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Measuring the stability of Emotion Specific Empathy using the German version of the Emotion Specific Empathy Questionnaire (ESE)

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Abstract

Knowing what another person is feeling and feeling that same emotion too is what empathy enables us to do. However, since there are various different emotions, the question becomes if we feel the same empathetic response when observing happiness and sadness in someone, for instance, or if our response differs. The emotion specific empathy questionnaire (ESE) differentiates our empathetic response to 9 different emotions: Anger, fear, sadness, happiness, disgust, surprise, relief, pride, and contentment. In this paper we wanted to find out, if on the one hand empathy as a whole and on the other hand our emotion specific empathies remain stable across time. We also wanted to know if there are differences in stability between the emotional empathies. For that purpose, we recruited 117 predominantly younger, white, female and educated participants who filled out the 90 ESE items at two different times three weeks apart. Our results support previous findings and our expected hypothesis that empathy as a whole remains stable. The emotion specific correlations differ quite a bit. Their correlations range from .64 to .99. The lowest correlation has been found for the disgust specific empathy, while the highest correlations were observed for pride and relief, followed by surprise and contentment.

Introduction

History of empathy as a concept in psychology

The German term *Einfühlung* was first used by Robert Vischer in 1873 when he talked about the psychology of aesthetics and form perception. The term was referring to the ability to project yourself into a beautiful artistic object. The first time the term *Einfühlung* was translated into the English language was in 1895 by novelist Violet Paget going by the pseudonym of Vernon Lee. She translated it with sympathy, defining it as feelings expressing themselves in muscular tensions – now known as muscular mimicry (Eisenberg, & Strayer, 1990).

German psychologist Theodor Lipps, who worked on optical illusions, extended the concept of *Einfühlung* on our relationship to other people in 1905. An observer projects himself into another person or object, perceiving an emotion like pride, for instance, in the perceived object itself, not about said object. Antonin Prandtl, another psychologist, argued, that people can only really know about their own inner life. When they think that they understand someone else, they really only imagine that they know. That can happen by remembering past experiences, he called it empirical empathy, or by empathy through feeling. The latter concept is closely related to Lipps definition of empathy (Eisenberg, & Strayer, 1990).

Edward Bradford Titchener used the concept of *Einfühlung* and brought it into the English language as the term *empathy* in 1909, borrowed from the Greek term *empatheia* which means in suffering or in passion. He did not believe someone could refer to their own past experiences to conclude that another person must feel a specific emotion (Eisenberg, & Strayer, 1990). For him, empathy meant feeling or imagining yourself into a situation. An example he gave was our tendency to shrink and feel nauseated when we are told of an accident that happened or how our mouth begins to water when we are told of a delicious fruit. He differentiated empathy and sympathy. The latter was an emotional state in social situations caused by an instinct to behave that way while the former meant a process of imagination using cognition and affection. While

Titcheners term *empathy* was used by almost everyone following 1909, his definition was not (Lux, & Weigel, 2017).

Psychoanalyst Sigmund Freud defined empathy as something that helps us understand what is foreign to our own ego when we deal with other people. He did not further develop his thoughts. Theodor Reik, who studied with Freud, argued that you empathize in four stages. In the first stage, the therapist observes the patient and gets emotionally influenced. In stage two he internalizes the emotions, whereby his unconscious responds to them in stage three. In stage four the therapist detaches from this subjective experience and mirrors his experience to the patient. Psychologist Robert Fliess outlines two phases of empathy. In the first phase, the therapist absorbs the emotions of the patient and uses his own past experiences to make sense of them. In phase two, he then detaches emotionally and transfers knowledge of how to deal with it back to the patient. The assumption of complete control and the ability of detaching yourself from emotions at will in Freudian empathy conceptions has been criticized (Verducci, 2000).

Physicist Christiaan Huygens observed in 1665, that two identical pendulum clocks will synchronize their motions after about thirty minutes when they are hanging on the same beam. This synchronized ticking stops after the clocks are separated again (Willms, Kitanov, & Langford, 2017). American neuropsychiatrist Richard M. Restak transfers this concept onto people and calls it *mutual entrainment* or *synchrony*. An example he gives are similar menstrual patterns of co-eds living closely together in a dormitory (Lichtenberg, Bornstein, & Silver, 2010). Related to the concept of empathy, he recites a scene in a home movie by infant researcher Louis Sander. A mother is holding her eight-day-old baby, which begins to cry. As she hands the babies hand to her husband while having a conversation with someone, he casually places it in his arms. After a few seconds it quiets down. In these seconds, infant and

father exchanges glances. For Restak this is an example of empathy occurring, where the baby synchronizes with the fathers' rhythm (Verducci. 2000).

Gestalt psychologist Wolfgang Köhler published his *book Intelligenzprüfungen an Menschenaffen (The Mentality of Apes)* in 1917 (Ruiz, & Sánches, 2014). In his studies with monkeys, Köhler pointed out the importance of communication and motor mimicry for perspective taking using the term "sympathetic" (Lux, & Weigel, 2017).

Heinz Kohut started to write mainly on empathy after the Second World War. He believed empathy to be the only possible way for a psychoanalytic therapist to really know his patient, in a purely subjective manner. He regarded objective reality to be unknowable. Merely using empathy in a proper way results in a therapeutic effect in life in general and in a clinical setting, he argued. For Kohut, empathy consists of affective and cognitive processes (Verducci, 2000). In his paper "Introspection, Empathy, and Psychoanalysis", written in 1959, he stated the importance of empathy as a tool for observation and obtaining information in therapy, as a way of feeling better by sharing feelings and as a defining factor of the field of depth psychology (Baxter, 1995). The cognitive part of empathy would be the gathering of information while the affective part is the creation of a strong emotional bond between people (Verducci, 2000).

Carl Rogers viewed empathy as an important part in creating a therapeutic atmosphere (Verducci, 2000). A successful outcome in therapy depends on having a relationship with the therapist that is based on empathy. For Rogers that meant the therapist had to act in a transparent and genuine manner, accept the patient without judgement and trying to perceive the world just as the client does. Empathic understanding relies on the therapist to feel the emotions and the situational meanings just as the patient does in the present moment (Baxter, 1995). If the therapists sensings are accurate are then determined via communicating with the client frequently. Laying aside your own values and views on a matter is critical during therapy in order to enter the patients' world, Rogers stated in 1975 (Verducci, 2000).

Different definitions of empathy

Since the concept was first brought up, many different definitions of empathy were thought of. This meant the outcome of studies concerning empathy could not be compared very well, treatment suggestions for enhancing empathy differed which lead to practical difficulties (Cuff, Brown, Taylor, & Howat, 2014).

Confusion arose mainly because two distinct questions were tried to be answered: How do you know what another person is thinking and feeling? Why does a person care for the pain experienced by another person (Batson, 2009)?

By answering those questions differently, you get eight different concepts of the term empathy. (1) Knowing what another person is feeling and thinking, often defined as *cognitive empathy* and closely related to the theory of mind, (2) mimicking the facial expression and posture, called *facial empathy*, (3) feeling the same or a similar emotion as someone else, often called *emotional contagion* or *affective empathy*, (4) projecting yourself into the situation of another, which is the original definition of empathy derived from the German "*Einfühlung*", (5) imagining or assuming how another person is thinking and feeling, called *projection* (6) imagining how you would feel if you were in the place of someone else, often referred to as *role* or *perspective taking* or *simulation*, (7) feeling anxious or distressed if you witness another person suffering, called *empathic distress*, and finally, (8) feeling for someone who suffers, called *sympathy* or *compassion*. Some of the concepts mentioned above might only be slightly different from each other, however, their distinctiveness matters (Batson, 2009).

Taking the perspective of someone else (7) is closely related to *cognitive empathy* (1). However, understanding what someone is thinking or feeling is also possible by reading facial cues, thinking of similar past events or *projecting* (4) your own emotional state onto someone else (Cuff, Brown, Taylor, & Howat, 2014).

Sympathy (8) differs from *affective empathy* (3) by not feeling the same or a very similar congruent emotion as someone else, sadness for instance, but feeling your own emotion, perhaps concern, for another human being. This difference also shows in different brain areas being activated (Decety, & Michalska, 2009).

The first question of how to know what someone else is thinking and feeling is mainly answered by (1), but can also be derived by (2), (3), (4), (5) and (6). If you, for instance, mimic the facial expression (2) of a person, it enables you to feel alike (Batson, 2009).

The second question of what makes another person respond with sensitivity and care, is answered by the latter two concepts: Either you are motivated to minimize your own distress (7) or you are genuinely compassionate and feel for the other person (8). Compassion requires an understanding of the thoughts and feelings (1), even if said understanding may be inaccurate (Batson, 2009).

For empathy to be shown the other person does not necessarily have to be present or show an emotion and can even be fictional. What matters is not the actual emotion within the target, but how it is perceived and understood by the observer (Cuff, Brown, Taylor, & Howat, 2014).

In order to differentiate empathy from related concepts, a self-other distinction becomes necessary. With empathy, you are aware that the emotion is not your own but instead comes from an external source. In the case of emotional contagion, you are not. You think the emotion that you feel is your own. Neuroscientific studies report that others pain and experiences are processed in the same brain areas that are active during the processing of our own pain and experiences, the degree of activation however depends on how well the self-other differentiation is made. Not being able to differentiate between yourself and the other person,

for instance, leads to greater activation. Some self-other merging seems to be necessary for people to be empathic (Cuff, Brown, Taylor, & Howat, 2014).

For the following paper and the questions of the emotion specific empathy questionnaire we chose to focus on *cognitive empathy* (1) and *affective empathy* (3). If the reported emotion matches the observed emotion, we use the term *congruent empathy*. For non-matching emotions we chose the term *incongruent empathy*.

Developing empathy: An evolutionary perspective

> „Evolutionary explanations are build around the principle that all that natural selection can work with are the effects of behavior – not the motivation behind it" (de Waal, 2008, p. 1).

In order to function effectively when interacting socially and cooperating it is necessary to be able to relate to the feelings of others fast and without too much thought. Empathy is thought to have evolved in the context of parental care, picking up on the infants' signals like crying or smiling and to then act accordingly, so the babies' needs are met. Since avian and mammalian parents show those behaviors just as human parents do, it is very likely that the ability to empathize has evolved long before our own species even existed. Since the ability to show empathy did not just disappear after their original purpose was fulfilled, it could be applied to all social contexts. One example in primates is healing injured macaques by licking and thus cleaning their wound (de Waal, 2008), another one would be showing consolation to alleviate distress in Tonkean macaques (Palagi, Dall'Olio, Demuru, & Stanyon, 2014).

De Waal (2008, p. 4) suggests that various levels of empathy can be differentiated. The lowest one is *emotional contagion*, when "one party is affected by another's emotional or arousal state". This can be seen when fear spreads among a flock of birds and they fly away as soon as one bird shows signs of being afraid and revolves around a non-altruistic, egocentric state of

arousal called personal distress. Emotional contagion also leads to behavioral copying, such as being in synch when eating, sleeping or playing which "is often a matter of life or death" (de Waal, 2008, p. 10).

Sympathetic Concern represents the next highest level of empathy. It occurs, when you are concerned about the state of someone else and you try to improve that state. *Sympathy* and *personal distress*, in other words your reason or motivation of why you seek to alleviate another one's pain, are differentiated here. An example for the latter in primates is found in infant rhesus monkeys. If one continually screams, its peers will hug or even pile on top of it to make it stop. An example for the former is consolation (de Waal, 2008). "After a conflict, victims can also receive a friendly, spontaneous contact from a bystander not involved in the aggression". This bystander must be a friend to the victim and the victims' anxiety must be reduced. Fulfilling these criteria, consolation has only been found in bonobos, chimpanzees and humans (Palagi, Dall'Olio, Demuru, & Stanyon, 2014, pp. 1-2), monkeys even "fail to comfort their own offspring after a fight" (de Waal, 2008, p. 7). Palagi, & Norscia (2013) collected data on bonobos for over 10 years. They concluded that consolation was indeed more likely to be shown when the victim had a closer bond with the bystander. Also, the victim showed lower scratching rates after the conflict, indicating lower anxiety rates. Sympathetic concern is basically cognitive empathy (Batson, 2009) and has been referred to as such by de Waal (Stanford, 1996). Do animals act on their sympathetic concern because it benefits themselves or their kin, so for an ultimate cause, or do they act on it because a situation triggers the behavior and the enabling mechanism, so for a proximate cause? This proximate cause would indicate altruism, so behavior that increases the recipients' fitness at the performers cost (de Waal, 2008, p. 2). De Waal (2008, p. 11) argues, that showing sympathetic concern out of sympathy for the other and acting on it, so in other words directed altruism, is found in apes. And that the literature supporting that claim is massive. Scenarios include sharing food (e.g. Morikawa, Kawai, &

Ehara, 1975), cooperating with each other (Kappeler, & Schaik, 2006) or supporting each other in dangerous situations (Dunbar, Harcourt, & de Waal, 1993).

