at the University of Vienna and the same materials were used in each instance.

Two experimenters were present during the testing. A second master’s degree student of Prof. Silani used the same paradigm for her thesis.

The behavioural task was run with MATLAB (*MATLAB*, 2010). The programming had been done by the University of Vienna prior to the study and this program had been used several times.

The written instructions were the same for every participant, see appendix. As they were self-explanatory, few oral explanations had to be given. At the beginning a brief overview about the task and questionnaires was given, before showing the participants the written instructions on their touchscreen. After they finished reading the instructions, and

right after the trial mode, they had the opportunity to ask questions. Once the behavioural task was over, they received four questionnaires with the specification to carefully read the instructions on every questionnaire and try to answer every question. During the processing of the questionnaires, participants could ask questions, if there were any uncertainties. After they were finished, and the questionnaires had been checked, they received their expense allowance.

6. Confounding Variables

Variables that could confound the data are gender, length of relationship, age, depression symptoms, the fact that the participants came with or without their partner, starting run (“self” or “other”) and if they live with their partner or not. The procedure was standardized: the setting in the room was always the same and most instructions were presented in written form on the touchscreen or on paper. It is worth noting that during the testing period it was incredibly hot, even more so in our test room, which is in the basement. Air supply was a slight problem as the windows could not be opened during the behavioural task. That led to another confounding variable: some of the participants reacted positively to the slimy objects because the slime was naturally cooler than the other objects. This variable has not been objectified, since we were unaware of this possible reaction until one participant told us that he found it enjoyable.

7. Socioeconomic Data

The socioeconomic data was assessed using a questionnaire including questions concerning gender, age, highest educational degree, length of relationship, place of residence, type of habitation (e.g. living with or without partner) and professional situation (study, independent, employed etc.).

8. Data Analysis

Statistical analysis, except for the computation of the *EEB*, which was performed in Excel, were performed using SPSS 26 (SPSS, 2019). For robust tests that had to be performed, the R 3.5 extension for SPSS was used. The sample consisted of no missing data. Most of the time it was not possible to use parametric methods as the needed requirements were not met,

so non-parametric or robust methods were used instead. To test the main hypothesis a Kendall's tau correlation was run because the data is not normally distributed. In addition, a Pearson correlation was used, and the interpretation was based on bootstrapped CI. To check for differences between groups, an independent samples t-test (interpretation based on bootstrapped CI), a robust t-test and the Mann-Whitney U test were performed.

Below every step is documented in detail. At the end all results are again summarized in a legible form.

8.1. Distribution of variables

Before checking any hypothesis, the distribution of every scaled variable needs to be determined. As our sample consists only of 55 participants, we cannot safely take advantage of the central limit theorem. Therefore, in order to perform most parametric tests, an approximately normal distribution and homoscedasticity will be needed. If the data meets the requirements for performing a parametric test, such a test is preferred over a non-parametric or robust one because its power is greater. If the requirements are not met, the population estimates, and the significance level could be strongly biased. In such a case a non-parametric or robust test is better.

To assure picking the best statistical test, the parametric assumptions are controlled first. Normal distribution can be checked with P-P Plots and histograms:

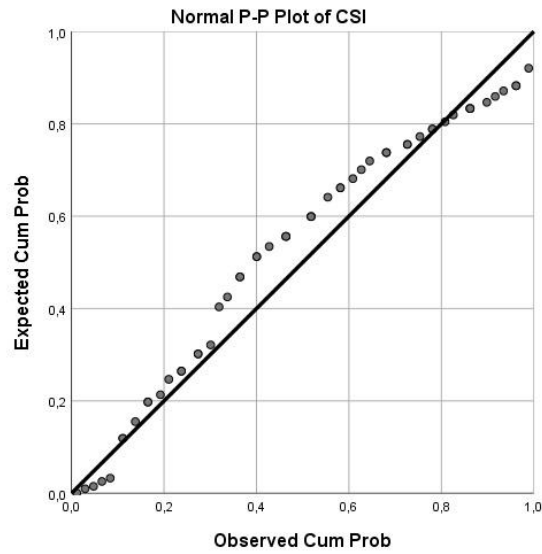


Figure 3. Normal P-P Plot of the CSI scores of all participants (N = 55)

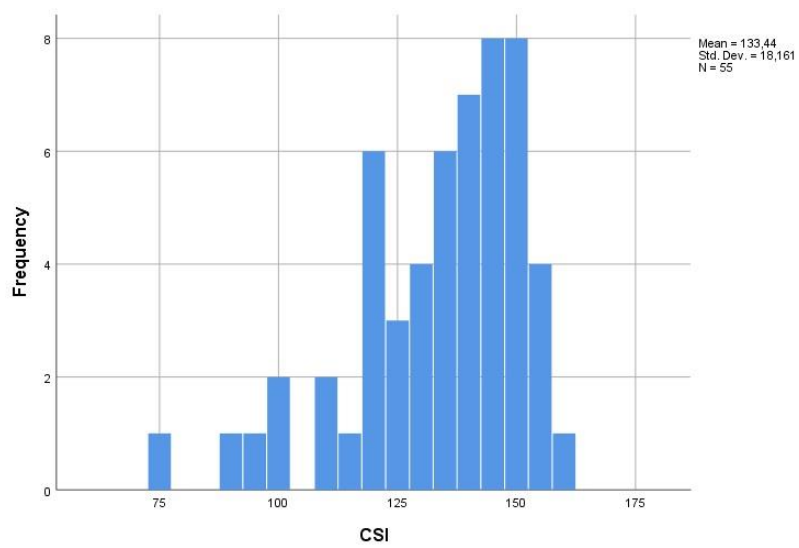


Figure 4. Histogram of CSI scores (N = 55)

Both, the P-P Plot (Figure 3) and the Histogram (Figure 4) show a left skewed distribution. The Histogram also indicates some outliers on the left, causing this skew.

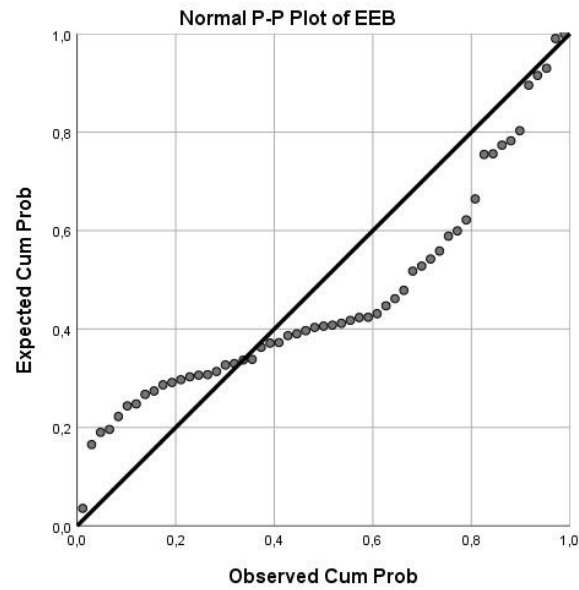


Figure 5. Normal P-P Plot of EEB values from the behavioural task (N = 55)

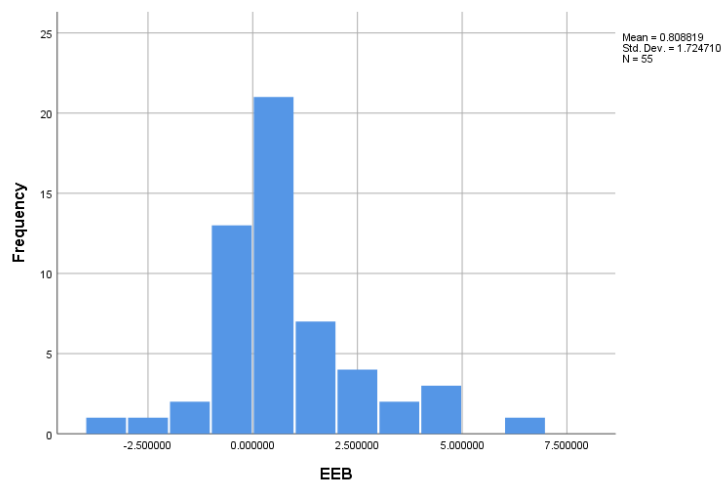


Figure 6. Histogram of the EEB values from the behavioural task (N=55)

The P-P Plot (Figure 5) and the Histogram (Figure 6) of the *EEB* values show right skewed data that is far from being normally distributed.

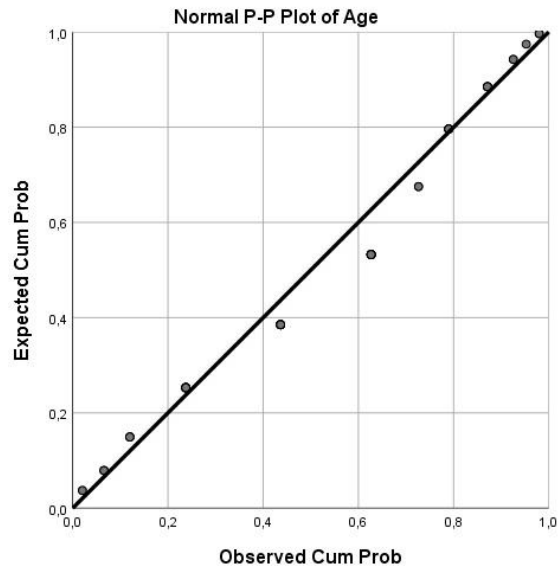


Figure 7. Normal P-P Plot of the participant's age (N = 55)

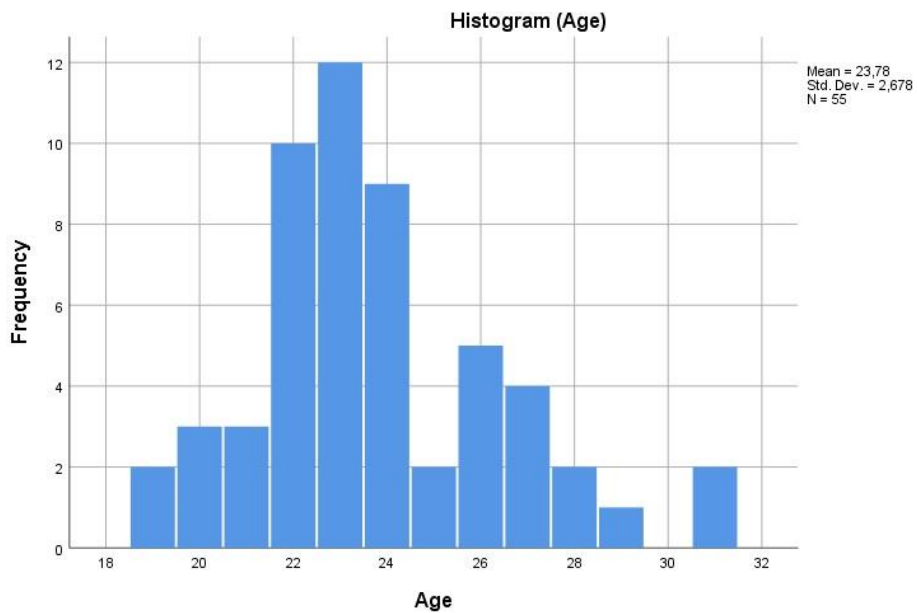


Figure 8. Histogram of the participant's age (N = 55)

The P-P Plot (Figure 7) and the Histogram (Figure 8) show approximately normally distributed data with a light right skew.

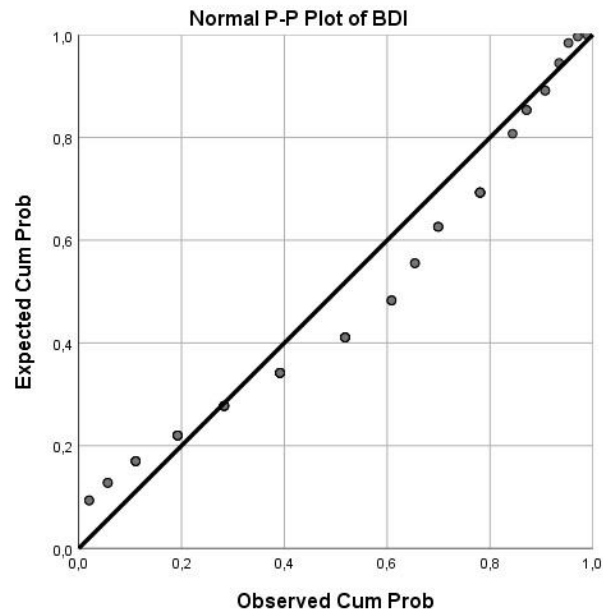


Figure 9. P-P Plot of BDI scores (N = 55)

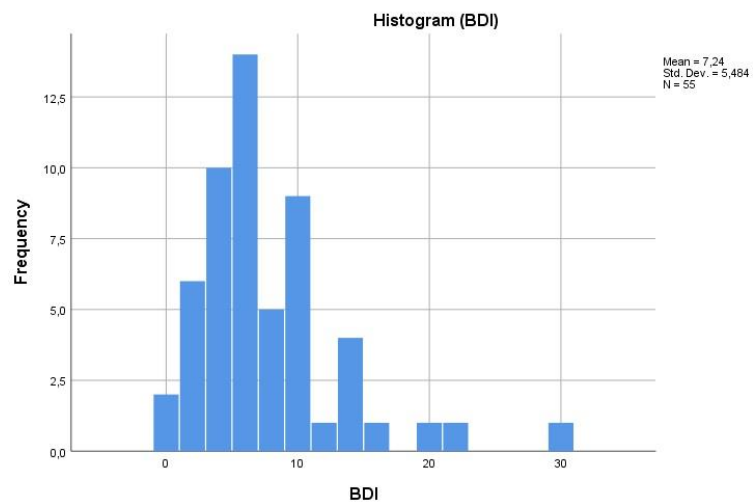


Figure 10. Histogram of BDI scores (N = 55)

Both, the Histogram (Figure 9) and the P-P Plot (Figure 10) show a right skewed distribution. The Histogram even shows some outliers on the right.

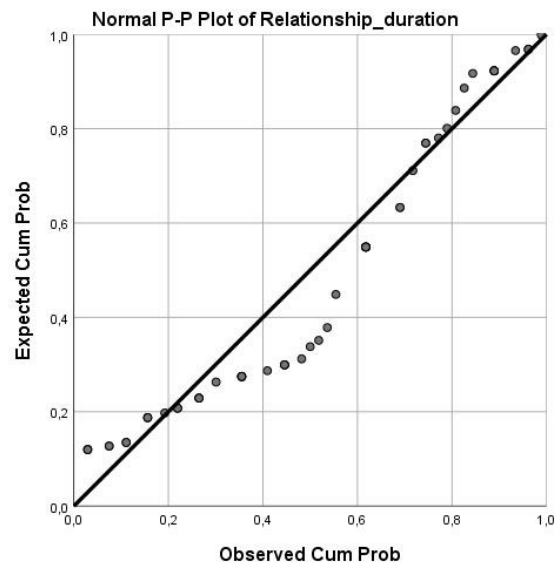


Figure 11. Normal P-P Plot of the participant's relationship duration in months (N = 55)

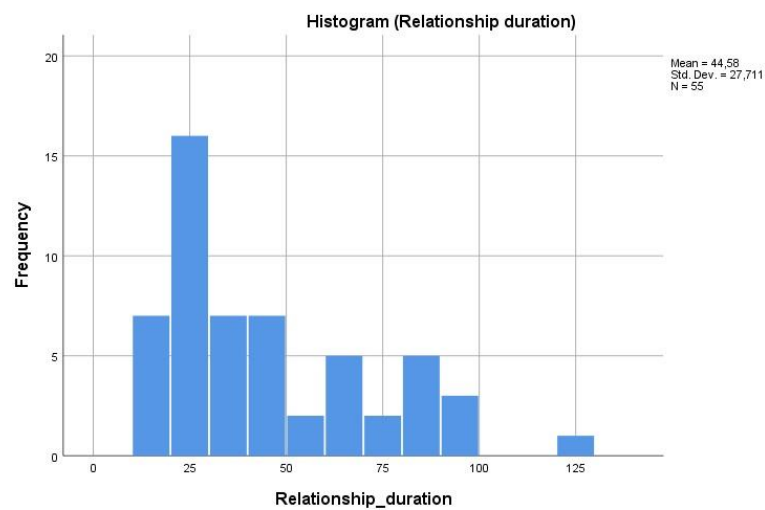


Figure 12. Histogram of the participant's relationship duration in months (N = 55)

The P-P Plot (figure 11) and the histogram (figure 12) show a heavily right skewed distribution. The Histogram also shows that there are outliers.

In addition to controlling the distribution visually, we will look at some descriptive data and run a normality test.

Table 7

Kolmogorov-Smirnoff (with Lilliefors Significance Correction) test for normality

	Statistic	df	Sig.
CSI	.130	55	.021
EEB	.166	55	.001
Age	.163	55	.001
Relationship duration	.178	55	.000
BDI	.177	55	.000

The results of the Kolmogorov-Smirnoff (K-S) test presented in table 7, show that all variables significantly deviate from a normal distribution. This is especially true because of our small sample size ($N = 55$) as the K-S test, as a lot of other tests, gains power with an increasing sample size. We will treat all data as non-normally distributed which contravenes a major assumption of most parametric tests.

8.1.1 Descriptive Tables

Tables 8-12 show some descriptive data about the sample distribution when split into different groups. The variables “age” and “relationship duration” are just shown as information but will not be used for the independent samples testing, as the distributional differences of those are considered non-systematic. “Starting Condition” is especially interesting when testing the differences in the *EEB* values as the first condition/run during the behavioural could influence the second one. Most studies about *EEB* used female participants, so gender differences need to be checked. There could be differences in the other variables. Whether the partner is present or whether one lives with the partner could potentially influence on the *EEB* and the other variables, especially the CSI and the RCI-S, since these questionnaires are about one’s relationship with one’s partner. As two slightly different tables were used, we want to be sure that there is no systematic difference in any variable.

Table 8*Descriptive table of the sample when split into test and control group*

Group		CSI	EEB	Age	Relationship duration	BDI
<u>Test</u>	N	26	26	26	26	26
	Mean	140.73	0.381	22.69	38.04	7
	Std.	2.088	0.279	0.425	5.226	1
	Error					
	Mdn	145	0.191	23.00	28.00	6
	SD	10.649	1.423	2.168	26.645	5.099
<u>Control</u>	N	29	29	29	29	29
	Mean	126.93	1.192	24.79	50.34	7.59
	Std.	3.904	0.353	0.509	5.175	1.078
	Error					
	Mdn	134	0.679	24.00	41	6
	SD	21.025	1.899	2.744	27.866	5.803

Table 9

Descriptive table of the sample when split between gender

Gender		CSI	EEB	Age	Relationship duration	BDI
Male	N	26	26	26	26	26
	Mean	131.54	0.914	24.62	44.46	6.23
	Std.	3.490	0.387	0.569	5.092	0.902
	Error					
	Mdn	133.00	0.479	24.00	35.00	5.00
	SD	17.797	1.972	2.899	25.965	4.598
Female	N	29	29	29	29	29
	Mean	135.17	0.714	23.07	44.59	8.28
	Std.	3.461	0.278	0.424	5.517	1.116
	Error					
	Mdn	138	0.505	23	31	6
	SD	18.636	1.498	2.282	29.709	6.011

Table 10*Descriptive table of the sample when split between starting conditions (self/other)*

Cond.		CSI	EEB	Age	Relationship duration
,Self'	N	27	27	27	27
	Mean	137.15	0.748	23.33	36.59
	Std. Error	2.611	0.357	0.474	5.030
	Mdn	141.00	0.423	23	30
	SD	13.567	1.855	2.465	26.138
,Other'	N	28	28	28	28
	Mean	129.89	0.868	24.25	52.18
	Std. Error	4.036	0.306	0.539	5.203
	Mdn	137.00	0.540	23	44.50
	SD	21.356	1.621	2.850	27.532

Table 11

Descriptive table of the sample when split between participants that live with their partner and those who do not

Living together		CSI	EEB	Age	Relationship duration	BDI
No	N	40	40	40	40	40
	Mean	134.20	0.728	23.35	36.53	7
	SE	2.903	0.259	0.391	3.235	.679
	Mdn	138	0.443	23	29	6
	SD	18.363	1.639	2.476	20.463	4.297
Yes	N	15	15	15	15	15
	Mean	131.47	1.025	25	65.87	8.13
	SE	4.676	0.511	0.756	8.687	2.028
	Mdn	134	0.536	26	65	5
	SD	18.110	1.981	2.928	33.643	7.855

Table 12

Descriptive table of the sample when split between tables used during the behavioural task

Table		CSI	EEB	Age	Relationship duration	BDI
1	N	29	29	29	29	29
	Mean	136.90	0.691	23.83	45.97	7
	Std. Error	2.798	0.248	0.509	5.655	.707
	Mdn	138	0.423	24	31	6
	SD	15.070	1.334	2.740	30.452	3.808
2	N	26	26	26	26	26
	Mean	129.62	0.940	23.77	42.92	7.65
	Std. Error	4.065	0.411	0.524	4.879	1.351
	Mdn	136	0.540	23	34.50	5.50
	SD	20.725	2.097	2.673	24.880	6.887

8.1.2 Frequency tables for the RCI-scores

Because the three RCI subtest scores are ordinal the descriptive statistics shown in the tables 8-12 are not very useful. In order to provide a viable description of the data in tables 13-16, frequency tables will be displayed.