The last and highest level of empathy animals are capable of showing is labeled *empathic perspective-taking*, defined as the "capacity to take another's perspective – e.g., understanding another's specific situation and needs separate from one's own- combined with vicarious emotional arousal" (de Waal, 2008, p. 7). The ability to imagine perceiving the world as if you were in someone elses shoes and responding to it affectively has only been found in apes (Hirata, 2006; Shillito, Shumaker, Gallup, & Beck, 2005) showing targeted helping. Targeted helping is defined as "help and care based on a cognitive appreciation of the other's specific need or situation" (de Waal, 2008, p. 7). An example of this form of empathy has been reported for wild chimpanzees. A group of chimpanzees was moving to another place, with them an injured mother carrying her infant. She frequently had to stop and put the baby down on the ground, yet she did not show any signs of distress. Over two days, an unrelated male chimpanzee who noticed her vulnerable state carried the child for her. For this to happen, he had to recognize the goal of the struggling mother (Pérez-Manrique, & Gomila, 2017). This requires a self-other distinction and the monkey to project himself in the mothers' shoes. One commonly practiced way to test for the ability of a self-other distinction in animals is Mirror self-recognition. They are required to recognize themselves in a mirror (Preston, & de Waal, 2001). Only humans, apes, elephants (Plotnik, Waal, & Reiss, 2006) and dolphins passed this test so far. The current literature suggests that mirror self-representation is associated with the ability to show higher levels of empathy. However, perspective-taking was also found in animals that did not pass this test (de Waal, 2008). Examples of altruism that are based on emotional perspective-taking is limited to anecdotes. De Waal (2008, p. 12) provides multiple examples, one illustration for great apes:

> "The two-meter-deep moat in front of the old bonobo enclosure at the San Diego Zoo had been drained for cleaning. After having scrubbed the moat and released the apes, the keepers went to turn on the valve to refill it with water when all of a sudden the old male, Kakowet, came to their window, screaming and frantically waving his arms so as to catch their attention. After so many years, he was familiar with the cleaning routine. As it turned out, several young bonobos had entered the dry moat but were unable to get out. The keepers provided a ladder. All bonobos got out except for the smallest one, who was pulled up by Kakowet himself".

There are two underlying mechanisms of empathy proposed by de Waal (2008, pp. 8-9). The first mechanism is the *perception action mechanism* (PAM). It assumes that the observer gains access to the subjective state of another in two ways. Firstly, via the automatically activated neural mechanism of mirror neurons (e.g. Pellegrino et al., 1992) and secondly, via social similarity. The more similar both are, the easier the identification with the other. Also, a following this perception, exhibiting a motor response – an action - gets more likely. The second mechanism is called the *Russian doll model*. It is called that way because empathy seems to be a layered phenomenon. Emotional contagion provided by the perception action model is at the Russian dolls core, followed by the next more complex layer of sympathetic concern and ending with the most complex form of perspective taking as the outer layer. This model applies to imitation and empathy, since "highly empathic persons are indeed more inclined to unconscious mimicry" (de Waal, 2008, p. 9). Imitation – like empathy – is spontaneously shown and a widely spread behavior among apes (Anderson, Myowa-Yamakoshi, & Matsuzawa, 2004; Addressi, & Visalberghi, 2001; Nakayama, 2004).

> "[The] Russian doll (…) is relevant to the origin of empathy: All prosocial behavior, even when dependent on prefrontal functioning, probably has PAM-based emotion sharing at its core (…). Humans have so little control over empathic activation that they

> regularly shield themselves from it (…). Generally, the empathic response is amplified by similarity, familiarity, social closeness, and positive experience with the other (…). These effects of previous experience have recently been confirmed (…): Seeing the pain of a cooperative confederate [in human studies] activates pain related brain areas, but seeing the pain of an unfair confederate [, where the relationship is perceived as competitive,] activates reward-related brain areas (…). Thus, the empathy mechanism is biased the way evolutionary theory would predict (…). A common way in which mutually beneficial exchanges are achieved is through investment in long-term bonds to which both parties contribute (…). If [this reciprocity or] altruism is produced by mechanisms, such as empathy and bonding (…), one may well ask if helping another does not boil down to helping oneself. It does, but (…) this is no reason to call empathy-based altruism selfish (…) since the mechanism delivers intrinsic rewards exclusively via the other (…). At the same time, it is futile to try to extract the self from the process. There simply is no satisfactory answer to the question of how altruistic is altruism (…). This is (…) the beauty of the empathy-altruism connection: The mechanism works so well because it gives individuals an emotional stake in the welfare of others. "(de Waal, 2008, p. 13).

Neurophysiology of empathy

In 1992, Giacomo Rizzolatti and his colleagues reported their findings on *mirror neurons* in macaque monkeys. Those neurons located in the rostral part of the inferior premotor cortex (area F5) are firing when the monkey performs an action, but also when it observes a meaningful action done by a researcher like placing food on a table or retrieving food from another researchers hand (Pellegrino, Fadiga, Fogassi, Gallese, & Rizzolatti, 1992). Since their discovery, their original paper has been cited over 3500 times and over 800 papers on mirror neurons have been published. New research suggests that mirror neurons show a preference to

fire when an action indicates a reward for the monkey, that the action does not need to be directly observed for the neurons to fire, when a monkey observed a performed action through a screen for example, and that mirror neurons exist in other areas of the brain like the ventral and dorsal premotor cortex and the primary motor cortex for instance (Kilner, & Lemon, 2013).

A paper by Rizzolatti and Craighero (2005, p. 2) links mirror neurons to empathy, stating that their mechanism "enables the observer to understand the action of others, the intention behind their actions, and their feelings". In humans, EEG, MEG, TMS and fMRI studies support the existence of mirror neurons. The motor system of the observer however is only excited when the observed action exists within the motor repertoire of the observer. Rizzolatti and Craighero (2005, p. 9) also report of the existence of so called "logically related" mirror neurons as a way of interpreting the intention behind an action, they "discriminate one motor act from another, thus activating a motor act chain that codes the final goal of the action. In this way the observing individual may re-enact internally the observed action and thus *predict* the goal of the observed action. In this way, the observer can "read" the intention of the acting individual". But is there a similar mechanism in place for cognitive and affective empathy, for understanding the emotions of others without feeling them and for feeling the same emotion as an observed individual? According to Rizzolatti and Craighero (2005, p. 13), the

> "data strongly suggest that humans understand disgust, and most likely other emotions (See Carr et al. 2003, Singer et al., 2004), through a direct mapping mechanism. The observation of emotionally laden actions activates those structures that give a first-person experience of the same actions. By means of this activation, a bridge is created between others and us".

The conclusion, that we activate the same emotions that we observe in others in brain structures such as the insula and the amygdala, has been supported by a great variety of studies (e.g., Carr et al. 2003, Goldman and Sripada 2003, Damasio 2003). Damasio (2003) hypothesizes, that an

"as-if-loop" in the insula as the most important brain structure is at the core of empathy from a neurological perspective.

Stability of Empathy

Over a 12-year period from 1992 to 2004, 236 participants in different age and income groups were selected to examine empathy across the adult llifespan. Among other factors, the stability of empathy was a point of interest. The result suggested that neither an age-related increase nor an age-related decrease has been observed and that over all those years, empathy remained stable (Grühn, Rebucal, Diehl, Lumley, & Labouvie-Vief, 2008).

Because it has been hypothesized that empathy among undergraduate medical students declines, a study measured the change of empathy over a period of four years using questionnaires measuring cognitive and affective empathy. Their results indicated no change in cognitive empathy and only a slight statistically significant decrease in affective empathy among men. However, in their conclusion they question the practical significance since the size of the change was so small (Quince, Parker, Wood, & Benson, 2011).

An older study followed two hundred and five high school students over a three-year period using the same measurement as the study mentioned above, the interpersonal reactivity index (IRI). They report considerable stability of all four empathy scales with a slight increase of perspective taking and empathic concern and a slight decrease for personal distress (Davis, & Franzoi, 1991).

The IRI was also used when examining 72 samples of college students in America in the timespan of 1979 to 2009 with a total of 13,737 participants. The subscales empathic concern and perspective taking were decreasing while the subscales fantasy and personal distress were not changing over time (Konrath, Obrien, & Hsing, 2010).

A meta-analysis of 152 longitudinal studies that looked at the consistency of personality traits from childhood to old age using 3,217 test-retest correlation coefficients reported in increase in trait consistency. From .31 in childhood up to .74 for ages 50 to 70 (Roberts, & Delvecchio, 2000). This suggests that personality traits are not as stable as previously assumed.

Another meta-analysis of 207 studies that looked at personality trait change through intervention found an effect size of d = .37 over an average time of 24 weeks. The personality domain that was most affected by the intervention turned out to be emotional stability (Roberts, Luo, Briley, Chow, Su, & Hill, 2017). However, there are results that suggest that there is no correlation between emotional stability and empathy (Barrio, Aluja, & Garcia, 2004).

Emotion specific empathy

We are interested in an emotion specific approach to empathy, using the six basic emotions fear, anger, disgust, happiness, surprise and sadness as postulated by Ekman (Ekman, 1992). Additionally, we put in pride, contentment and relief to balance for positive emotions. Research thus far mainly focused on sadness as a relevant emotion for empathy with the subscale *personal distress* of the *Interpersonal Reactivity Index* (IRI) (Corte, et al., 2007), a very common way to measure empathy for psychologists. However, with the Perception Action Model (PAM) of empathy, there is a theoretical foundation which supports the argument, that empathy should be regarded as emotion specific (e.g. Preston & de Waal, 2002; Leslie, Johnson-Frey, & Grafton, 2004; Harris, 2007). When an observer perceives the emotional state of another, similar emotional states are activated via neurological mechanisms, which implicitly assumes emotion specificity of empathy. When you have a proclivity to be happy while rarely being sad and you observe someone who feels happy, this observation will theoretically lead to you experiencing greater happiness through the activation of related neural areas. If such an individual observes someone experiencing sadness, he most likely will not feel as sad since it is not an emotion that he usually experiences himself (Olderbak, Sassenrath, Keller, &

Willhelm, 2014). Also, since the appraisal and the processing of information differs with each emotion, concepts that are related to empathy such as facial mimicry could benefit from this approach by being understood better (Frijda, 1986). Further, the finding of mirror neurons supports the PAM. Since the ability to emphasize depends largely on our own capacity to experience emotions (Rizzolatti, & Craighero, 2005; See: History of empathy as a concept in psychology) it is worth taking a look at possible variations in this capacity. Larson, Moneta, Richards, & Wilson (2002) examined the change in adolescents' daily emotional range between early and late adolescence. Their results show that emotional states on average became less positive until grade 10, then they became more stable in late adolescence. How stable are the six basic emotions plus pride, contentment and relief?

Stability of Emotion Specific Empathies

Hakulinen et al. (2013) followed 3,073 individuals over 15 years. They report moderate stability of rank-order for anger. However, Weisberg, Deyoung, & Hirsh (2011) report higher average scores for men in the neuroticism subscale that measures anger, relative to women.

An individual's genetically based tendency to experience disgust has been labeled disgust sensitivity (Petrowski, et al., 2010). This construct can be measured with the Disgust Scale (DS) where three out of eight factors including Core Disgust, Animal Reminder Disgust and Contamination Disgust have been found to be psychometrically stable (Haidt, Mccauley, & Rozin, 1994). In the shorter revised version (DS-R), reliabilities of .71 to .82 measured with Cronbach's Alpha (Olatunji, et al., 2007) have been found. Two other measurements of disgust report relatively high test-retest reliability. With r=.64, the participants of the study concerning The Three Domains Of Disgust Scale (TDDS) did not significantly differ at both time points (Olatunji, et al., 2012).Shams, Foroughi, Moretz, & Olatunji (2013) report a test-retest reliability of .85 for the Persian Disgust Scale-Revised (PDS-R).These results suggest that your

proclivity to experience disgust remains stable and thus the likelihood of empathizing with someone who is experiencing disgust should remain stable, as well.

Replicating previous findings, Weisberg, Deyoung, & Hirsh (2011) report higher scores for neuroticism in women than in men, especially when it comes to anxiety. The test-retest reliability for neuroticism with r=.87 is high (McCrae, Kurtz, Yamagata, & Terracciano, 2010).

Extraversion strongly influences your proclivity of experiencing positive emotions such as happiness and is connected to how sensitive you react to being rewarded. There is a small gender differences, respectively that women score a bit higher on the overall scale than men. The test-retest reliability with around .88 is high (Weisberg, Deyoung, & Hirsh, 2011).

There has not been a lot of research of the self-conscious emotion pride. When a person fails or succeeds in an area that is important to his or her self-representation, it elicits the response of a self-conscious emotion. Which emotion a person responds with is determined by the cognitive appraisal of a situation. Pride has been associated with "greater perseverance approach motivation, and performance in achievement contexts" (Robins & Schriber, 2009, pp. 1-2), though. While it is recognized by various cultures on a non-verbal level, it is often argued that it consists of more than one separate emotion (Tracy & Robins, 2007). Tracy & Robins (2007) argue for two variants of pride. If you feel proud of your actions, they label it authentic pride. If you are proud simple because you think you are always amazing, they label it hubristic pride, which is stable and internal. In their results section of their study, they report that the existence of two factors of pride is more likely than just the one factor. What seems to activate both versions of pride is how a situation is appraised by an individual, not the event itself. Those two versions of pride are compared to the distinctiveness of the other two negative self-conscious emotions shame and guilt, which are also distinguishable (Tracy, Robins, & Tangney, 2008, p. 267).

Rojas & Veenhoven (2011) define contentment as an evaluation of life how it is right now compared with how you want your life to be. The closer you are right now to your ideal life, the more content you are. This evaluation is seen as a more cognitive definition of happiness.

According to Lazarus (1994, p. 281), if relief is treated as an emotion it is a unique emotion, the simplest even. It only occurs, "if goal incongruence has been eliminated or relieved so that emotion distress will subside". Goal relevance and the elimination of goal incongruence are the only appraisal processes. Lazarus compares relief to sadness, since an action tendency is lacking in both and instead of increasing arousal like the other emotions, they both decrease it. There is, again, not much research about relief as an emotion or about its stability.

States of pleasure and displeasure are grounded in the activation of certain brain areas and they are universal to all humans. However, when suffering from certain conditions like depression, schizophrenia, social anxiety and generalized anxiety disorder, panic disorder or post-traumatic stress disorder the ability to experience positive emotions is impaired and experiencing negative emotions becomes more likely (Barrett, Mesquita, Ochsner, & Gross, 2007). Emotion specific empathy also depends on our ability to put our emotional experiences into words. This ability can be impaired in conditions like alexithymia (Lane, Ahern, Schwartz, & Kaszniak, 1997).

Most of the results mentioned above suggest empathy as well as almost all emotional experiences themselves largely remain stable across time.

In the current study we would like to examine if emotion specific empathy will also remain stable across time, like your proclivity to experience emotions does. We do this by administering emotion specific empathy with the emotion specific empathy questionnaire developed by Olderbak, Sassenrath, Keller, & Wilhelm (2014) at two time points three weeks apart from each other. Given the results stated above, we expect the following:

We hypothesize that trait-level empathy will remain stable across time (**Hypothesis 1**).

We hypothesize that *sad cognitive empathy* (subscale S_C) will stay stable across the different times of measurement (**Hypothesis 2**) as well as that *sad affective empathy* (subscale S_A) will remain stable as well (**Hypothesis 3**).

Anger cognitive empathy (subscale A_C) will stay stable across the different times of measurement **(Hypothesis 4**). *Anger affective empathy* (subscale A_A) will stay stable across the different times of measurement (**Hypothesis 5**). Because of the results stated above, we expect the following: *Anger cognitive empathy* (subscale A_C) for men will not significantly differ from *Anger cognitive empathy* (subscale A_C) for women **(Hypothesis 6)**. *Anger affective empathy* (subscale A_A) for men will not significantly differ from *Anger affective empathy* (subscale A_A) for women **(Hypothesis 7)**.

Disgust cognitive empathy (subscale D_C) will stay stable across the different times of measurement **(Hypothesis 8)**. *Disgust affective empathy* (subscale D_A) will stay stable across the different times of measurement **(Hypothesis 9)**.

Fear cognitive empathy (subscale F_C) will stay stable across the different times of measurement **(Hypothesis 10)**. *Fear affective empathy* (subscale F_A) will stay stable across the different times of measurement **(Hypothesis 11)**. *Fear cognitive empathy* (subscale F_C) for women will be significantly higher than *fear cognitive empathy* (subscale F_C) for men. This difference will also significantly differ from the mean gender difference of *cognitive empathy*, measured by taking all the other emotions into account except fear **(Hypothesis 12)**. *Fear affective empathy* (subscale F_A) for women will be significantly higher than *fear affective empathy* (subscale F_A) for men. This difference will also significantly differ from the mean gender difference of *affective empathy*, measured by taking all the other emotions into account except fear **(Hypothesis 13)**.

Happiness cognitive empathy (subscale H_C) will stay stable across the different times of measurement **(Hypothesis 14)**. *Happiness affective empathy* (subscale H_A) will stay stable across the different times of measurement **(Hypothesis 15)**.

Since there have not been any studies examining the stability of pride with a questionnaire by looking at the test-retest reliability, and since pride does seem to be a mixture of emotions that has one stable component with hubristic pride and one unstable component with authentic pride, since you are not always proud of the actions you take, we expect that:

Pride cognitive empathy (subscale P_C), measured at time 1, will be significantly different from *Pride cognitive empathy* (subscale P_C), measured at time 2 **(Hypothesis 16)**. *Pride affective empathy* (subscale P_A), measured at time 1, will be significantly different from *Pride affective empathy* (subscale P_A), measured at time 2 **(Hypothesis 17)**.

Contentment cognitive empathy (subscale C_C) will stay stable across the different times of measurement **(Hypothesis 18)**. *Contentment affective empathy* (subscale C_A) will stay stable across the different times of measurement **(Hypothesis 19)**.

According to Lazarus (1994, p. 281), if relief is treated as an emotion it is a unique emotion, the simplest even. It only occurs, "if goal incongruence has been eliminated or relieved so that emotion distress will subside". Goal relevance and the elimination of goal incongruence are the only appraisal processes. Lazarus compares relief to sadness, since an action tendency is lacking in both and instead of increasing arousal like the other emotions, they both decrease it. There is, again, not much research about relief as an emotion or about its stability. We could make a guess and argue either for or against stability, but since research is utterly lacking, we will not specify any predictions about relief. The same goes for surprise.

Furthermore, we expect the structural equation model that you can see in *Figure 1* to stay the same at time 1 and time 2 **(Hypothesis 20)**.

Methods

Sample

Our participants were recruited via convenient sample, the distribution of flyers in Ulm or through the online website eBay-Kleinanzeigen. The study got approved by the ethics commission with the Antragnummer 81/19. For participating, and for filling out all of the required parts, they were given a maximum of 90€. A total of 154 participants completed the first questionnaire package. After removing every subject that failed the build in questions that checked the participants attention, 132 people remained. Of those, 14 did not fill out any of the ESE items and one participant was not in the age range from 18 to 35, leaving 117 remaining participants. 121 people completed the follow-up questionnaire three weeks later. From those, 118 remained after removing duplicates.

Demographics have only been administered for the first questionnaire. The average age of the 117 participants of this study was 24.96 years (SD = 3.42). 59 % (69) of the subjects were female, 97,4 % were German (114) and 95,7 % (112) were white. Only 14,5 % (17) graduated from Mittelschule or Realschule, the overwhelming majority had an Abitur (43) or a bachelors degree (50). 67,6 % (79) are currently employed either part-time or fulltime. Anonymity was provided via generating a unique 5-digit code.

Materials and procedure

Table 2

German version of the 90 item ESE with revised item numbers. Based on (Olderbak, Sassenrath, Keller, & Willhelm, 2014, distributed under CC BY 3.0, https://creativecommons.org/licenses/by/3.0/)

Anger Affective Empathy

Subscale	Number	Item	Neg. Coding	r (T1/T2)
AA1	16	Ich werde auch leicht ärgerlich, wenn andere Leute sich über etwas ärgern.		0.374
AA2	68	Ich werde ärgerlich, wenn ich sehe, dass jemand anderem etwas passiert das ihn/sie ärgert.		0.300

AA3	62	Wenn ich bemerke, dass eine andere Person sich über etwas ärgert, kann ich mich leicht mitärgern.		0.443
AA4	79	Wenn mir ein Freund/eine Freundin von etwas erzählt, das ihn bzw. sie ärgert, ärgere ich mich auch leicht.		0.449
AA5	34	Ich werde leicht ärgerlich, wenn Andere sich ärgern.		0.398

Anger Cognitive Empathy

Subscale	Number	Item	Neg. Coding	r (T1/T2)
AC1	60	Es fällt mir schwer, vorauszusehen, welche Situationen andere Personen ärgern.	Yes	0.414
AC2	66	Ich kann es leicht nachvollziehen, wenn meine Freunde sich ärgern.		0.340
AC3	2	Wenn jemand mir von etwas erzählt, das ihn bzw. sie ärgert, kann ich leicht verstehen, warum es ihn/sie ärgert.		0.406
AC4	56	Es fällt mir schwer, zu verstehen, was meine Freunde ärgert.	Yes	0.392
AC5	33	Ich kann es leicht nachvollziehen, warum Andere ärgerlich werden, wenn ihnen etwas Unangenehmes passiert.		0.499

Sadness Affective Empathy

Subscale	Number	Item	Neg. Coding	r (T1/T2)
SA1	61	Ich lasse mich nicht so leicht von der Trauer anderer Leute anstecken.	Yes	0.362
SA2	55	Ich fühle mich leicht traurig, wenn andere traurig sind.		0.384
SA3	63	Wenn mir ein Freund/eine Freundin von etwas erzählt, das ihn bzw. sie traurig macht, werde ich auch leicht traurig.		0.460
SA4	73	Wenn ich sehe, dass ein Freund traurig ist, bin ich auch schnell traurig.		0.645
SA5	21	Ich werde traurig, wenn ich sehe, dass einer fremden Person etwas passiert, was ihn/sie traurig macht.		0.555

Sadness Cognitive Empathy

Subscale	Number	Item	Neg. Coding	r (T1/T2)
SC1	78	Ich kann es leicht nachvollziehen, wenn meine Freunde traurig sind.		0.459
SC2	29	Ich kann es sehr gut verstehen, warum andere traurig sind, wenn ihnen etwas Trauriges passiert.		0.582
SC3	36	Es fällt mir schwer, vorauszusehen, welche Situationen Andere traurig machen.	Yes	0.538
SC4	58	Es fällt mir schwer, zu verstehen, was meine Freunde traurig macht.	Yes	0.690
SC5	49	Wenn jemand mir von etwas erzählt, das ihn bzw. sie traurig macht, kann ich leicht verstehen, warum es ihn/sie traurig macht.		0.300

Fear Affective Empathy

Subscale	Number	Item	Neg. Coding	r (T1/T2)
FA1	10	Ich ängstige mich leicht, wenn ich sehe, dass anderen etwas passiert was sie ängstigt.		0.418
FA2	69	Ich lasse mich nicht so leicht von der Angst anderer Leute anstecken.	Yes	0.209
FA3	40	Ich ängstige mich auch leicht, wenn andere um mich herum Angst haben.		0.545
FA4	38	Wenn mir ein Freund/eine Freundin von etwas erzählt, das ihn bzw. sie ängstigt macht, ängstige ich mich auch leicht.		0.398
FA5	15	Wenn ich sehe, dass ein Freund von mir, sich wegen etwas ängstigt, kann ich mich auch leicht ängstigen.		0.060

Fear Cognitive Empathy

Subscale	Number	Item	Neg. Coding	r (T1/T2)
FC1	5	Ich kann es sehr gut nachvollziehen, warum andere Angst bekommen, wenn ihnen etwas Ängstigendes geschieht.		0.259
FC2	6	Ich kann es leicht nachvollziehen, wenn meine Freunde sich ängstigen.		0.210
FC3	30	Es fällt mir schwer, vorauszusehen, welche Situationen Andere ängstigen.	Yes	0.477
FC4	65	Es fällt mir schwer zu verstehen, was meine Freunde ängstigt.	Yes	0.243
FC5	67	Wenn jemand mir von etwas erzählt, das ihn bzw. sie ängstigt, kann ich leicht verstehen, warum es ihn/sie ängstigt.		0.455

Disgust Affective Empathy

Subscale	Number	Item	Neg. Coding	r (T1/T2)
DA1	14	Wenn andere Personen mir von etwas erzählen, was sie ekelt, kann ich das leicht nachempfinden.		0.493
DA2	22	Wenn ich bemerke, dass andere Personen sich vor bestimmten Dingen ekeln, ekele ich mich auch leicht.		0.504
DA3	23	Ich ekele mich, wenn ich bemerke, dass jemand anderem etwas passiert, dass ihn/sie ekelt.		0.278
DA4	50	Ich lasse mich nicht so leicht vom Ekel anderer Leute anstecken.	Yes	0.460
DA5	43	Ich ekele mich leicht, wenn Andere sich ekeln.		0.443

Disgust Cognitive Empathy

Subscale	Number	Item	Neg. Coding	r (T1/T2)
DC1	84	Es fällt mir schwer, zu verstehen, was meine Freunde ekelt.	Yes	0.280
DC2	81	Wenn jemand mir von etwas erzählt, das ihn bzw. sie ekelt, kann ich leicht verstehen, warum es ihn/sie ekelt.		0.620
DC3	48	Ich kann es leicht nachvollziehen, wenn meine Freunde sich ekeln.		0.399
DC4	4	Es fällt mir leicht zu verstehen, warum Andere sich ekeln, wenn ihnen etwas Ekelerregendes passiert.		0.359
DC5	75	Es fällt mir schwer vorauszusehen, welche Situationen Andere ekeln.	Yes	0.464

Surprise Affective Empathy

Subscale	Number	Item	Neg. Coding	r (T1/T2)
ÜA1	76	Wenn ich sehe, dass sich jemand erschreckt, kann es ein, dass ich mich mit erschrecke.		0.392
ÜA2	59	Ich lasse mich nicht so leicht von der Überraschung anderer Leute anstecken.	Yes	0.407
ÜA3	47			0.507
ÜA4	25	Wenn mir ein Freund/eine Freundin von etwas erzählt, das ihn bzw. sie überrascht, kann ich leicht die Überraschung mitfühlen.		0.609
ÜA5	64	Ich bin auch überrascht, wenn ich sehe, dass einer fremden Person etwas passiert, was ihn/sie überrascht.		0.623

Surprise Cognitive Empathy

Subscale	Number	Item	Neg. Coding	r (T1/T2)
ÜC1	37	Ich kann es sehr gut verstehen, warum andere überrascht sind, wenn ihnen etwas Unerwartetes passiert.		0.655

ÜC2	71	Es fällt mir schwer, vorauszusehen, welche Situationen andere überraschen.	Yes	0.500
ÜC3	13	Wenn jemand mir von etwas erzählt, das ihn bzw. sie überrascht, kann ich leicht verstehen, warum es ihn/sie überrascht.		0.446
ÜC4	51	Es fällt mir schwer, zu verstehen, was meine Freunde überrascht.	Yes	0.373
ÜC5	85	Ich kann es leicht nachvollziehen, wenn meine Freunde überrascht sind.		0.423

Happiness Affective Empathy

Subscale	Number	Item	Neg. Coding	r (T1/T2)
HA1	11	Wenn ich sehe, dass ein Freund von mir sich über etwas freut, freue ich mich auch.		0.394
HA2	53	Ich kann mich sehr leicht mit anderen mitfreuen.		0.462
HA3	18	Wenn mir ein Freund/eine Freundin von etwas erzählt, das ihn bzw. sie freut, kann ich mich leicht mitfreuen.		0.646
HA4	87	Ich lasse mich nicht so leicht von der Freude anderer Leute anstecken.	Yes	0.361
HA5	31	Ich freue mich, wenn einer fremden Person etwas passiert, was ihn/sie freut.		0.344

Happiness Cognitive Empathy

Subscale	Number	Item	Neg. Coding	r (T1/T2)
HC1	45	Ich kann es sehr gut verstehen, warum andere sich freuen, wenn ihnen etwas Angenehmes passiert.		0.250
HC2	89	Ich kann es leicht nachvollziehen, wenn meine Freunde sich freuen.		0.241
HC3	26	Es fällt mir schwer, zu verstehen, was Andere freut.	Yes	0.452
HC4	74	Es fällt mir schwer, vorauszusehen, welche Situationen Andere erfreuen.	Yes	0.443
HC5	54	Wenn jemand mir von etwas erzählt, das ihn bzw. sie freut, kann ich leicht verstehen, warum es ihn/sie freut.		0.475