Table 13

Frequency table of RCI subscales scores split between test and control group (N=55)

Group	Scores	RCI-F		RCI-V		RCI-S	
		Frequency	Percent	Frequency	Percent	Frequency	Percent
Test	1	2	7.7	-	-	-	-
	2	-	-	-	-	-	-
	3	-	-	-	-	-	-
	4	2	7.7	1	3.8	-	-
	5	5	19.2	5	19.2	8	30.8
	6	6	23.1	9	34.6	14	53.8
	7	6	23.1	9	34.6	4	15.4
	8	4	15.4	2	7.7	-	-
	9	1	3.8	-	-	-	-
Control	1	3	10.3	-	-	-	-
	2	-	-	-	-	-	-
	3	-	-	-	-	-	-
	4	3	10.3	1	3.4	1	3.4
	5	10	34.5	6	20.7	3	10.3
	6	6	20.7	8	27.6	19	65.5
	7	2	6.9	11	37.9	6	20.7
	8	2	6.9	3	10.3	-	-
	9	3	10.3	-	-	-	-

Table 14*Frequency table of RCI subscales scores split between starting conditions (N=55)*

Start. Cond.	Scores	RCI-F		RCI-V		RCI-S	
		Frequency	Percent	Frequency	Percent	Frequency	Percent
'Self'	1	3	11.1	-	-	-	-
	2	-	-	-	-	-	-
	3	-	-	-	-	-	-
	4	-	-	1	3.7	-	-
	5	9	33.3	7	25.9	6	22.2
	6	5	18.5	7	25.9	15	55.6
	7	6	22.2	9	33.3	6	22.2
	8	3	11.1	3	11.1	-	-
	9	1	3.7	-	-	-	-
'Other'	1	2	7.1	-	-	-	-
	2	-	-	-	-	-	-
	3	-	-	-	-	-	-
	4	5	17.9	1	3.6	1	3.6
	5	6	21.4	4	14.3	5	17.9
	6	7	25.0	10	35.7	18	64.3
	7	2	7.1	11	39.3	4	14.3
	8	3	10.7	2	7.1	-	-
	9	3	10.7	-	-	-	-

Table 15

Frequency table of RCI subscales scores split between male and female participants (N=55)

Gender	Scores	RCI-F		RCI-V		RCI-S	
		Frequency	Percent	Frequency	Percent	Frequency	Percent
Male	1	2	7.7	-	-	-	-
	2	-	-	-	-	-	-
	3	-	-	-	-	-	-
	4	2	7.7	1	3.8	1	3.8
	5	9	34.6	5	19.2	5	19.2
	6	4	15.4	7	26.9	17	65.4
	7	2	7.7	10	38.5	3	11.5
	8	5	19.2	3	11.5	-	-
	9	2	7.7	-	-	-	-
Female	1	3	10.3	-	-	-	-
	2	-	-	-	-	-	-
	3	-	-	-	-	-	-
	4	3	10.3	1	3.4	-	-
	5	6	20.7	6	20.7	6	20.7
	6	8	27.6	10	34.5	16	55.2
	7	6	20.7	10	34.5	7	24.1
	8	1	3.4	2	6.9	-	-
	9	2	6.9	-	-	-	-

Table 16

Frequency table of RCI subscales scores split between couples who live together and couples who do not live together (N=55)

Living	Scores	RCI-F		RCI-V		RCI-S	
		Frequency	Percent	Frequency	Percent	Frequency	Percent
Not Together	1	5	12.5	-	-	-	-
	2	-	-	-	-	-	-
	3	-	-	-	-	-	-
	4	3	7.5	1	2.5	1	2.5
	5	9	22.5	10	25.0	7	17.5
	6	8	20.0	13	32.5	23	57.5
	7	7	17.5	12	30.0	9	22.5
	8	5	12.5	4	10.0	-	-
	9	3	7.5	-	-	-	-
Together	1	-	-	-	-	-	-
	2	-	-	-	-	-	-
	3	-	-	-	-	-	-
	4	2	13.3	1	6.7	-	-
	5	6	40.0	1	6.7	4	26.7
	6	4	26.7	4	26.7	10	66.7
	7	1	6.7	8	53.3	1	6.7
	8	1	6.7	1	6.7	-	-
	9	1	6.7	-	-	-	-

8.2 Distributional differences – robust t-test and Mann-Whitney U test

In order to check if the variables differ significantly between groups, several t-tests will be performed. An independent samples t-test will be performed, but as most of our variables are not normally distributed, bootstrapping will be used to estimate the confidence intervals, which will be used to see if there could be any significant differences. Additionally, a robust version of the t-test will be run, as proposed by Yuen (1974) which implies bootstrapping and trimming (20%) which should deal with our assumption problem quite well. Last, the non-parametric Mann-Whitney U test, which uses ranked means, is performed. Ideally all these tests will show the same significant results. The robust and the Mann-Whitney U tests should have greater power than the independent samples t-test, because the assumptions of parametric testing are violated. This affects not so much the t-value, but it affects the significance testing and the F-test. For that reason, the bootstrapped (Bias corrected and accelerated) CI is used to detect any significances (in the independent samples t-test) and non-equal variances are assumed (because the F-test is lacking power too). For legibility reasons the independent samples t-test results will be shown in the ‘Supplementary Analysis’ section in the Appendix.

Our interested variables are the following: Group (test and control group), Gender, Starting Condition (“self” or “other” as first condition in the behavioural task), the table of objects and whether participants live with their partner. We are interested if those groups differ significantly in their CSI, *EEB*, BDI and RCI scores. Variables such as age, gender and relationship duration are not considered, because differences in these variables should be non-systematic and of low interest.

8.2.1 Important results of the Mann-Whitney-U test and the robust t-test

On average, participants in the test group had higher CSI scores ($M = 140.73$, $SE = 2.088$) than those of the control group ($M = 126.93$, $SE = 3.904$). The trimmed mean difference of 12.474 was significant, $Y_t = 2.617$, 95% CI [3.7935, 21.1539], $p = .00835$. The Mann-Whitney test was significant too, $U = 223.500$, $z = -2.589$, $p = .010$. Both tests show a significant result.

The robust test, $Y_t = -1.854$, 95% CI [-1.474, 0.026], $p = .062$ and the Mann Whitney test, $U = 488$, $z = 1.871$, $p = .061$, show a slightly insignificant result when *EEB* values are compared between test and control group.

The 95% CI [0.7435, 198.2697] of the robust test indicates a significant difference between the tables and the RCI-F values, while the p-value is just not significant, $p = .05008$. As the other tests do not indicate any significance the null hypothesis is retained.

No test found a significant difference between conditions, Gender or whether one lives with its partner.

8.3.4. Robust t-test - tables

Table 17

Robust t-test comparing differences between groups

Group	Test Statistic	p-value	Trimmed mean difference	95% CI	
				Lower	Upper
CSI	2.6169	.00835	12.47368	3.7935	21.1539
EEB	-1.8537	.06177	-0.72399	-1.474	0.026
BDI	-0.1809	.84641	-0.22368	-2.4308	1.9834
RCI-F	1.7641	.0818	97.73026	-13.8008	209.2613
RCI-V	-0.5971	.53756	-0.78289	-3.4032	1.8375
RCI-S	-0.0707	.94658	-0.27632	-8.2213	7.6687

Table 18

Robust t-test comparing differences between gender

Gender	95% CI				
	Test Statistic	p-value	Trimmed mean difference	Lower	Upper
CSI	-1.3262	.19699	-6.39803	-16.6784	3.8824
EEB	-0.0088	.99332	-0.00401	-0.9205	0.9125
BDI	-1.5155	.0985	-1.78289	-3.9444	0.3787
RCI-F	-0.0315	.9783	-2.02303	-129.2321	125.186
RCI-V	0.9373	.35559	1.22697	-1.4423	3.8962
RCI-S	-0.8447	.40067	-2.9375	-9.5749	3.6999

Table 19

Robust t-test comparing differences between participants that live with their partner and those that do not

Living together	95% CI				
	Test Statistic	p-value	Trimmed mean difference	Lower	Upper
CSI	0.607	.57763	3.45833	-9.6567	16.5733
EEB	0.0371	.97329	0.01142	-0.5962	0.6191
BDI	0.5652	.58765	0.80556	-2.2895	3.9006
RCI-F	1.5389	.13022	71.45833	-21.5904	164.507
RCI-V	-1.2953	.23372	-1.48611	-4.0503	1.0781
RCI-S	0.5143	.61269	2.16667	-7.5021	11.8354

Table 20

Robust t-test comparing differences between tables

Table	Test Statistic	p-value	Trimmed mean difference	95% CI	
				Lower	Upper
CSI	1.0241	.33723	5.31908	-5.2414	15.8795
EEB	-0.5787	.53923	-0.22001	-0.9478	0.5077
BDI	0.5522	.5626	0.68421	-1.7693	3.1377
RCI-F	1.9345	.05008	99.50658	0.7435	198.2697
RCI-V	1.0887	.27713	1.45395	-1.2199	4.1278
RCI-S	0.7146	.42905	2.59211	-4.6607	9.8449

Table 21

Robust t-test comparing differences between starting conditions

Starting Condition	Test Statistic	p-value	Trimmed mean difference	95% CI	
				Lower	Upper
CSI	1.2039	.247	6	-4.3166	16.3166
EEB	.7233	.50083	0.33951	-0.6578	1.3369
BDI	-0.6296	.52254	-0.72222	-3.106	1.6616
RCI-F	.5824	.52254	31.94444	-77.8851	141.774
RCI-V	-0.4046	.63773	-0.44444	-2.6263	1.7374
RCI-S	0.0341	.96995	0.11111	-6.763	6.9853

8.3.5 Mann-Whitney-U test - tables

Table 22

Results of the Mann-Whitney U test comparing test and control group

	U	z	p
CSI	223.500	-2.589	.010
EEB	488.000	1.871	.061
BDI	384.000	0.119	.906
RCI-F	287.500	-1.512	.130
RCI-V	423.500	.786	.432
RCI-S	394.000	.287	.774

Table 23

Results of the Mann-Whitney U test comparing gender

	U	z	p
CSI	427.000	0.843	.399
EEB	368.000	-0.152	.879
BDI	469.000	1.557	.119
RCI-F	379.000	0.034	.973
RCI-V	318.000	-0.998	.318
RCI-S	444.000	1.131	.258

Table 24

Results of the Mann-Whitney U test comparing participants whether they live with their partner

	U	z	p
CSI	266.000	-0.643	.520
EEB	317.000	0.321	.748
BDI	278.000	-0.418	.676
RCI-F	256.500	-0.824	.410
RCI-V	350.500	0.957	.338
RCI-S	270.500	-0.558	.577

Table 25

Results of the Mann-Whitney U test comparing the tables used

	U	z	p
CSI	306.000	-1.198	.231
EEB	414.000	0.624	.533
BDI	348.500	-0.482	.629
RCI-F	299.000	-1.318	.188
RCI-V	304.500	-1.226	.220
RCI-S	329.500	-0.802	.423

Table 26

Results of the Mann-Whitney U test comparing starting conditions

	U	z	p
CSI	366.500	-1.235	.217
EEB	451.000	0.015	.988
BDI	473.000	0.342	.733
RCI-F	421.500	-0.422	.673
RCI-V	469.000	0.282	.778
RCI-S	448.500	-0.022	.982

8.2. Measuring the monotonic and linear relationship – Kendall's tau and Pearson's r

A consequence of the data's distribution is that a Pearson correlation does not suffice to test our main hypothesis. Especially the significance test is not very reliable when the normality assumption is violated. In addition, the Pearson r is also biased by the outliers. There are several possible ways to overcome this problem. We could use a non-parametric test (Spearman correlation or Kendall's tau) or we could use bootstrapped confidence intervals to see if the correlation is probably significant, though the r value could stay biased. On the other hand, picking a non-parametric test is equal to losing power and information because ranked data will be used instead of our continuous data. In order to get the most out of the data both methods will be used. This enables us to compare the results later. Because we have a rather small sample ($N = 55$) and some tied ranks (e.g. the CSI and RCI values) Kendall's tau is preferred over the Spearman correlation.

It is important to note that Kendall's tau, unlike Pearson's r , does not measure the linear relationship between two variables but the monotonic relationship of the variables. An advantage of the Pearson correlation, besides the fact that it measures the linear relationship, is that it can measure the relationship between continuous and dichotomous data. This way it is possible to include variables like 'Group', 'Gender', 'Starting Condition', 'Living together' and 'Table'.

Both methods have their advantages. Kendall's tau does not need normality, is unaffected by outliers and can be calculated with ordinal data like RCI scores. The Pearson correlation measures the linear relationship and can be calculated with dichotomous data as well as continuous data.

Kendall's tau is, at least in this case, considered more accurate and useful as the Pearson correlation. Therefore, and for legibility reasons, the results and the associated tables of the Pearson correlation are moved to the 'Supplementary Analysis' in the Appendix.

8.2.3. Results of the Kendall's tau analysis

A significant correlation between *EEB* values and CSI scores cannot be assumed, as, $\tau = -.101$, 95% BCa CI $[-.313, .096]$, $p = .279$.

The result indicates a significant negative relationship between CSI and BDI scores, $\tau = -.318$, 95% BCa CI $[-.463, -.156]$, $p = .001$.

RCI-F scores correlate positively with CSI scores, $\tau = .206$, 95% BCa CI $[.022, .374]$, $p = .031$. RCI-V scores also correlate positively with CSI scores, $\tau = .218$, 95% BCa CI $[.024, .420]$, $p = .036$.

Age is significantly related to the relationship duration when using Kendall's tau, $\tau = .406$, 95% BCa CI $[.242, .546]$, $p = .000$.

In the present sample BDI scores are also related to age, $\tau = -.208$, 95% BCa CI $[-.383, -.028]$, $p = 0.038$.

8.2.1 Kendall's tau - tables

Table 27

Correlation matrix using Kendall's tau (2-tailed; N=55)

	CSI	EEB	Age	Relationship duration	BDI	RCI-F	RCI-V	RCI-S
CSI	1							
EEB	-0.101	1						
Age	-0.176	.029	1					
Relationship duration	-0.041	.015	.406**	1				
BDI	-0.318**	-.008	-.208*	-.128	1			
RCI-F	.211*	.114	-.026	-.136	-.014	1		
RCI-V	.218*	.010	-.121	-.019	-.036	.149	1	
RCI-S	-.003	-.017	.106	.168	.017	-.160	-.165	1

Note. *significant relationship with $p \leq .05$; **significant relationship with $p \leq .01$.

Table 28

Exact significance levels of the Kendall's tau correlation shown in table 27

	CSI	EEB	Age	Relationship duration	BDI	RCI-F	RCI-V	RCI-S
CSI	.							
EEB	.279	.						
Age	.073	.769	.					
Relationship duration	.662	.873	.000	.				
BDI	.001	.936	.038	.186	.			
RCI-F	.035	.251	.805	.177	.888	.		
RCI-V	.036	.921	.264	.855	.736	.149	.	
RCI-S	.980	.875	.343	.122	.874	-.160	-.165	.

Table 29

Bias corrected accelerated (BCa) bootstrapped Confidence intervals of the Kendall's tau correlations (N=55)

		CSI	EEB	Age	Relationship duration	BDI	RCI- F	RCI- V	RCI- S
CSI	Lower	.							
	Upper	.							
EEB	Lower	-.313	.						
	Upper	.096	.						
Age	Lower	-.389	-.165	.					
	Upper	.053	.203	.					
Relationship duration	Lower	-.232	-.189	.242	.				
	Upper	.151	.198	.546	.				
BDI	Lower	-.463	-.200	-.383	-.342	-.463			
	Upper	-.156	.183	-.028	.100	-.156			
RCI-F	Lower	.014	-.113	-.221	-.352	-.194	.		
	Upper	.400	.342	.180	.081	.163	.		
RCI-V	Lower	.024	-.222	-.347	-.214	-.236	-.090	.	
	Upper	.420	.237	.134	.185	.162	.380	.	
RCI-S	Lower	-.266	-.219	-.131	-.025	-.180	-.407	-.431	.
	Upper	.258	.188	.345	.353	.204	.115	.116	.

Note. Bootstrap results are based on 2000 bootstrap samples.

9. Discussion

9.1. Summary

One of the purposes of this study was to explore if there is a significant relationship between relationship satisfaction and the *Emotional Egocentricity Bias (EEB)*. Relationship satisfaction was measured with a questionnaire, the CSI. The *EEB* was measured with a visuo-tactile behavioural task. It could be shown that no significant linear or monotonic relationship exists between these two measures. The RCI questionnaire has been added to examine additional possible relationships with the *EEB*. But as with the CSI, no significant correlation could be detected.

Another purpose was to examine whether a differentiation between dyadic and general *EEB* can be made. It is difficult to come to a definitive conclusion because the robust t-test's ($p = .062$), as well as the Mann-Whitney U test's ($p = .061$) results indicate a slightly insignificant difference in *EEB* values between test and control group. But one can speak of a trend, also because the direction of the possible effect is the same as postulated by the hypothesis, with lower *EEB* values in the test group ($M = 0.381$, $SD = 1.423$) than in the control group ($M = 1.192$, $SD = 1.899$).

Other group differences for the *EEB*, such as a Gender effect, which is especially interesting because the studies cited in this thesis used female participants only, were not found.

However, several additional relationships have been found, such as a negative relationship between BDI scores (depression symptoms) and CSI scores (relationship satisfaction) ($\tau = -.318$, $p = .001$). On the other hand, CSI scores are positively correlated with RCI-F ($\tau = .206$, $p = .031$) and RCI-V values ($\tau = .218$, $p = .036$). Age shows a positive correlation with relationship duration ($\tau = .406$, $p = .000$), while BDI scores are negatively related to age ($\tau = -.208$, $p = .038$).

One very interesting distributional difference has been found. CSI scores differ significantly between test and control group ($p = .008$ [robust t-test]/ $p = .010$ [Mann-Whitney U test]), with the higher scores in the test group.

9.2 Interpretation of the results not concerning the main hypothesis

The correlation between RCI-F and CSI scores leads to the interesting question of causality. Are people who often spend time together with their partner more satisfied in their relationship or do they spend more time together because they are more satisfied. There could already be studies on this subject, but they are not known to the author.

The difference in average CSI scores between test and control group could have different reasons. One is that participating with one's partner serves as a positive prime. It may evoke positive feelings and facilitates the recall of positive memories, thus leading to a more positive estimation of the relationship's situation. Another possibility is that couples

who are on average more satisfied with their relationship are more likely to participate together in a study than couples who are less satisfied.

The negative relationship between CSI and BDI scores is not very surprising. Many studies found a correlation between depression (or depressive symptoms) and life satisfaction or relationship satisfaction.

The RCI-F's and RCI-V's positive correlation with CSI is also interesting but not unexpected. Possible explanations are that either seeing each other more often or doing more distinct activities leads to more relationship satisfaction. Or the opposite way, that more satisfied couples tend to see each other more often and do more together. Perhaps this has already been investigated, but such studies are not known to the author.

9.3 Interpretation of the main findings

Self-other distinction is a key ability in empathy and a lack of that ability can lead to greater *Emotional Egocentricity Bias*. As a lot of studies found a positive correlation between empathy and relationship satisfaction, there was a tendency to believe that *EEB* would negatively correlate with relationship satisfaction. This hypothesis is not backed up by the results of this thesis, as all statistical analysis show largely insignificant p-values. So, at least for this sample, there is no significant correlation between *EEB* values and CSI scores. It is not clear what causes the relation between empathy and relationship satisfaction. It could be less the cognitive parts of it, but more the emotional parts that eventually can lead to prosocial behaviour. To overcome an *Emotional Egocentricity Bias* though, the cognitive factor is important.

The interpretation of the results concerning the hypothesis 2 is not so straightforward. While it is true that the *EEB* values do not significantly differ between test and control groups, the p-values from the robust t-test ($p = .062$) and the Mann-Whitney U test ($p = .061$) are not that high. This insignificance could be due to sample characteristics (more in the "Limitations" section). Given the facts that the direction of the potential difference is the one postulated by the hypothesis (lower values in the test group; trimmed mean difference = -0.724) and the p-values that are close to .05 one can speak of a trend which needs further investigation. The question if there might exist a difference in the *EEB* when confronted with love partners (dyadic *EEB*) or strangers (general *EEB*) cannot be answered right now.

Both the robust t-test ($p = .008$) and the Mann-Whitney U test ($p = .010$) show that the CSI scores differ significantly between the test ($M = 140.73$) and control group ($M = 126.93$).