Relief Affective Empathy

Subscale	Number	Item	Neg. Coding	r (T1/T2)
RA1	7	Nur weil andere erleichtert sind bedeutet das nicht, dass ich mich auch erleichtert fühle.	Yes	0.584
RA2	1	Ich fühle mich erleichtert, wenn ich sehe, dass einer fremden Person etwas passiert, das sie erleichtert.		0.496
RA3	32	Wenn ich beobachte, dass ein Freund erleichtert über etwas ist, fühle ich mich auch oft erleichtert.		0.560
RA4	28	Wenn ein/e Freund/in mit von einem Geschehnis in seinem/ihrem Leben erzählt, in dem er/sie erleichtert war, fällt es mir leicht mich auch erleichtert zu fühlen.		0.466
RA5	9	Ich fühle mich oft erleichtert, wenn die Leute um mich herum erleichtert sind.		0.534

Relief Cognitive Empathy

Subscale	Number	Item	Neg. Coding	r (T1/T2)
RC1	24	Es fällt mir schwer vorherzusagen, welche Situationen andere Personen erleichtern.	Yes	0.459
RC2	46	Es fällt mir leicht an Situationen zu denken, die meine Freunde erleichtern.		0.576
RC3	82	Wenn mir jemand von einem Geschehnis erzählt, auf das er erleichtert reagierte, fällt es mir leicht zu verstehen, warum das Geschehnis ihn erleichterte.		0.488
RC4	17	Es fällt mir schwer zu verstehen, was meine Freunde erleichtert.	Yes	0.336

RC5	39	Es fällt mir leicht zu verstehen, warum andere erleichtert reagieren, wenn ihnen etwas Gutes widerfährt.		0.289

Pride Affective Empathy

Subscale	Number	Item	Neg. Coding	r (T1/T2)
PA1	12	Nur weil andere stolz sind bedeutet das nicht, dass ich mich auch stolz fühle.	Yes	0.660
PA2	8	Ich fühle mich stolz, wenn ich sehe, dass einer fremden Person etwas passiert, das sie stolz macht.		0.344
PA3	72	Wenn ich beobachte, dass ein Freund stolz auf etwas ist, fühle ich mich auch oft stolz.		0.614
PA4	52	Wenn ein/e Freund/in mit von einem Geschehnis in seinem/ihrem Leben erzählt, in dem er/sie stolz war, fällt es mir leicht mich auch stolz zu fühlen.		0.555
PA5	57	Es fällt mir leicht, mich stolz zu fühlen, wenn sich die Menschen um mich herum stolz fühlen.		0.416

Pride Cognitive Empathy

Subscale	Number	Item	Neg. Coding	r (T1/T2)
PC1	83	Es fällt mir schwer vorherzusagen, welche Situationen andere Personen stolz machen.	Yes	0.293
PC2	70	Es fällt mir leicht an Situationen zu denken, die meine Freunde stolz machen.		0.581
PC3	41	Wenn mir jemand von einem Geschehnis erzählt, in dem er/sie stolz war, fällt es mir leicht zu verstehen, warum das Geschehnis ihn/sie stolz gemacht hat.		0.631
PC4	90	Es fällt mir schwer zu verstehen, was meine Freunde stolz macht.	Yes	0.490
PC5	19	Es fällt mir leicht zu verstehen warum andere mit Stolz reagieren, wenn ihnen etwas Ermutigendes widerfährt.		0.508

Contentment Affective Empathy

Subscale	Number	Item	Neg. Coding	r (T1/T2)
CA1	35	Nur weil andere zufrieden sind bedeutet das nicht, dass ich mich auch zufrieden fühle.	Yes	0.420
CA2	3	Ich fühle mich zufrieden, wenn ich sehe, dass einer fremden Person etwas passiert, das sie zufrieden macht.		0.498
CA3	44	Wenn ich beobachte, dass ein Freund zufrieden über etwas ist, fühle ich mich auch oft zufrieden.		0.498
CA4	27	Wenn ein/e Freund/in mit von einem Geschehnis in seinem/ihrem Leben erzählt, das ihn/sie zufrieden machte, fällt es mir leicht, mich auch zufrieden zu fühlen.		0.430
CA5	88	Es fällt mir leicht zufrieden zu sein, wenn die Menschen um mich herum zufrieden sind.		0.351

Contentment Cognitive Empathy

Subscale	Number	Item	Neg. Coding	r (T1/T2)
CC1	80	Es fällt mir schwer vorherzusagen, welche Situationen andere Personen zufrieden machen.	Yes	0.528
CC2	42	Es fällt mir leicht an Situationen zu denken, die meine Freunde zufrieden machen.		0.137
CC3	20	Wenn mir jemand von einem Geschehnis erzählt, das ihn zufrieden machte, fällt es mir leicht zu verstehen, warum das Geschehnis ihn zufrieden gemacht hat.		0.376
CC4	77	Es fällt mir schwer zu verstehen, was meine Freunde zufrieden macht.	Yes	0.389
CC5	86	Es fällt mir leicht zu verstehen, warum andere zufrieden sind, wenn ihnen etwas Angenehmes widerfährt.		0.481

Note. AA = Anger Affective, AC = Anger Cognitive, SA = Sadness Affective, SC = Sadness Cognitive, FA = Fear Affective, FC = Fear Cognitive, DA = Disgust Affective, DC = Disgust Cognitive, ÜA = Surprise Affective (Ü is an abbreviation for

Überraschung, German for surprise), ÜC = Surprise Cognitive, HA = Happiness Affective, HC = Happiness Cognitive, RA = Relief Affective, RC = Relief Cognitive, PA = Pride Affective, PC = Pride Cognitive, CA = Contentment Affective, CC = Contentment Cognitive; Number = Revised ESE item numbers that have been used in a periodic order in this study, do not match the original English item numbers; Neg. Coding = Negative Coding means, that the item is reverse coded. If a participant strongly agrees with a reverse coded statement he actually strongly disagrees; r (T1/T2) = Correlation between time point 1 and time point 2.

The subjects had to fill out the German version of the Emotion Specific Empathy questionnaire (see **Table 2**) as well as various other measures which are not relevant for this paper in the first questionnaire package. The other measures included emotion perception and emotion selection tasks, questionnaires regarding the quality of their work as well as the quality of their friendships and their relationships, their emotion knowledge, loneliness and the Beck Depression Inventory (BDI). This took them approximately 90-180 minutes. For two following weeks, participants received questions regarding their empathy and current affective state which were relevant to another paper. After three weeks, they once more completed the German version of the Emotion Specific Empathy questionnaire, this time without the other measures. This took them 10-15 minutes. After completion, all participants received information about the purpose of this study and their payment. The money was transferred via transaction. Alternatively, it could be picked up in Ulm University. Most participants chose the former option.

Emotion Specific Empathy Questionnaire (ESE)

The former version of the ESE had a total of 60 items. The updated English version now consists of 90 items, 10 items for each emotion and 5 items for each subscale (for the whole English version of the ESE see **Table 1**). The original version included the six basic emotions anger, sadness, fear, surprise, happiness and disgust. The newer version added in the emotions pride, relief and contentment, with a total of nine different emotions. This was done to balance out the positive emotions with the negative emotions. Each emotion is separated into affective and

cognitive empathy. There are statements concerning Anger Affective Empathy and Anger Cognitive Empathy or Pride Affective Empathy and Pride Cognitive Empathy, for instance. **Table 2** shows an overview of all the 18 subscales including all the related items used in the study. It uses a seven-level bipolar Likert scale, ranging from (-3) strongly disagree to (3) strongly agree. The translated German version of the 90 item ESE begins with the following introduction: “Die folgenden Aussagen erfragen Ihre Gedanken und Gefühle in verschiedenen Situationen. Bitte geben Sie bei jeder Aussage an, wie sehr Sie mit den folgenden Aussagen übereinstimmen. Zu diesem Zweck steht Ihnen eine Skala von "stimme gar nicht zu" (-3) bis "stimme vollkommen zu"(3) zu Verfügung. Bitte kreuzen Sie für Ihre Angabe die entsprechende Zahl an.“ The questions then appeared in a randomly generated order, to avoid boredom and stop the participants from answering and learning a pattern. All the translated items kept the same phrasing for each emotion to ensure consistency (see **Table 2**, item SA2, DA5 and FA3 for example.). One of the only differences between the English and the German version is the first item of the Anger Affective Empathy subscale, AA1. The reverse coded item in the original version states “I am not easily infected by the anger of other people.”, while the German item, which is not reverse coded, has been translated with “Ich werde auch leicht ärgerlich, wenn andere Leute sich über etwas ärgern.”. The differences between both items is due to translational difficulties regarding the statement and the emotion anger. For the emotions pride, relief and contentment there has only been an English version available for use. I translated the six related subscales, which included a total of 30 statements, into German. I made sure the phrasing and sentence structure of the statements was consistent with the phrasing and sentence structure of the related items of the other emotions. Item five of the added Relief Cognitive Empathy scale “Es fällt mir leicht zu verstehen, warum andere erleichtert reagieren, wenn ihnen etwas Gutes widerfährt.“, item five of the Contentment Cognitive Empathy scale “Es fällt mir leicht zu verstehen, warum andere zufrieden sind, wenn ihnen etwas Angenehmes widerfährt.“ and item five of the new Pride Cognitive Empathy scale “Es fällt mir leicht zu

verstehen warum andere mit Stolz reagieren, wenn ihnen etwas Ermutigendes widerfährt.“, for instance, are very similar in their choice of words and sentence structure to the items one of the Happiness Cognitive Empathy scale “Ich kann es sehr gut verstehen, warum andere sich freuen, wenn ihnen etwas Angenehmes passiert.“ and item one of the Surprise Cognitive Empathy scale “Ich kann es sehr gut verstehen, warum andere überrascht sind, wenn ihnen etwas Unerwartetes passiert.“ (**Table 2**, RC5, CC5, PC5 and HC1, ÜC1).

Results

Comparison of the correlation matrices

First we used the *cortest.mat()* function from the *psych* package in R (version 3.6.0) to compute the correlation matrices of all the items in the respective subscales for time 1 and compared them with the correlation matrices for time 2. **Table 3** shows the χ^2 values and gives information whether or not they are significant, indicating that those correlation matrices differ from each other at both times. A total of 10 out of 18 values are significant. The higher the χ^2 value is, the more the subscales’ items relate differently to another at the first and the second time of measurement. If the relation of the items of a subscale differs at both times, their measurement model will likely be slightly different. The highest values include both the Disgust Affective and the Disgust Cognitive subscales, the Fear Affective subscale and the Surprise Affective subscale. If either the affective or the cognitive subscales’ χ^2 value is significant, the likelihood increases that the other subscale of that emotional empathy is significant too. There is no pattern that shows that either the affective or the cognitive subscales’ χ^2 value is more often significant, for instance. The only emotional empathies where both subscales show insignificant χ^2 values are pride and contentment.

Table 3

Chi² values for the correlation matrices of each subscale with 20 degrees of freedom

Subscale	χ^2

Anger Affective	31.29
Anger Cognitive	46.47*
Sad Affective	47.87*
Sad Cognitive	38.98*
Fear Affective	65.15*
Fear Cognitive	24.16
Disgust Affective	79.59*
Disgust Cognitive	83.71*
Surprise Affective	53.1*
Surprise Cognitive	21.98
Happiness Affective	43.54*
Happiness Cognitive	48.96*
Relief Affective	21.4
Relief Cognitive	31.7*
Pride Affective	21.99
Pride Cognitive	26,96
Contentment Affective	21.99
Contentment Cognitive	21.69

Note. Significant Chi² values are marked with *, implying the correlation matrices of the subscale are different at both time points.

Subscale Measurement Models for time 1 and time 2

After merging the ESE questionnaire datasets of time 1 and time 2 in SPSS, we used R to check for model fit of all the subscales. Firstly, the model fit was checked for each ESE subscale for time 1 and time 2 separately. Whenever the model did not fit, meaning the standardized root mean squared residual (SRMR; Bentler, 1995) or the root mean square error of approximation (RMSEA; Steiger and Lind, 1980) were above 0.080, indicating a not acceptable fit (see Black, Babin, & Anderson, 2014), or the Comparative Fit Index (CFI; Bentler, 1990) was below 0.900, we had to add covariances that were retrieved by using the *modindices()* function of the *lavaan* package in order to get an acceptable model fit (see **Table 4**). For the Anger Affective subscale

for instance, covariances of the items 16 and 68 as well as 34 and 79 had to be added. In a total of 28 out of 36 cases, covariances had to be added. However, which exact covariances between the items were added for the same subscale at both times differed in all cases, except for the Pride Affective subscale. For 7 subscales, no alteration had to be done. For 14 subscales, one covariance was added. Two covariances were added for 8 subscales. In 5 instances, 3 covariances were added and in one case, it was 4 covariances. There doesn't appear to be a pattern in which subscales are affected. In some cases, for the Anger Cognitive subscale for time 1 and the Surprise Affective subscale for time 1 respectively, we had to remove one item to get a good model fit. One item for the Surprise Cognitive subscale appeared twice in the questionnaire as item 47 and 85: "Ich kann es leicht nachvollziehen, wenn meine Freunde überrascht sind." For the data analysis, we only used item number 47. Because it mistakenly appeared twice, an item for the Surprise Affective subscale was missing and could not be included in the final analysis.

Table 4

Model fit with added covariances, Cronbach's α and McDonalds ω for each ESE subscale for time 1 and time 2

Time	**Subscale**	**α**	**ω**	**χ^2**	**χ^2 *df***	**p(χ^2)**	**SRMR**	**RMSEA**	**CFI**
1	Anger Affective	0.907	0.932	0.825	3	0.843	0.008	0.000	1.000
Added covariances: Item 16 and 68, r = -0.35 | Item 34 and 79, r = -0.52									
2	Anger Affective	0.920	0.902	5.938	4	0.204	0.020	0.064	0.996
Added covariances: Item 16 and 34, r = 0.50									
1	Anger Cognitive	0.615	0.630	1.201	2	0.549	0.024	0.000	1.000
Removed items: 60r									
2	Anger Cognitive	0.745	0.755	3.886	5	0.566	0.031	0.000	1.000
Time	**Subscale**	**α**	**ω**	**χ^2**	**χ^2 *df***	**p(χ^2)**	**SRMR**	**RMSEA**	**CFI**
1	Sadness Affective	0.847	0.855	5.644	5	0.342	0.027	0.033	0.997
2	Sadness Affective	0.878	0.850	1.146	2	0.564	0.011	0.000	1.000
Added covariances: Item 55 and 21, r = 0.46 | Item 55 and 73, r = -0.31 | Item 61r and 21, r = 0.20									
1	Sadness Cognitive	0.760	0.790	0.134	2	0.935	0.006	0.000	1.000
Added covariances: Item 78 and 58r, r = -0.29 | Item 29 and 36r, r = -0.06 | Item 29 and 49, r = 0.48									
2	Sadness Cognitive	0.831	0.880	0.393	2	0.821	0.008	0.000	1.000
Added covariances: Item 29 and 58r, r = -0.20 | Item 36r and 49, r = -0.45 | Item 29 and 36r, r = -0.21									
Time	**Subscale**	**α**	**ω**	**χ^2**	**χ^2 *df***	**p(χ^2)**	**SRMR**	**RMSEA**	**CFI**
1	Fear Affective	0.874	0.870	2.257	3	0.521	0.015	0.000	1.000
Added covariances: Item 10 and 15, r = 0.37 | Item 10 and 69r, r = -0.20									

2	Fear Affective	0.907	0.895	0.524	1	0.469	0.006	0.000	1.000
Added covariances: Item 10 and 15, r = -0.41 | Item 10 and 38, r = -0.69 | Item 69r and 40, r = 0.27 | Item 40 and 38, r = 0.33									
1	Fear Cognitive	0.727	0.656	5.729	3	0.126	0.028	0.089	0.981
Added covariances: Item 5 and 6, r = 0.40 | Item 30r and 65r, r = 0.27									
2	Fear Cognitive	0.740	0.710	4.431	4	0.351	0.039	0.031	0.997
Added covariances: Item 5 and 6, r = 0.33									
Time	**Subscale**	**α**	**ω**	**χ^2**	**χ^2 *df***	**p(χ^2)**	**SRMR**	**RMSEA**	**CFI**
1	Disgust Affective	0.788	0.775	6.015	4	0.198	0.047	0.066	0.992
Added covariances: Item 22 and 23, r = 0.51									
2	Disgust Affective	0.910	0.910	5.701	4	0.223	0.021	0.061	0.996
Added covariances: Item 14 and 22, r = 0.25									
1	Disgust Cognitive	0.814	0.870	2.002	3	0.572	0.020	0.000	1.000
Added covariances: Item 4 and 75r, r = -0.27 | Item 81 and 48, r =-0.53									
2	Disgust Cognitive	0.880	0.890	2.213	2	0.331	0.018	0.030	0.999
Added covariances: Item 84r and 75r, r = 0.14 | Item 48 and 75r, r = -0.35 | Item 84r and 4, r = -0.27									
Time	**Subscale**	**α**	**ω**	**χ^2**	**χ^2 *df***	**p(χ^2)**	**SRMR**	**RMSEA**	**CFI**
1	Surprise Affective	0.440	0.852	0.024	1	0.878	0.004	0.000	1.000
Missing items: 85 | Removed items: 76 | Added covariances: Item 25 and 64, r = -0.20									
2	Surprise Affective	0.680	0.595	0.043	1	0.835	0.004	0.000	1.000
Missing items: 85 | Added covariances: Item 76 and 59r, r = 0.37 | Item 59r and 64, r = 0.23									
1	Surprise Cognitive	0.726	0.771	2.759	4	0.599	0.027	0.000	1.000
Added covariances: Item 37 and 51r, r = -0.33									
2	Surprise Cognitive	0.785	0.787	1.948	5	0.856	0.019	0.000	1.000
Time	**Subscale**	**α**	**ω**	**χ^2**	**χ^2 *df***	**p(χ^2)**	**SRMR**	**RMSEA**	**CFI**
1	Happiness Affective	0.742	0.763	5.011	5	0.415	0.035	0.004	1.000
2	Happiness Affective	0.812	0.845	1.657	4	0.798	0.019	0.000	1.000
Added covariances: Item 18 and 31, r = -0.26									
1	Happiness Cognitive	0.826	0.826	3.550	3	0.314	0.026	0.040	0.998
Added covariances: Item 45 and 89, r = 0.40 | Item 74r and 54, r = -0.50									
2	Happiness Cognitive	0.803	0.775	0.331	1	0.565	0.009	0.000	1.000
Added covariances: Item 89 and 54, r = 0.36 | Item 45 and 26r, r =-0.07 | Item 89 and 74r, r =-0.23									
Time	**Subscale**	**α**	**ω**	**χ^2**	**χ^2 *df***	**p(χ^2)**	**SRMR**	**RMSEA**	**CFI**
1	Relief Affective	0.648	0.704	5.705	4	0.222	0.044	0.060	0.980
Added covariances: Item 1 and 28, r = -0.31									
2	Relief Affective	0.758	0.791	0.105	4	0.999	0.005	0.000	1.000
Added covariances: Item 7r and 32, r = -0.41									
1	Relief Cognitive	0.647	0.505	2.701	3	0.440	0.029	0.000	1.000
Added covariances: Item 24r and 82, r = 0.33 | Item 24r and 17r, r = 0.31									
2	Relief Cognitive	0.682	0.634	5.782	4	0.216	0.040	0.061	0.979
Added covariances: Item 24r and 17r, r = 0.17									
Time	**Subscale**	**α**	**Ω**	**χ^2**	**χ^2 *df***	**p(χ^2)**	**SRMR**	**RMSEA**	**CFI**
1	Pride Affective	0.829	0.807	0.185	4	0.996	0.006	0.000	1.000
Added covariances: Item 72 and 52, r = 0.48									
2	Pride Affective	0.879	0.856	1.830	4	0.767	0.014	0.000	1.000
Added covariances: Item 72 and 52, r = 0.50									

1	Pride Cognitive	0.740	0.671	1.792	3	0.617	0.020	0.000	1.000
Added covariances: Item 83r and 19, r = 0.31 | Item 83r and 90r, r = 0.22									
2	Pride Cognitive	0.741	0.748	5.959	5	0.310	0.037	0.040	0.992
Time	**Subscale**	**α**	**ω**	**χ^2**	***χ^2 df***	**p(χ^2)**	**SRMR**	**RMSEA**	**CFI**
1	Content. Affective	0.684	0.686	4.499	5	0.480	0.033	0.000	1.000
2	Content. Affective	0.733	0.697	3.629	4	0.459	0.028	0.000	1.000
Added covariances: Item 44 and 88, r = 0.15									
1	Content. Cognitive	0.784	0.764	5.266	4	0.261	0.035	0.053	0.992
Added covariances: Item 77r and 86, r = 0.22									
2	Content. Cognitive	0.788	0.790	3.077	5	0.688	0.024	0.000	1.000

Note. Time 1 only included the data of the first ESE included in the questionnaire package, time 2 only included the data of the follow up questionnaire that was filled out 3 weeks later; Added covariances lists the randomized item numbers from the questionnaire and their correlation so an acceptable model fit could be achieved; Content. Affective = Contentment Affective, Content. Cognitive = Contentment Cognitive.

Combined Subscale Measurement Models

Afterwards, we looked at the model fit of the combined ESE subscales for both points of measurement. Here we also made sure, that the SRMR and RMSEA for all the subscales are above 0.080 and the CFI is above 0.900. For the Fear Affective subscale and the Happiness Cognitive subscale, the RMSEA could not go below 0.080 even with added covariances (see **Table 5**).

Table 5

Model fit for the ESE subscales for both times points as well as their correlation for time 1 and time 2

Subscale	**χ^2**	***χ^2 df***	**p(χ^2)**	**SRMR**	**RMSEA**	**CFI**	**r (T1/T2)**
Anger Affective	48.158	31	0.025	0.033	0.076	0.979	0.78
Anger Cognitive	39.621	26	0.042	0.063	0.076	0.942	0.84
Sadness Affective	49.217	31	0.020	0.054	0.078	0.965	0.81
Sadness Cognitive	44.652	28	0.024	0.055	0.080	0.955	0.84
Fear Affective	54.807	28	0.002	0.043	0.100	0.964	0.80
Fear Cognitive	46.750	31	0.035	0.057	0.074	0.947	0.68
Disgust Affective	49.408	32	0.025	0.062	0.077	0.971	0.64
Disgust Cognitive	44.439	29	0.033	0.064	0.074	0.971	0.78
Surprise Affective	15.962	10	0.101	0.060	0.079	0.953	0.98
Surprise Cognitive	39.278	33	0.209	0.062	0.045	0.975	0.78
Happiness Affective	52.975	33	0.015	0.062	0.079	0.93	0.84
Happiness Cognitive	52.280	29	0.005	0.063	0.094	0.943	0.84
Relief Affective	45.053	32	0.063	0.062	0.066	0.945	0.83
Relief Cognitive	39.803	31	0.134	0.067	0.055	0.950	0.99
Pride Affective	48.693	23	0.030	0.041	0.074	0.973	0.88
Pride Cognitive	49.240	32	0.026	0.064	0.076	0.937	0.99
Contentment Affective	46.203	33	0.063	0.066	0.065	0.939	0.91
Contentment Cognitive	30.341	33	0.600	0.049	0.000	1.000	0.78

Note. r (T1/T2) is the correlation of the respective ESE subscales for time 1 and time 2.

We also correlated the subscales for time 1 and time 2. The complete results are listed in the r(T1/T2) section in **Table 5** and range from .64 to .99. They all show a strong positive linear relationship. In addition to altering the covariances for the individual subscales, the Sadness Cognitive combined subscale had to be slightly altered too. One covariance was added for items 29 and 36r in time 2. The average correlation for the affective subscales is 0.830, while the average correlation for the cognitive subscales is 0.836, implying that there is not much difference. The highest correlations can be found for the Surprise Affective, the Relief Cognitive, the Pride Cognitive and the Contentment Affective subscales with correlations >.90. The Fear Cognitive and the Disgust Affective subscales were found to have the lowest correlations <.70. In general, the lower the χ^2 values in **Table 3** were for the subscales, the higher they seem to correlate which can be seen when looking at Relief, Pride or Contentment in **Table 5** for instance. Furthermore, the lower the χ^2 values, the lower the correlation seems to be. One example are the Disgust Affective and Disgust Cognitive subscales.

Figures 1 to 18 show a graphic overview of all the subscales.

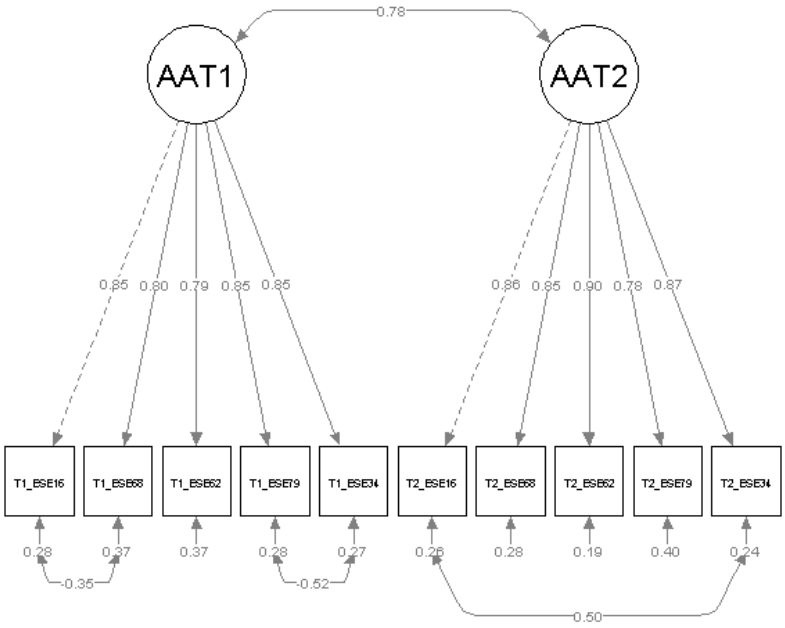


Figure 1. Anger Affective Empathy subscale for time 1 and time 2.

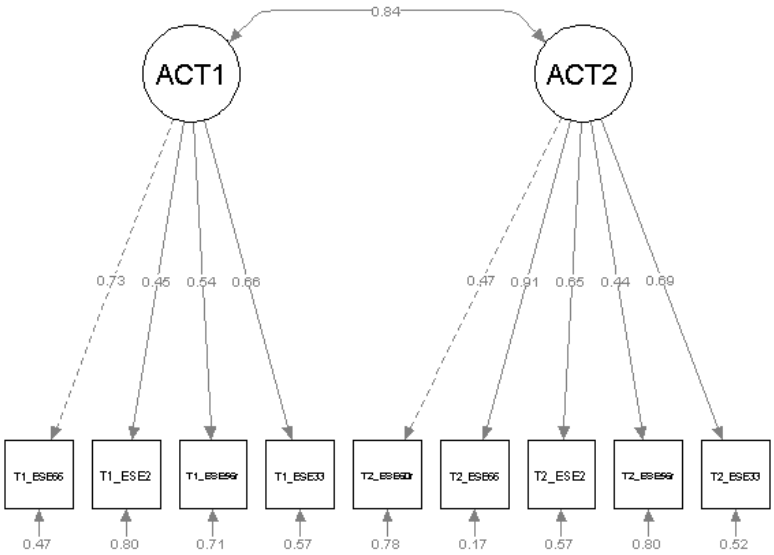


Figure 2. Anger Cognitive Empathy subscale for time 1 and time 2.