It is not completely clear why this effect happened. A possible explanation is that couples that are happier in their romantic relationship tend to participate together, while couples that are less happy are more likely to come alone.

9.4 Limitations

A strong limitation is the presented sample. It's size of 55 participants is not that small, but it is also not big enough to take advantage of the central limit theorem. Socio-demographically the sample does not cover the whole population. It only covers young adults, most of whom are still students. So, the educational level of this sample does in no way represent the population. These problems were known during the recruiting phase, but it was difficult to find enough participants. Maybe some inclusion criteria, such as a relatively long and stable relationship (one year minimum), were too restrictive. The age span needed to be so narrow, because of the limited resources available and the U-shaped relation between *EEB* and age (Riva et al., 2016).

Because of the sample's distributional properties normal parametric tests could not be used. Every adaptation (either non-parametric tests or robust tests) equals a loss in Information. Parametric tests, such as the Spearman correlation, Kendall's tau correlation or Mann-Whitney U test, use ranked data instead of continuous data. This is a huge drawback for the interpretation. Future samples might have better distributional properties or are large enough to take advantage of the central limit theorem.

Another limitation is the incapability to randomly assign participants into test and control groups. The idea of letting couples come together every time but testing them after one another while mixing them up with another couple, was simply not feasible. A benefit (of the way we did it) is that this way we could also test participants whose partners were not available.

Future researches could combine (dyadic) empathy questionnaires or collect data about prosocial behaviour. A very good idea would be to combine *EEB* experiments with experiments that can measure prosocial behaviour. Either with a social game or questionnaires. The first is probably better because it does not just show the motivation to help or the assumed motivation to help when thinking about a specific situation, but taking real action, even though it is just a game. Cognition can never replace action.

Also, it is not known what the threshold of the *EEB* values is, to be susceptible of developing empathic or emotional distress. Is *EEB* even significantly related to such a negative outcome? A lot of research is still needed to completely understand the effect of the *EEB* and how it is related to other constructs such as empathy, *self-other distinction* and maybe most importantly, prosocial behaviour. It might be less the way we understand and think, but the way we act that causes major impacts, even though both are probably related too.

This thesis is a start in a relative new field and can therefore only be an exploration. Most likely the *EEB* is not significantly related to relationship satisfaction. But how is it related to empathy in general, or to dyadic empathy more specifically? Maybe this thesis has taken a step too far. The right step may have been to investigate that question. A lot of researches see *self-other distinction* as a crucial part of empathy, but to this day no study tried to quantify that relationship with the help of the fairly recent *EEB* paradigm.

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13. Appendix A

Abstract (English)

The purposes of this thesis were to investigate the relationship between the *Emotional Egocentricity Bias (EEB)* and couples' relationship satisfaction and whether a differentiation between dyadic and general *EEB* can be made. The *EEB* describes the fact that one's judgement about the emotions of another can be biased in the direction of one's emotions, leading to a misjudgement. In this thesis *dyadic EEB* refers to the *EEB* one shows when judging the emotions of one's love partner. *General EEB* is referring to the *EEB* one shows when judging the emotions of a stranger. To overcome this bias, an ability called *self-other distinction* is crucial. *Self-other distinction* is thus an important part of the construct of empathy, allowing the effective identification of the source of the felt emotions and by this reducing the *EEB*. Previous research suggests a positive correlation between empathy and self-rated relationship satisfaction. By using a visuo-tactile paradigm, which allows to measure the *EEB* of every participant, and several questionnaires, the correlation between the *EEB* and relationship satisfaction was quantified. Fifty-five participants took part in the study. Twenty-six participants constituted the test group (participating in romantic couples) and 29 were in the control group (tested pairwise as strangers). The statistical analysis showed no significant correlation between the *EEB* and relationship satisfaction. The test group showed higher couple satisfaction scores ($U = 223.500$, $p = .010$) but a slightly insignificant *EEB* difference ($U = 488$, $p = .061$), which constitutes a trend that needs further research.

Keywords: Emotional Egocentricity Bias, empathy, self-other distinction, relationship satisfaction, dyadic Emotional Egocentricity Bias

Abstract (German)

Ziel dieser Arbeit war es, sowohl den Zusammenhang zwischen dem *Emotional Egocentricity Bias (EEB)* und der Beziehungszufriedenheit von Paaren zu untersuchen, als auch zu prüfen, ob man eine Unterscheidung zwischen dyadischem *EEB* und allgemeinem *EEB* vornehmen kann. Der *EEB* beschreibt, dass man bei der Einschätzung der Gefühlslage einer anderen Person von seiner eigenen Gefühlslage beeinflusst wird, was zu einem Fehltritt führen kann. In dieser Arbeit wird mit *dyadischem EEB* der *EEB* beschrieben der auftritt, wenn man die Gefühle eines Liebespartners einschätzt. Der *allgemeine EEB* hingegen beschreibt die Einschätzung der Gefühle einer fremden Person. Um den durch den *EEB* entstehenden Fehler zu vermeiden ist die *self-other distinction*, also die Fähigkeit, zwischen seinen eigenen Gefühlen und denen der anderen Person zu unterscheiden, essenziell. *Self-other distinction* ist ein wichtiger Teil des Empathiekonstrukts und ermöglicht es den Ursprung der eigenen Gefühle besser zu identifizieren und somit auch die Wahrscheinlichkeit eines Fehltritts zu verringern. Vorherige Studien weisen darauf hin, dass es einen positiven Zusammenhang zwischen Empathie und der selbstbeurteilten Beziehungszufriedenheit von Paaren gibt. Anhand eines visuo-taktilen Experiments, mit welchem der *EEB* quantifiziert werden kann, sowie einigen Fragebögen, wurde die Korrelation zwischen *EEB* und Beziehungszufriedenheit ermittelt. Fünfundfünfzig Personen nahmen an dieser Studie teil. Sechszwanzig Teilnehmer waren in der Versuchsbedingung (nahmen mit dem Partner/ der Partnerin teil) und 29 in der Kontrollgruppe (wurden paarweise mit einer fremden Person getestet). Die statistische Auswertung zeigte keinen signifikanten Zusammenhang zwischen dem *EEB* und der Beziehungszufriedenheit. Die Testgruppe zeigt höhere Beziehungszufriedenheitswerte ($U = 223.500$, $p = .010$) aber auch einen leicht insignifikanten Unterschied in den *EEB* Werten ($U = 488$, $p = .061$), welchen man als Trend bezeichnen kann und weitere Forschung erfordert.

Keywords: Emotional Egocentricity Bias, empathy, self-other distinction, relationship satisfaction, dyadic Emotional Egocentricity Bias

14. Appendix B

14.1 Supplementary Analysis

14.1.1 Results of the Pearson correlation

The results of the Pearson correlation are very similar to that of the Kendall's tau analysis. Below the most important results will be summarized:

The correlation between *EEB* and CSI scores is not significant, given $r = -.107$, BCa 95% CI $[-.346, .134]$.

CSI and BDI scores negatively correlate significantly, $r = -.377$, BCa 95% CI $[-.590, -.153]$.

As with the Kendall's tau analysis, the result of the Pearson correlation shows a significant positive correlation between age and relationship duration, with $r = .485$, 95% BCa CI $[0.275, 0.676]$.

BDI scores are also significantly correlated with age, this time negatively, as $r = -0.243$, 95% BCa CI $[-0.401, -0.099]$.

As the Pearson correlation can be used to measure the relationship between continuous and nominal data, the following significant (according to the interpretation of the BCa CI) relationships can be reported (also check the t-tests and Mann-Whitney U test results and the descriptive tables):

CSI scores are negatively related to the 'Group' variable, $r = -.383$ $[-.567, -.170]$. This indicates that the CSI scores are higher in the test group (which is coded by '0') than in the control group.

The 'Group' variable and the participants' age correlate positively, $r = .394$ $[.181, .565]$, meaning that the average age in the control group is higher than in the test group.

There is also a positive relationship between the Starting Condition and the relationship duration, $r = .283$ $[.021, .531]$, indicating a higher average age in the 'other' starting condition.

Gender and age are negatively correlated, $r = -.290$ $[-.490, -.053]$, indicating a higher age of male participants.

Relationship duration is positively related to whether one lives with one's partner, $r = .475 [0.179, 0.713]$, indicating that the longer the relationship the likelier it is to live together.

14.1.2 Pearson Correlation - tables

Table S1

Pearson correlation between CSI scores and respective variables

	r	Sig.	BCa 95% CI	
			Lower	Upper
EEB	-.107	.437	-.346	.134
Group	-.383	.004	-.567	-.170
Starting	-.201	.140	-.420	.065
Condition				
Gender	.101	.464	-.166	.387
Age	-.267	.049	-.525	.025
Relationship	-.014	.921	-.290	.231
duration				
Living	-.068	.624	-.342	.173
BDI	-.377	.005	-.590	-.153
Table	-.202	.139	-.433	.057

Note. Potential significant values are not marked with '*' or '**' because that could lead to the misconception that significances were accurate. Bootstrap results are based on 2000 bootstrap samples.

Table S2*Pearson correlation between EEB values and respective variables*

	r	Sig.	BCa 95% CI	
			Lower	Upper
Group	.237	.081	-.036	.460
Starting	.035	.799	-.240	.275
Condition				
Gender	-.059	.671	-.306	.214
Age	.154	.261	-.146	.425
Relationship	.075	.589	-.196	.333
duration				
Living	.078	.573	-.176	.308
BDI	-.093	.502	-.285	.123
Table	.073	.597	-.194	.321

Note. Correlation with CSI scores is missing because this correlation was shown in table 11. Bootstrap results are based on 2000 bootstrap samples.

Table S3*Pearson correlation between the variable Group and respective variables*

	r	Sig.	BCa 95% CI	
			Lower	Upper
Starting	.236	.083	-.021	.470
Condition				
Gender	-.021	.878	-.298	.245
Age	.394**	.003	.181	.565
Relationship	.223	.101	-.036	.462
duration				
Living	.089	.517	-.195	.364
BDI	.054	.694	-.210	.286
Table	.021	.878	-.248	.285

Note. The Group variable indicates whether the participants belong to the test (coded as 0) or the control group (coded as 1). Correlations with CSI scores and *EEB* values are missing because they were shown in table 11-12. Potential significant values are not marked with ‘*’ or ‘***’ because that could lead to the misconception that significances were accurate. Bootstrap results are based on 2000 bootstrap samples.