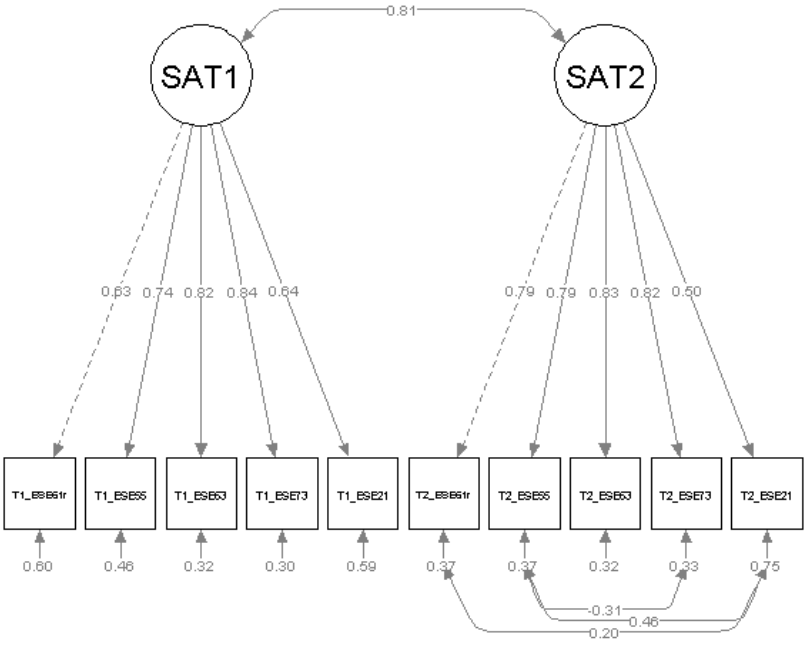


Figure 3. Sad Affective Empathy subscale for time 1 and time 2.

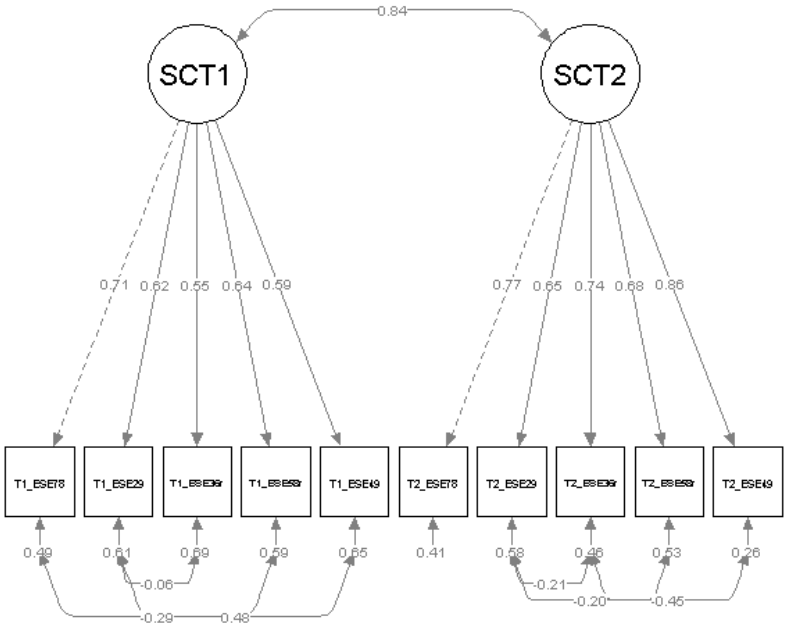


Figure 4. Anger Cognitive Empathy subscale for time 1 and time 2.

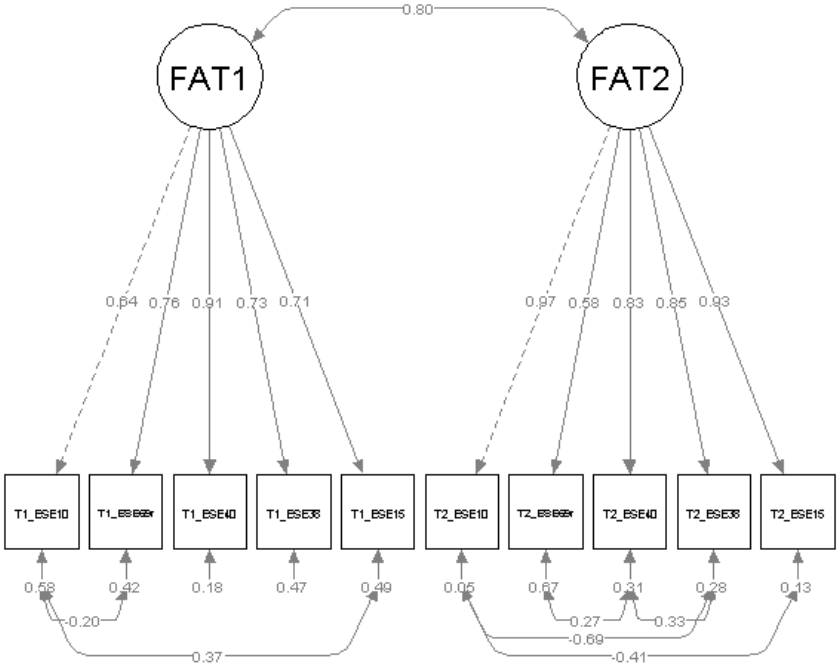


Figure 5. Fear Affective Empathy subscale for time 1 and time 2.

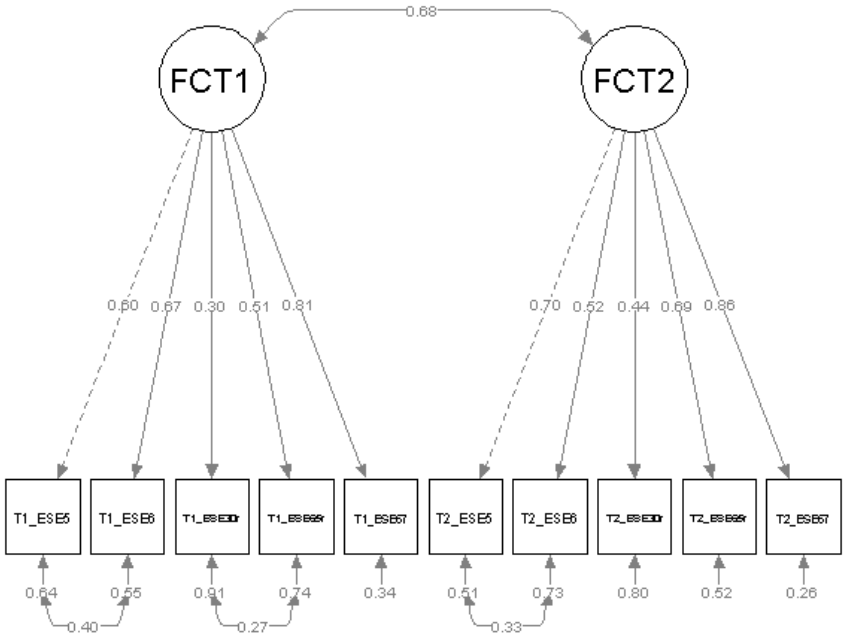


Figure 6. Fear Cognitive Empathy subscale for time 1 and time 2.

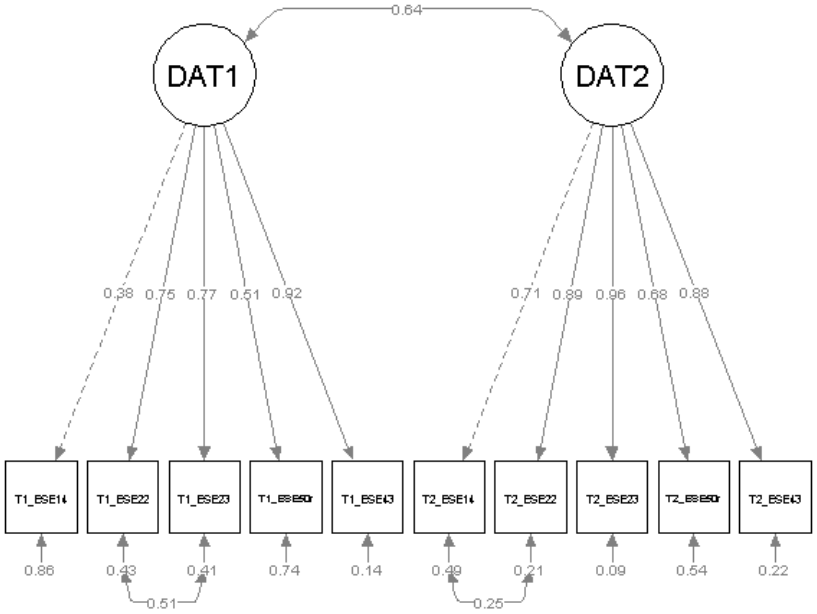


Figure 7. Disgust Affective Empathy subscale for time 1 and time 2.

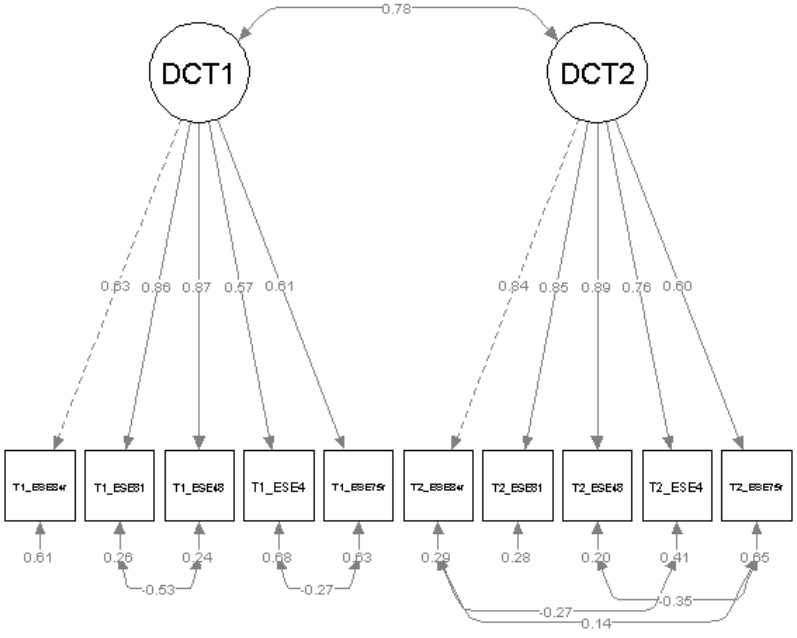


Figure 8. Disgust Cognitive Empathy subscale for time 1 and time 2.

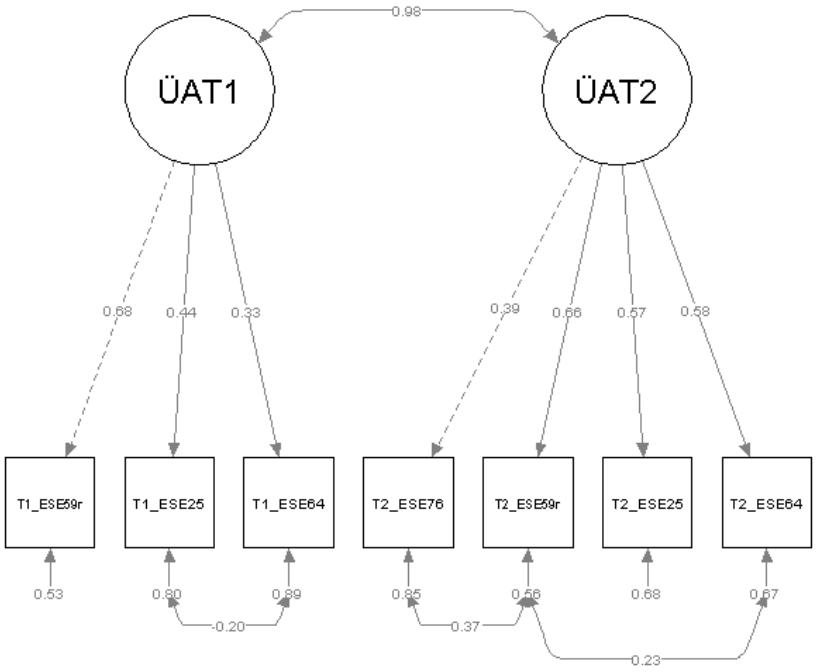


Figure 9. Surprise Affective Empathy subscale for time 1 and time 2.

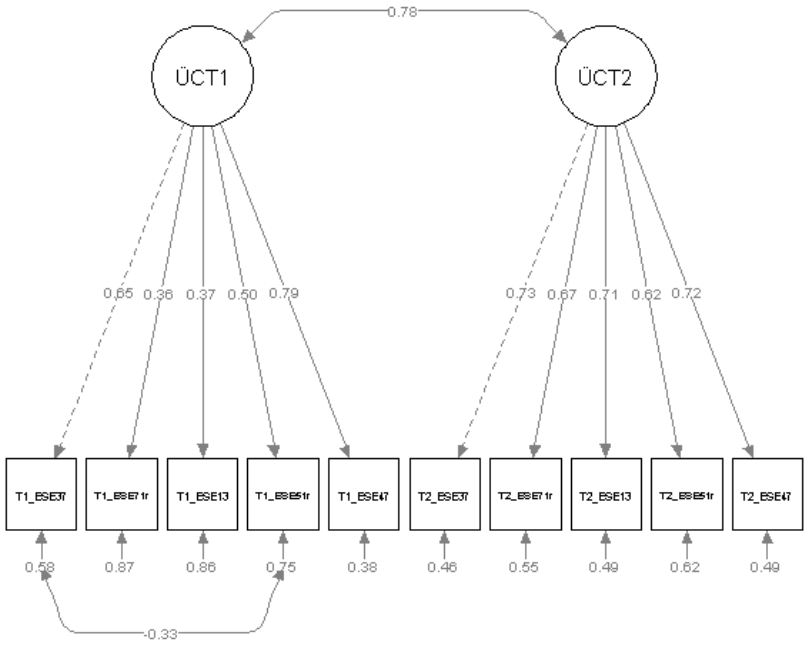


Figure 10. Surprise Cognitive Empathy subscale for time 1 and time 2.