Table S4*Pearson correlation between the variable Starting Condition and respective variables*

	r	Sig.	BCa 95% CI	
			Lower	Upper
Gender	.017	.901	-.250	.264
Age	.172	.208	-.075	.376
Relationship duration	.283*	.036	.021	.531
Living	.111	.418	-.154	.370
BDI	.097	.482	-.173	.332
Table	.056	.687	-.219	.320

Note. The Starting Condition variable indicates whether the participants started with the ‘self’ (0) or ‘other’ (1) condition. Correlations with CSI scores, *EEB* values and the Group variable are missing because they were shown in table 11-13. Potential significant values are not marked with ‘*’ or ‘***’ because that could lead to the misconception that significances were accurate. Bootstrap results are based on 2000 bootstrap samples.

Table S5*Pearson correlation between the variable Gender and respective variables*

	r	Sig.	BCa 95% CI	
			Lower	Upper
Age	-.290	.032	-.490	-.053
Relationship duration	.002	.987	-.262	.256
Living	-.074	.590	-.336	.199
BDI	.189	.166	-.076	.407
Table	-.125	.364	-.413	.163

Note. Male is coded as 0 and female is coded as 1. Correlations with CSI scores, *EEB* values the Group and Starting Condition variables are missing because they were shown in table 11-14. Potential significant values are not marked with ‘*’ or ‘***’ because that could lead to the misconception that significances were accurate. Bootstrap results are based on 2000 bootstrap samples.

Table S6*Pearson correlation between the variable Age and respective variables*

	r	Sig.	BCa 95% CI	
			Lower	Upper
Relationship	.485	.000	.275	.676
duration				
Living	.276	.041	-.005	.521
BDI	-.243	.074	-.401	-.099
Table	-.011	.937	-.290	.240

Note. Correlations with the following variables are missing because they were shown in table 11-15: CSI, *EEB*, Group, Starting Condition and Gender. Potential significant values are not marked with ‘*’ or ‘***’ because that could lead to the misconception that significances were accurate. Bootstrap results are based on 2000 bootstrap samples

Table S7*Pearson correlation between the variable Relationship duration and respective variables*

	r	Sig.	BCa 95% CI	
			Lower	Upper
Living	.475	.000	.179	.713
BDI	-.119	.386	-.403	.152
Table	-.055	.689	-.305	.227

Note. Correlations with the following variables are missing because they were shown in table 11-16: CSI, *EEB*, Group, Starting Condition, Gender and Age. Potential significant values are not marked with ‘*’ or ‘***’ because that could lead to the misconception that significances were accurate. Bootstrap results are based on 2000 bootstrap samples.

Table S8*Pearson correlation between the variable Living together and respective variables*

	r	Sig.	BCa 95% CI	
			Lower	Upper
BDI	.094	.496	-.238	.353
Table	.238	.080	-.020	.484

Note. The variable Living together indicates whether the participants live with their partner (coded as 1) or not (coded as 0). Correlations with the following variables are missing because they were shown in table 11-17: CSI, *EEB*, Group, Starting Condition, Gender, Age and Relationship duration. Bootstrap results are based on 2000 bootstrap samples.

Table S9*Pearson correlation between the BDI scores and the Table variable*

	r	Sig.	BCa 95% CI	
			Lower	Upper
Table	.061	.660	-.239	.284

Note. Correlations with the following variables are missing because they were shown in table 11-18: CSI, *EEB*, Group, Starting Condition, Gender, Age, Relationship duration and Living together. Bootstrap results are based on 2000 bootstrap samples.

14.1.3 Results of the independent samples t-test

Same as the robust t-test and the Mann-Whitney U test, the mean difference of 13.8 between the CSI scores of the test and the control group, with higher scores in the first mentioned, seems to be significant, given the BCa 95% CI [5.348, 22.920], which does not cross zero.

The BCa 95% CI [-1.729, -.012] of the t-test indicates a possible significantly lower *EEB* values in the test group.

14.1.4 Independent samples t-test - tables

Table S10

Bootstrap for independent samples t-test comparing differences between test and control group

	Mean Diff.	Bias	Std. Error	Sig.	BCa 95% CI	
					Lower	Upper
CSI	13.800	0.136	4.542	.004	5.310	22.333
EEB	-0.812	-0.024	0.442	.075	-1.667	0.086
BDI	-0.586	0.067	1.441	.684	-3.774	2.517

Note. Bootstrap results are based on 2000 bootstrap samples.

Table S11

Bootstrap for independent samples t-test comparing differences between starting conditions

	Mean Diff.	Bias	Std. Error	Sig.	BCa 95% CI	
					Lower	Upper
CSI	7.255	-0.122	4.651	.132	-1.496	15.790
EEB	-0.120	0.002	0.471	.795	-1.095	0.797
BDI	-1.044	0.040	1.428		-3.987	2.035

Note. Bootstrap results are based on 2000 bootstrap samples.

Table S12*Bootstrap for independent samples t-test comparing differences between Genders*

	Mean Diff.	Bias	Std. Error	Sig.	BCa 95% CI	
					Lower	Mean Diff.
CSI	-3.634	-0.024	4.872	.453	-13.012	5.933
EEB	0.200	0.004	0.477	.666	-0.725	1.171
BDI	-2.045	-0.024	1.394		-4.730	0.415

Note. Bootstrap results are based on 2000 bootstrap samples.

Table S13*Bootstrap for independent samples t-test comparing differences between participants that live with or without their partner*

	Mean Diff.	Bias	Std. Error	Sig.	BCa 95% CI	
					Lower	Mean Diff.
CSI	2.733	.117	5.435	.604	-8.604	14.306
EEB	-0.300	0.008	0.561	.624	-1.453	0.717
BDI	-1.133	0.058	2.083		-5.715	2.840
RCI-F	42.542	1.515	57.026	.464	-79.761	157.200
RCI-V	-0.733	0.026	1.131		-3.088	1.764
RCI-S	2.042	0.002	3.720		-5.032	9.052

Note. Bootstrap results are based on 2000 bootstrap samples.

Table S14*Bootstrap for independent samples t-test comparing differences between tables*

	Mean Diff.	Bias	Std. Error	Sig.	BCa 95% CI	
					Lower	Mean Diff.
CSI	7.281	0.039	4.894	.149	-2.068	17.789
EEB	-0.253	-0.007	0.475	.613	-1.205	0.661
BDI	-0.654	-0.033	1.507		-3.630	2.299
RCI-F	65.292	-1.360	57.521	.274	-47.804	172.858
RCI-V	1.605	-0.002	1.063		-0.418	3.677
RCI-S	1.887	0.040	3.342	.576	-4.864	8.784

Note. Bootstrap results are based on 2000 bootstrap samples.

14.2 Inclusion and exclusion questionnaire

Vielen Dank für Ihr Interesse zur Teilnahme an unserer Studie im Rahmen unserer Masterarbeit an der Universität Wien! Um sicherzustellen, dass Sie für die Studie geeignet sind würden wir uns freuen, wenn Sie diesen Fragebogen kurz ausfüllen würden und ihn uns per E-Mail zurücksenden (a*****@univie.ac.at).

Wichtiger Hinweis: Das Ausfüllen dieses Fragebogens sowie die Teilnahme an der Studie sind rein freiwillig. Allerdings könnte es sein, dass nicht beantwortete Fragen eine Teilnahme an der Studie verhindern. Dieser Fragebogen dient lediglich zur Kontrolle der Ein- und Ausschlusskriterien. Die erhobenen Daten werden nicht an Dritte weitergegeben und später anonymisiert.

Fragebogen zur Ermittlung von Ein- und Ausschlusskriterien

Sexuelle Orientierung

☐Heterosexuell ☐Homosexuell ☐Bisexuell ☐Andere:

Sind psychiatrische Störungen bekannt?

☐Ja Wenn ja, welche:

☐Nein

Sind neurologische Störungen bekannt?

☐Ja Wenn ja, welche:

☐Nein

Psychologische oder psychotherapeutische Behandlungen:

☐ Ja

Wenn ja, wann war die letzte Sitzung/Behandlung:

☐ vor über 6 Monaten

☐ innerhalb der letzten 6 Monate

Grund für die Behandlung (Nur relevant, wenn letzte Sitzung/Behandlung vor weniger als 6 Monaten stattfand):

Beschwerdefreiheit: ☐ Ja ☐ Nein

☐ Nein

Regelmäßige Einnahme von Psychopharmaka in den letzten 6 Monaten?

☐ Ja

Wenn ja, welche:

☐ Nein

Einnahme von Medikamenten, die die Wahrnehmung oder Gefühle/Affekte beeinflussen können:

☐ Ja

Wenn ja, welche:

☐ Nein

Befinden Sie sich in einer festen Beziehung?

☐ Ja

Wenn ja, wie lange schon (ohne Pause/Unterbrechung)?

Jahre Monate

☐ Nein

Alter in Jahren und Monaten:

Nationalität:

Deutschsprachig (Muttersprache):

☐ Ja

☐ Nein

Geschlecht:

☐ männlich

☐ weiblich

Leiden Sie unter irgendwelchen Phobien oder Ängsten?

☐ Ja

Wenn ja, welche:

☐ Nein

Haben Sie Probleme damit, an der Hand berührt zu werden? Die Berührung erfolgt teilweise durch Objekte, die man sich normalerweise nicht auf die Hand legen würde (z.B.: weil man sie eklig findet). Sie ist allerdings immer schmerzfrei.

☐ Ja

☐ Nein

Haben Sie irgendeine Hautkrankheit, die Sie in irgendeiner Weise während des Experiments beeinträchtigen würde? (z.B.: Reduzierte Wahrnehmung, starke Allergien...)

☐ Ja

Wenn ja, welche und inwiefern:

☐ Nein

14.3 Informed Consent Form

Teilnehmer*inneninformation und Einwilligungserklärung zur Teilnahme an der Masterarbeitsstudie:

Einschätzen von Emotionen, Beziehung und Sexualität

Sehr geehrte Teilnehmerin, sehr geehrter Teilnehmer,

Ihre Teilnahme an dieser Studie erfolgt freiwillig. Sie können jederzeit, ohne Angabe von Gründen, Ihre Bereitschaft zur Teilnahme ablehnen oder auch im Verlauf der Studie zurückziehen.

Unverzichtbare Voraussetzung für die Durchführung von Studien ist jedoch, dass Sie Ihr Einverständnis zur Teilnahme an dieser Studie schriftlich erklären. Bitte lesen Sie den folgenden Text sorgfältig durch und zögern Sie nicht, Fragen zu stellen.

In der Studie „Einschätzen von Emotionen, Beziehung und Sexualität“ geht es darum, wie sich bestimmte visuell-taktile Erfahrungen auf unsere Emotionen auswirken (d.h. während der Betrachtung bspw. eines Bildes einer Rose wird gleichzeitig die Hand mit einer Rose berührt). Darüber hinaus wollen wir untersuchen, wie Sie sich fühlen, während eine andere Person auch eine derartige visuell-taktile Erfahrung macht und wie Sie die Gefühle der anderen Person einschätzen. Aus diesem Grund nehmen immer zwei Personen (Sie und eine weitere Person) an dieser Studie teil. Während des Experiments werden Ihnen und der weiteren Versuchsperson Bilder mit unterschiedlichen Objekten präsentiert bei gleichzeitiger taktiler Stimulation. Anschließend bewerten Sie, wie angenehm oder unangenehm diese visuell-taktile Erfahrungen für Sie selbst bzw. für die andere Person waren. Die taktiler Stimulation Ihrer Hand erfolgt vollkommen schmerzfrei. Im Anschluss an das Experiment werden wir Sie bitten, noch einige Fragebögen auszufüllen. Dabei werden auch Fragen zur Beziehung und zur Sexualität gestellt. Ziel dieser Studie ist es, mehr über den Zusammenhang von Erleben und Verhalten und der Wahrnehmung von Emotionen bei sich selbst und bei anderen Personen zu erfahren. Dabei wollen wir auch untersuchen, wie sich das bei Personen äußert, die sich in einer Beziehung befinden.

Ihre Daten werden anonymisiert und ausschließlich für statistische Zwecke genutzt. Es wird kein Rückschluss auf Ihre Person möglich sein.

Ihr Zeitaufwand für die Studie beträgt ca. eine Stunde. Für Ihre Teilnahme an dieser Studie erhalten Sie **nach Absolvierung der gesamten Testung 12,50€.**

Bei weiteren Fragen zögern Sie bitte nicht, uns zu kontaktieren.

Kontakt Daten

Versuchsleiter	XY, BA BSc E-Mail: a*****@unet.univie.ac.at Tel.: + 43 *** *****
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MA-Betreuerin	Ass.-Prof. Dr. Silani E-Mail: giorgia.silani@univie.ac.at
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Einwilligungserklärung

Ich erkläre mich bereit, am Forschungsprojekt „Einschätzen von Emotionen, Beziehung und Sexualität“ teilzunehmen.

Ich bin von XY und XY ausführlich und verständlich über Zielsetzung, Bedeutung und Tragweite der Studie und die sich für mich daraus ergebenden Anforderungen aufgeklärt worden. Ich habe darüber hinaus den Text dieser Teilnehmer*inneninformation und Einwilligungserklärung gelesen. Aufgetretene Fragen wurden mir von der Studienleitung verständlich und ausreichend beantwortet. Ich hatte genügend Zeit, mich zu entscheiden, ob ich an der Studie teilnehmen möchte. Ich habe zurzeit keine weiteren Fragen mehr.

Ich werde versuchen, die Hinweise, die für die Durchführung der Studie erforderlich sind, zu befolgen. Ich behalte mir jedoch das Recht vor, meine freiwillige Mitwirkung jederzeit zu beenden, ohne dass mir daraus Nachteile entstehen. Sollte ich aus der Studie ausscheiden wollen, so kann ich dies jeder Zeit bei XY oder XY veranlassen.

Ich bin zugleich damit einverstanden, dass meine im Rahmen dieser Studie erhobenen Daten aufgezeichnet und ausgewertet werden.

Ich stimme zu, dass meine Daten dauerhaft in anonymisierter Form elektronisch gespeichert werden. Die Daten werden in einer nur der Studienleitung zugänglichen Form gespeichert.

Ich habe eine Kopie dieser Teilnehmer*inneninformation erhalten. Die Einwilligungserklärung verbleibt bei der Studienleitung.

(Datum und Unterschrift der Teilnehmerin/des Teilnehmers)

.....

(Datum, Name und Unterschrift der Studienleitung)

.....

14.4 CSI Translation

14.4.1 German Translation of the CSI

Couples Satisfaction Index (CSI-32)/Paar-Zufriedenheits-Index

Bitte geben sie den Grad an Glücklichkeit, alle Dinge berücksichtigt, ihrer Beziehung an.

Extrem Unglücklich	Ziemlich Unglücklich	Ein wenig Unglücklich	Glücklich	Sehr Glücklich	Extrem Glücklich	Perfekt
☐	☐	☐	☐	☐	☐	☐

Die meisten Menschen haben Meinungsverschiedenheiten in ihrer Beziehung. Bitte geben Sie unten das ungefähre Ausmaß an Zustimmung oder Widerspruch zwischen Ihnen und Ihrem Partner für jedes Item in der nachfolgenden Liste an.

	Immer Überein- stimmung	Fast Immer Überein- stimmung	Gelegent- liches Wider- sprechen	Häufiges Wider- sprechen	Fast Immer Wider- sprechen	Immer Widersprechen
Höhe der zusammen verbrachten Zeit	☐	☐	☐	☐	☐	☐
Treffen wichtiger Entscheidungen	☐	☐	☐	☐	☐	☐
Zuneigungsbekundungen	☐	☐	☐	☐	☐	☐

	Immer	Die meiste Zeit	Öfters als nicht	Gelegent- lich	Selten	Nie
Im Allgemeinen, wie oft denken Sie, dass die Dinge zwischen Ihnen und Ihrem Partner gut laufen?	☐	☐	☐	☐	☐	☐
Wie oft wünschen Sie sich Sie wären diese Beziehung nicht eingegangen?	☐	☐	☐	☐	☐	☐

	Gar nicht WAHR	Ein wenig WAHR	Etwas WAHR	Überwiegend WAHR	Beinahe völlig WAHR	Vollig WAHR
Ich fühle immer noch eine starke Verbundenheit mit meinem Partner	☐	☐	☐	☐	☐	☐
Wenn ich mein Leben noch einmal leben würde, würde ich die gleiche Person heiraten (oder mit ihr zusammenleben/daten)	☐	☐	☐	☐	☐	☐
Unsere Beziehung ist stark	☐	☐	☐	☐	☐	☐
Ich frage mich manchmal ob es irgendwo noch jemand anderen für mich gibt	☐	☐	☐	☐	☐	☐

Meine Beziehung zu meinem Partner macht mich glücklich	☐	☐	☐	☐	☐	☐
Ich habe eine warme und komfortable Beziehung mit meinem Partner	☐	☐	☐	☐	☐	☐
Ich kann mir nicht vorstellen meine Beziehung mit meinem Partner zu beenden	☐	☐	☐	☐	☐	☐
Ich spüre, dass ich mich meinem Partner mit quasi allem anvertrauen kann	☐	☐	☐	☐	☐	☐
Ich war in letzter Zeit nicht völlig von dieser Beziehung überzeugt	☐	☐	☐	☐	☐	☐
Für mich ist mein Partner der perfekte Liebespartner	☐	☐	☐	☐	☐	☐
Ich fühle mich wirklich als <u>Teil eines Teams</u> mit meinem Partner	☐	☐	☐	☐	☐	☐
Ich kann mir keine andere Person vorstellen, die mich so glücklich macht wie mein Partner	☐	☐	☐	☐	☐	☐

	Überhaupt nicht	Ein wenig	Etwas	Meistens	Fast Komplett	Komplett
Wie lohnend ist Ihre Beziehung mit ihrem Partner?	☐	☐	☐	☐	☐	☐
Wie gut geht ihr Partner auf Ihre Bedürfnisse ein?	☐	☐	☐	☐	☐	☐
In welchem Ausmaß stimmt ihre Beziehung mit Ihren ursprünglichen Erwartungen überein?	☐	☐	☐	☐	☐	☐
Im Allgemeinen, wie zufriedener sind Sie mit Ihrer Beziehung?	☐	☐	☐	☐	☐	☐

	Schlechter als alle anderen (Extrem schlecht)	Besser als alle anderen (Extrem gut)
Wie gut ist Ihre Beziehung im Vergleich zu den meisten?	☐	☐

	Nie	Weniger als einmal im Monat	Ein- oder Zweimal im Monat	Ein- oder Zweimal in der Woche	Einmal am Tag	Öfter
Genießen Sie die Gesellschaft Ihres Partners?	☐	☐	☐	☐	☐	☐
Wie oft haben Sie und Ihr Partner gemeinsam Spaß?	☐	☐	☐	☐	☐	☐

Für jedes dieser Items wählen Sie die Antwort aus, die am besten beschreibt wie Sie über ihre Beziehung denken.

INTERESSANT	☐	☐	☐	☐	☐	☐	LANGWEILIG
SCHLECHT	☐	☐	☐	☐	☐	☐	GUT
VOLL	☐	☐	☐	☐	☐	☐	LEER
EINSAM	☐	☐	☐	☐	☐	☐	FREUNDSCHAFTLICH
SOLIDE	☐	☐	☐	☐	☐	☐	ZERBRECHLICH
ENTMUTIGEND	☐	☐	☐	☐	☐	☐	HOFFNUNGSVOLL
ANGENEHM	☐	☐	☐	☐	☐	☐	MISERABEL

14.4.2 English translation of the translated German version of the CSI

Couples Satisfaction Index (CSI-32)/Paar-Zufriedenheits-Index

Please indicate the degree of happiness in your relationship, considering all factors.

Extremely Unhappy	Very Unhappy	Slightly Unhappy	Happy	Very Happy	Extremely Happy	Perfect
☐	☐	☐	☐	☐	☐	☐

Most people have differences of opinion in their relationships. Please indicate the approximate degree of agreement or disagreement between you and your partner for each item in the following list.

	Always agree	Nearly always agree	Occasional disagreement	Frequently disagree	Nearly always disagree	Always disagree
Amount of time spent together	☐	☐	☐	☐	☐	☐
Making important decisions	☐	☐	☐	☐	☐	☐
Expression of affection	☐	☐	☐	☐	☐	☐

	Always	Most of the time	More often than not	Sometimes	Rarely	Never
In general, how often do you think that things with your partner are going well?	☐	☐	☐	☐	☐	☐
How often do you wish, you hadn't gotten into this relationship?	☐	☐	☐	☐	☐	☐

	Not TRUE	A little TRUE	Quite TRUE	Mostly TRUE	Nearly always TRUE	Always TRUE
I still feel a strong connection to my partner	☐	☐	☐	☐	☐	☐
If I could live my life again, I would get married, cohabit or date the same person	☐	☐	☐	☐	☐	☐
Our relationship is strong	☐	☐	☐	☐	☐	☐

Sometimes I ask myself, if there is anyone else meant for me	☐	☐	☐	☐	☐	☐
My relationship with my partner makes me happy	☐	☐	☐	☐	☐	☐
I have a warm and content relationship with my partner	☐	☐	☐	☐	☐	☐
I cannot imagine ending my relationship with my partner	☐	☐	☐	☐	☐	☐
I feel that I can entrust my partner with nearly everything	☐	☐	☐	☐	☐	☐
Lately, I have been having doubts about this relationship	☐	☐	☐	☐	☐	☐
For me personally my partner is the perfect mate	☐	☐	☐	☐	☐	☐
I feel like me and my partner are a team	☐	☐	☐	☐	☐	☐
I cannot imagine another person making me as happy as my partner does	☐	☐	☐	☐	☐	☐

	Not at all	A little	Sometimes	Mostly	Nearly completely	Completely
How rewarding is your relationship with your partner?	☐	☐	☐	☐	☐	☐
How well does your partner respond to your needs?	☐	☐	☐	☐	☐	☐
To what degree does your relationship correspond with your original expectations?	☐	☐	☐	☐	☐	☐
In general, how satisfied are you in your relationship?	☐	☐	☐	☐	☐	☐

**Worse than all others
(Extremely bad)**

**Better than all others
(Extremely good)**

How good is your relationship in comparison to most others?