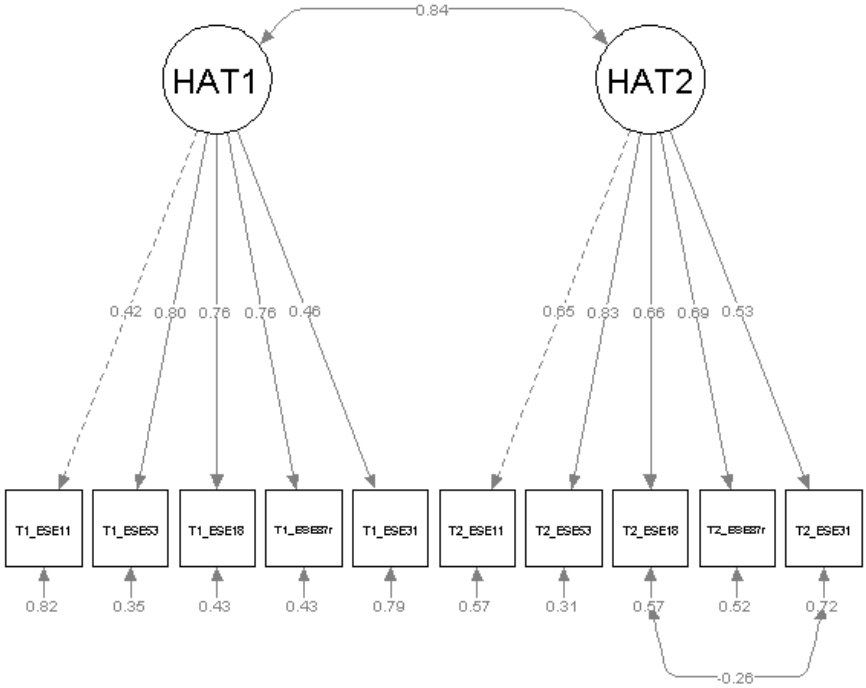


Figure 11. Happiness Affective Empathy subscale for time 1 and time 2.

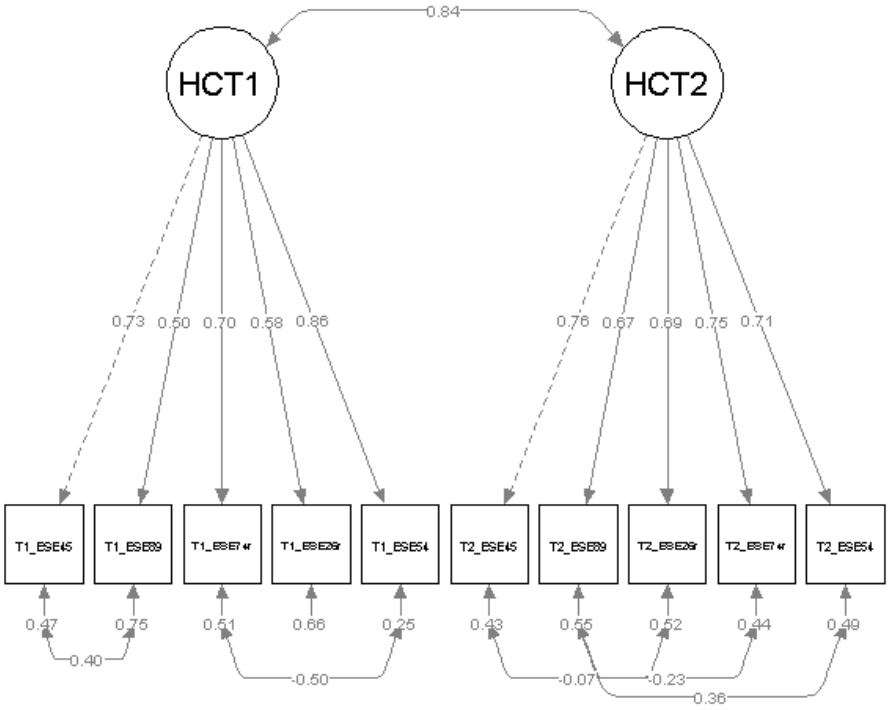


Figure 12. Happiness Cognitive Empathy subscale for time 1 and time 2.

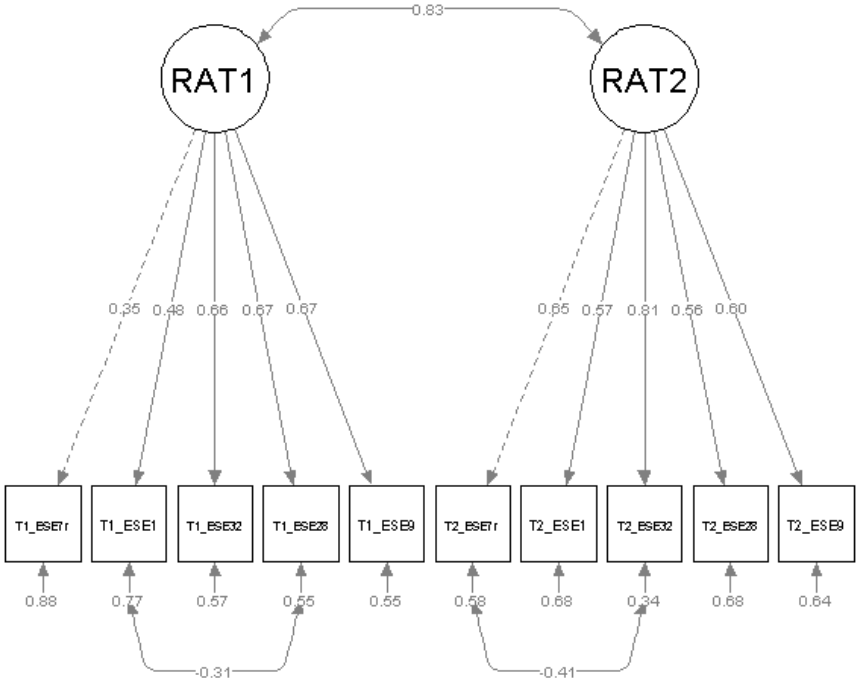


Figure 13. Relief Affective Empathy subscale for time 1 and time 2.

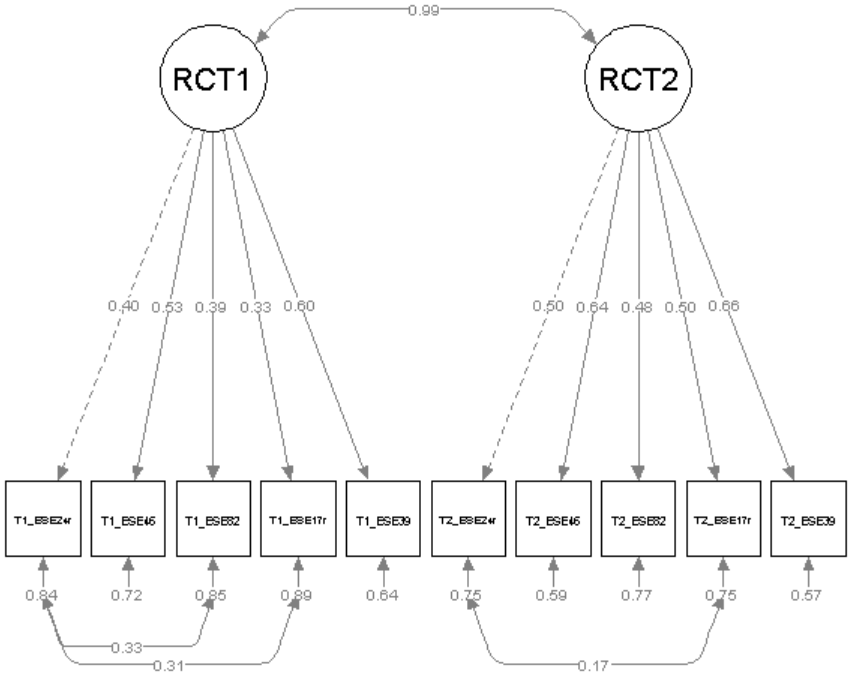


Figure 14. Relief Cognitive Empathy subscale for time 1 and time 2.

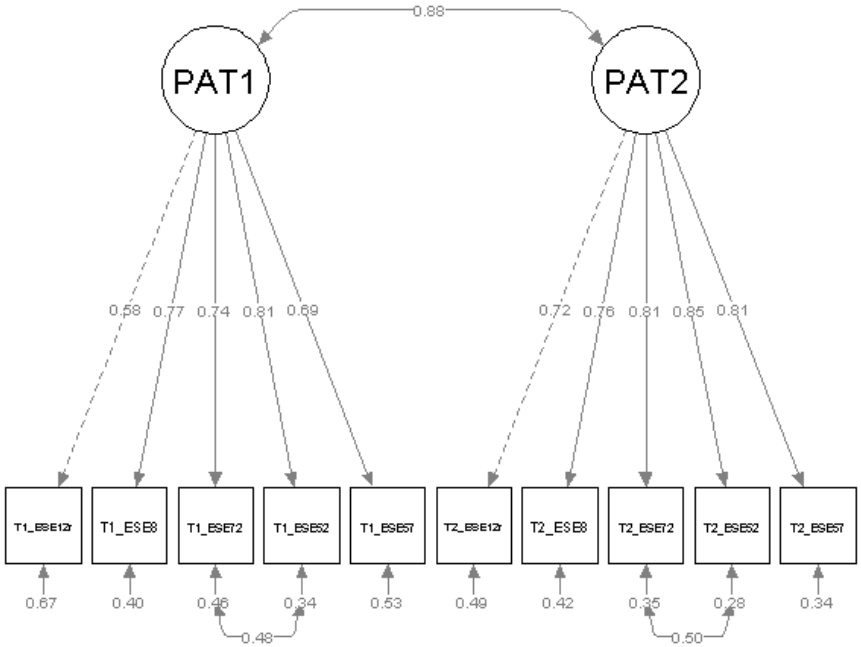


Figure 15. Pride Affective Empathy subscale for time 1 and time 2.

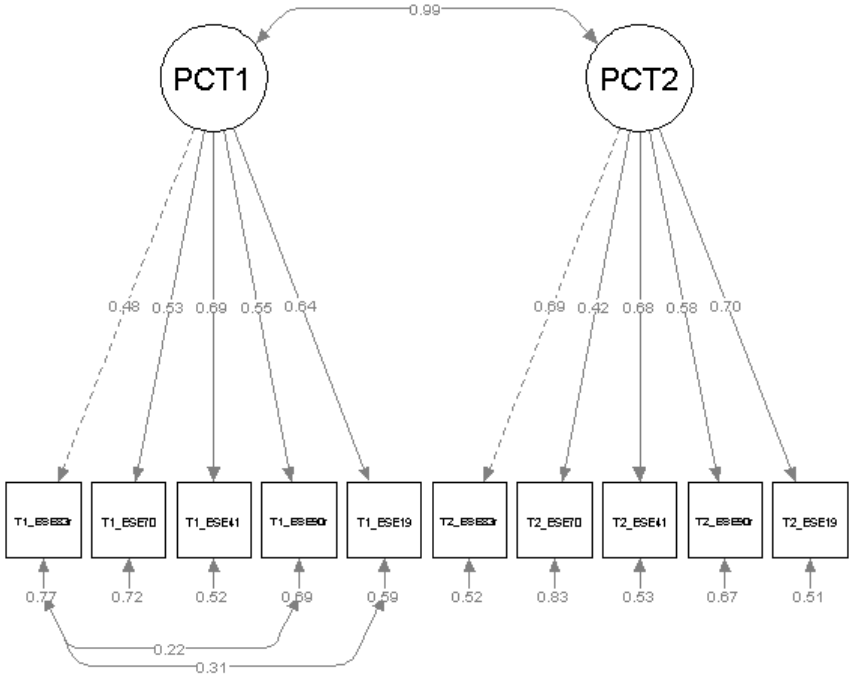


Figure 16. Pride Cognitive Empathy subscale for time 1 and time 2.

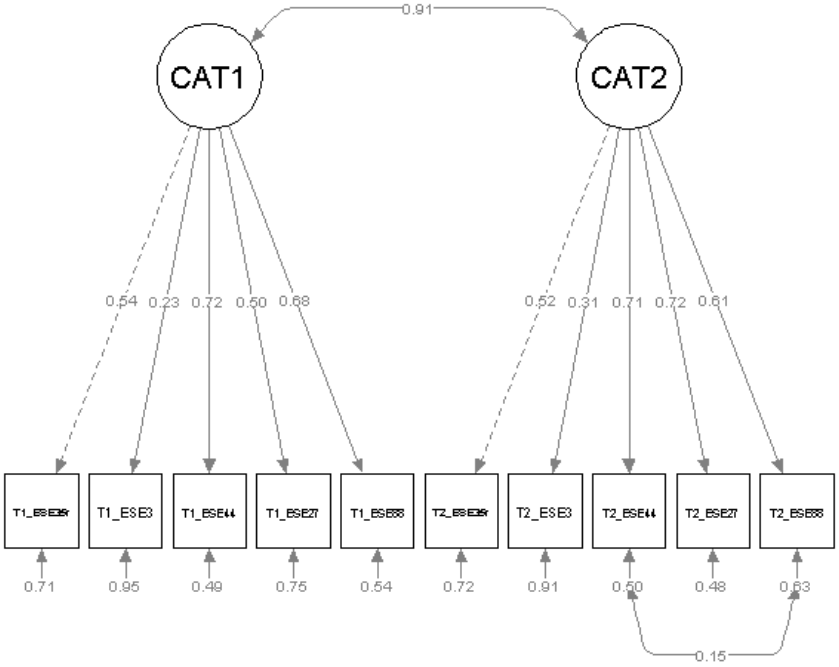


Figure 17. Contentment Affective Empathy subscale for time 1 and time 2.