☐ ☐ ☐ ☐ ☐ ☐

	Never	Less than once a month	once or twice a month	once or twice a week	once a day	often
Do you enjoy your partners company?	☐	☐	☐	☐	☐	☐
How often do you and your partner have fun together?	☐	☐	☐	☐	☐	☐

For each of these items, choose which of the answers best describes what you think of your relationship.

INTERESTING	☐	☐	☐	☐	☐	☐	BORING
BAD	☐	☐	☐	☐	☐	☐	GOOD
FULL	☐	☐	☐	☐	☐	☐	EMPTY
LONELY	☐	☐	☐	☐	☐	☐	FRIENDLY
ROBUST	☐	☐	☐	☐	☐	☐	FRAGILE
DAUNTING	☐	☐	☐	☐	☐	☐	HOPEFUL
COMFORTABLE	☐	☐	☐	☐	☐	☐	MISERABLE

14.4.3 Original CSI

Couples Satisfaction Index (CSI-32)

Please indicate the degree of happiness, all things considered, of your relationship.

Extremely Unhappy	Fairly Unhappy	A Little Unhappy	Happy	Very Happy	Extremely Happy	Perfect
0	1	2	3	4	5	6

Most people have disagreements in their relationships. Please indicate below the approximate extent of agreement or disagreement between you and your partner for each item on the following list.

	Always Agree	Almost Always Agree	Occa- sionally Disagree	Fre- quently Disagree	Almost Always Disagree	Always Disagree
Amount of time spent together	5	4	3	2	1	0
Making major decisions	5	4	3	2	1	0
Demonstrations of affection	5	4	3	2	1	0

	All the time	Most of the time	More often than not	Occa- sionally	Rarely	Never
In general, how often do you think that things between you and your partner are going well?	5	4	3	2	1	0
How often do you wish you hadn't gotten into this relationship?	0	1	2	3	4	5

	Not at all TRUE	A little TRUE	Some- what TRUE	Mostly TRUE	Almost Completely TRUE	Completely TRUE
I still feel a strong connection with my partner	0	1	2	3	4	5
If I had my life to live over, I would marry (or live with / date) the same person	0	1	2	3	4	5
Our relationship is strong	0	1	2	3	4	5
I sometimes wonder if there is someone else out there for me	5	4	3	2	1	0
My relationship with my partner makes me happy	0	1	2	3	4	5
I have a warm and comfortable relationship with my partner	0	1	2	3	4	5
I can't imagine ending my relationship with my partner	0	1	2	3	4	5
I feel that I can confide in my partner about virtually anything	0	1	2	3	4	5
I have had second thoughts about this relationship recently	5	4	3	2	1	0
For me, my partner is the perfect romantic partner	0	1	2	3	4	5
I really feel like <u>part of a team</u> with my partner	0	1	2	3	4	5
I cannot imagine another person making me as happy as my partner does	0	1	2	3	4	5

	Not at all	A little	Some- what	Mostly	Almost Completely	Completely
How rewarding is your relationship with your partner?	0	1	2	3	4	5
How well does your partner meet your needs?	0	1	2	3	4	5

To what extent has your relationship met your original expectations?	0	1	2	3	4	5
In general, how satisfied are you with your relationship?	0	1	2	3	4	5

	Worse than all others (Extremely bad)				Better than all others (Extremely good)		
How good is your relationship compared to most?	0	1	2	3	4	5	

	Never	Less than once a month	Once or twice a month	Once or twice a week	Once a day	More often
Do you enjoy your partner's company?	0	1	2	3	4	5
How often do you and your partner have fun together?	0	1	2	3	4	5

For each of the following items, select the answer that best describes how you feel about your relationship. Base your responses on your first impressions and immediate feelings about the item.

INTERESTING	5	4	3	2	1	0	BORING
BAD	0	1	2	3	4	5	GOOD
FULL	5	4	3	2	1	0	EMPTY
LONELY	0	1	2	3	4	5	FRIENDLY
STURDY	5	4	3	2	1	0	FRAGILE
DISCOURAGING	0	1	2	3	4	5	HOPEFUL
ENJOYABLE	5	4	3	2	1	0	MISERABLE

14.5 Written Instructions displayed on the participants' touchscreens

Instruktionen zur Computeraufgabe

Inhalt

Liebe Teilnehmer*innen,

vielen Dank für Ihre Teilnahme an der heutigen Studie.

Wir interessieren uns dafür, wie sich bestimmte visuell-taktile Erfahrungen auf unsere Emotionen auswirken (d.h. während der Betrachtung bspw. eines Bildes einer Rose wird gleichzeitig die Hand mit einer Rose berührt). Darüber hinaus wollen wir untersuchen, wie Sie sich fühlen, während eine andere Person auch eine derartige visuell-taktile Erfahrung macht und wie Sie die Gefühle der anderen Person einschätzen. Aus diesem Grund nehmen immer zwei Personen (Sie und eine weitere Person) an dieser Studie teil.

Während des Experiments werden Ihnen und der weiteren Versuchsperson Bilder mit unterschiedlichen Objekten bei gleichzeitiger taktiler Stimulation präsentiert. Anschließend bewerten Sie, wie angenehm oder unangenehm diese visuell-taktile Erfahrungen für Sie selbst bzw. für die andere Person waren.

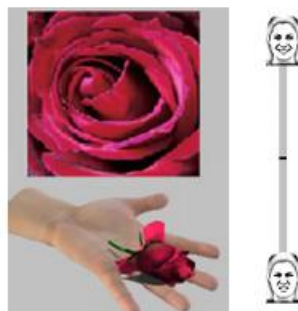
Die taktile Stimulation Ihrer Hand erfolgt vollkommen schmerzfrei.

Ziel

Ziel dieser Studie ist es, mehr über den Zusammenhang von Erleben und Verhalten und der Wahrnehmung von Emotionen bei sich selbst und bei anderen Personen zu erfahren.

Beschreibung der Aufgaben

Auf einem Bildschirm werden Ihnen Bilder von unterschiedlichen Objekten präsentiert und gleichzeitig wird Ihre linke Hand taktil stimuliert, entsprechend dem gezeigten Objekt. Anschließend werden Sie gebeten, anhand einer Skala zu bewerten, wie angenehm oder unangenehm diese visuell-taktile Erfahrung entweder für Sie selbst oder für die andere Person war.



Beschreibung der Aufgaben

Nach einer kurzen Übungssequenz sehen Sie in der eigentlichen Testphase immer **ZWEI** Bilder auf dem Bildschirm. Eines, welches das Objekt zeigt, mit dem Sie stimuliert werden und ein zweites, welches das Objekt zeigt, mit dem die andere Versuchsperson stimuliert wird.



Abhängig von der vorausgehenden Instruktion:

- Wie angenehm oder unangenehm fühlt sich die Berührung **für Sie selbst** an?

ODER

- Wie angenehm oder unangenehm fühlt sich die Berührung **für Ihren Versuchspartner bzw. Ihre Versuchspartnerin** an?

Ablauf



Beide Versuchspersonen bearbeiten die gleichen Aufgaben zur gleichen Zeit.

Während der Testung liegt Ihre LINKE Hand flach auf dem Handrücken ausgestreckt hinter einen Abdeckung.

Auf einem Bildschirm werden Ihnen Bilder von verschiedenen Objekten präsentiert und gleichzeitig erhalten Sie an der Hand eine entsprechende taktile Stimulation.

Wesentlich für die erfolgreiche Durchführung dieser Studie ist es, dass Sie sich bitte bewusst vorstellen, von dem dargestellten Objekt berührt zu werden.

Anschließend erscheint eine Bewertungsskala auf dem Bildschirm anhand derer Sie einschätzen, wie angenehm oder unangenehm die gerade erfolgte visuell-taktile Stimulation entweder für Sie selbst oder für die andere Person war.

Bewertung der visuell-taktilen Stimulation



Mittels Berührung des Touch-Screens können Sie eine Markierung auf einer Skala von sehr unangenehm (verzogenes Gesicht) bis sehr angenehm (lachendes Gesicht) setzen.

Bitte antworten Sie spontan und machen Sie sich keine Gedanken über richtige oder falsche Antworten – wir sind an Ihrer subjektiven Einschätzung interessiert.

Zusätzliche Informationen

Nach der Übungsphase kommen insgesamt zwei Durchgänge. Die Durchgänge erfolgen direkt nacheinander. Bitte lesen Sie die jeweilige Instruktion sorgfältig. Die jeweilige Instruktion (Bewertung für sich selbst oder für die andere Person) gilt für die gesamte Dauer eines Durchgangs. Für den darauffolgenden Durchgang kann sich die Instruktion ändern.

NACH den beiden Durchgängen bleiben Sie bitte noch kurz ruhig sitzen. Wir geben Ihnen ein Zeichen, sobald Sie wieder reden können.

Abschließende Informationen

Bitte bearbeiten Sie jede Aufgabe bewusst und sorgfältig. Sollten Sie einmal daneben gedrückt oder zu langsam geantwortet haben, machen Sie sich keine Gedanken darüber, sondern konzentrieren Sie sich gleich wieder auf die nächste Aufgabe. Es gibt weder richtige noch falsche Angaben, es zählt ausschließlich Ihr subjektiver Eindruck.

Sollten Sie noch Fragen haben, zögern Sie bitte nicht, diese zu stellen. Uns ist es wichtig, dass Sie die Aufgabenstellungen verstanden haben und Sie mit der Studie vertraut sind.

Wir wollen Sie nochmals daran erinnern, dass Ihre Teilnahme an dieser Studie vollständig freiwillig erfolgt und daher haben Sie das Recht, jederzeit die Studie (auch ohne Angaben von Gründen) abubrechen.

Vielen Dank für Ihre Teilnahme!