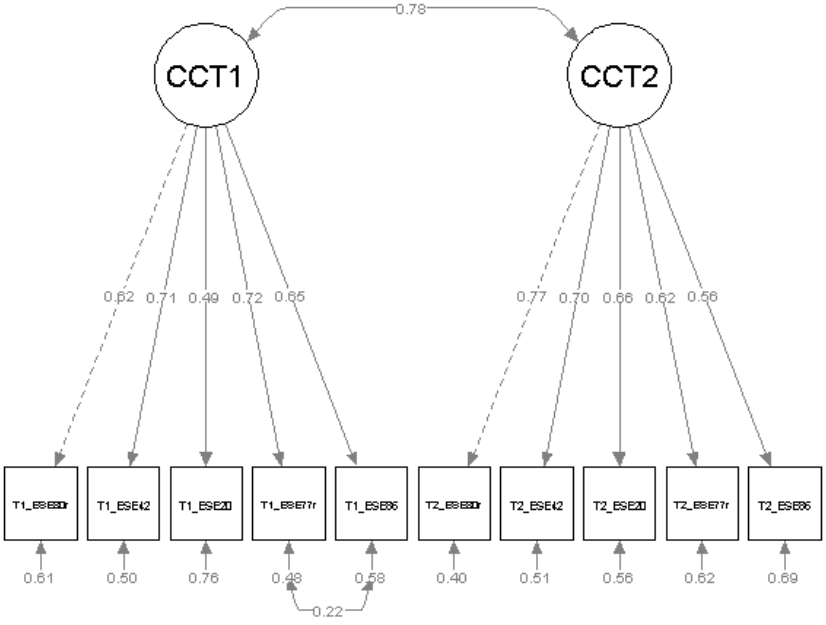


Figure 18. Contentment Cognitive Empathy subscale for time 1 and time 2.

ESE Measurement Model for time 1

We tried several different structures to find the best fitting ESE measurement models for time 1 and time 2. The models are not based on the individual items of each subscale, but instead on the subscale composite scores. The first model we tried was one general factor that predicted the 9 affective and the 9 cognitive subscales. As can be seen in **table 6** and **table 7**, this model does not fit as good compared to the two-factor model with one affective and one cognitive latent variable. The same goes for the 9 latent emotional variables predicting their respective affective and cognitive subscale. A model where a correlation between those variables is allowed fits better compared to a model where they are not allowed to correlate. The best fitting model was the one, where uncorrelated affective and cognitive factors as well as the 9 correlated emotional factors where used as predictors. However, as can be seen in **Table 6**, the RMSEA with 0.097 was not acceptable yet. After adding the five covariances between the subscales that are listed below, the model fit was acceptable. Another model that was tried, which is not listed in the tables, is one where we used one positive and one negative latent emotional empathy factor as predictors for the manifest variables instead of the separate latent factors for each emotional empathy. However, that approach did not yield good model fit.

Table 6

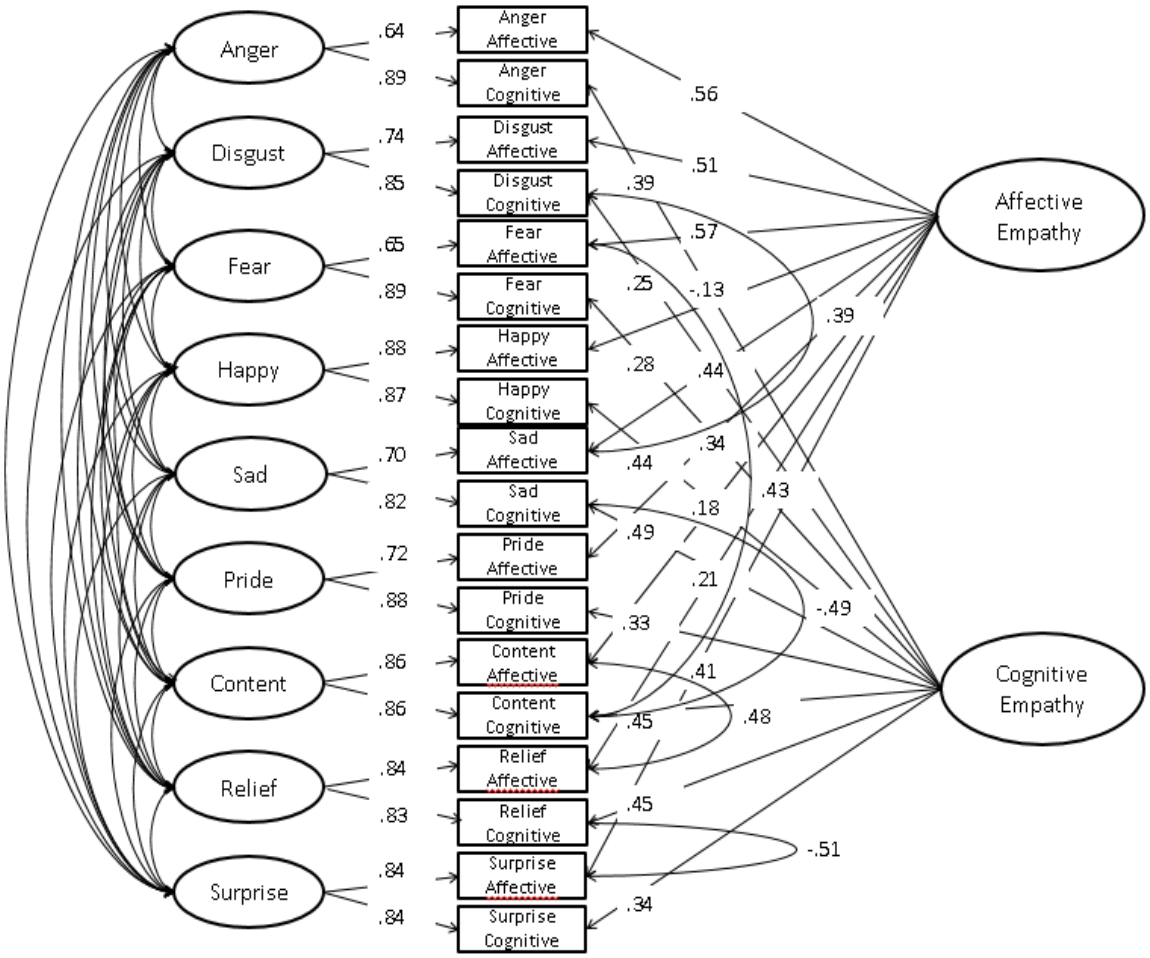
Different ESE measurement model structures for time 1

ESE measurement model (time 1)	χ^2	χ^2 *df*	p(χ^2)	RMSEA	CFI
One general factor	646.136	135	0.000	0.181	0.586
Affective and Cognitive factor (uncorrelated)	456.397	135	0.000	0.144	0.740
Affective and Cognitive factor (correlated)	440.969	134	0.000	0.141	0.751
9 uncorrelated emotional factors	1468.339	153	0.000	0.273	0.000
9 correlated emotional factors	597.914	117	0.000	0.189	0.611
One general factor, 9 correlated emotional factors	222.852	99	0.000	0.104	0.900
Affective and Cognitive factor (uncorrelated), 9 uncorrelated emotional factors	926.386	134	0.000	0.227	0.358
Affective and Cognitive factor (correlated), 9 correlated emotional factors	205.101	99	0.000	0.097	0.914
Affective and Cognitive factor (correlated), 9 uncorrelated emotional factors (With 5 added covariances)	161.643	94	0.000	0.079	0.945

Added covariances:
Relief Affective Empathy and Contentment Affective Empathy, r = 0.48; Sad Cognitive Empathy and Contentment Cognitive Empathy, r = -0.49; Surprise Affective Empathy and Relief Cognitive Empathy, r = -0.51; Sad Affective Empathy and Disgust Cognitive Empathy, r = 0.39; Fear Affective Empathy and Contentment Cognitive Empathy, r = 0.43

Note. r (T1/T2) is the correlation of the respective ESE subscales for time 1 and time 2.

Figure 19 shows the final ESE measurement model for time 1. It depicts the correlations of the affective and cognitive empathy latent variables as well as the emotion specific latent variables with the respective manifest affective or cognitive emotional subscales. The correlation matrix in the lower part of *Figure 19* shows how the latent emotional variables correlate with each other.



Correlations between the emotion specific latent variables for time 2

	Anger	Sad	Fear	Disgust	Surprise	Happiness	Relief	Pride
Sad	0.71*							
Fear	0.64*	0.74*						
Disgust	0.57*	0.60*	0.69*					
Surprise	0.74*	0.85*	0.74*	0.66*				
Happiness	0.71*	0.85*	0.64*	0.40*	0.88*			
Relief	0.74*	0.83*	0.68*	0.50*	0.90*	0.94*		
Pride	0.60*	0.73*	0.53*	0.47*	0.82*	0.85*	0.88*	
Contentment	0.78*	0.83*	0.71*	0.46*	0.90*	0.98*	0.98*	0.87*

Note: * $p < .05$

Figure 19. Final ESE measurement model for time 1 with the 5 added covariances (on the far right side)

ESE Measurement Model for time 2

For time 2 (**Table 7**), the best model allowed no correlations of the affective and cognitive factors, but again correlations of the emotion specific factors. Two covariances had to be added

as well as the variances of the anger cognitive subscale, the fear cognitive subscale and the contentment cognitive subscale had to be set to zero, so the RMSEA got acceptable. The added covariances in time 2 differed from time 1, where the Relief and Contentment Affective, Sad and Contentment Cognitive, Surprise Affective and Relief Cognitive, Sad Affective and Disgust Cognitive as well as Fear Affective and Contentment Cognitive subscales covaried. For time 2, the Fear and Disgust Affective as well as Anger and Fear Affective subscales covaried.

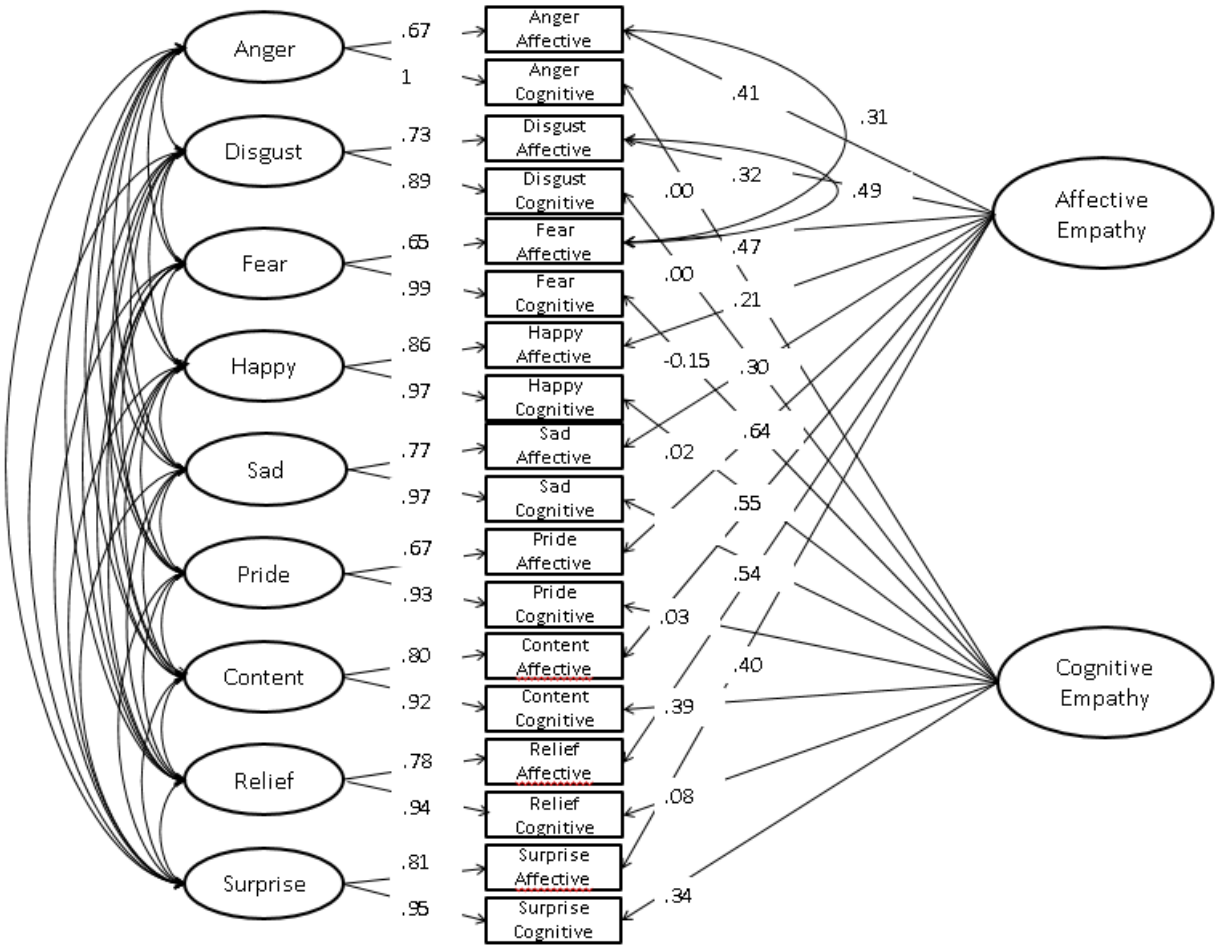
Table 7

Different ESE measurement model structures for time 2

ESE measurement model (time 2)	χ^2	χ^2 *df*	p(χ^2)	RMSEA	CFI
One general factor	804.445	135	0.000	0.209	0.545
Affective and Cognitive factor (uncorrelated)	684.452	135	0.000	0.189	0.627
Affective and Cognitive factor (correlated)	645.628	134	0.000	0.183	0.653
9 uncorrelated emotional factors	1396.810	153	0.000	0.267	0.156
9 correlated emotional factors	594.751	117	0.000	0.189	0.676
One general factor, 9 correlated emotional factors	212.484	99	0.000	0.100	0.923
Affective and Cognitive factor (uncorrelated), 9 uncorrelated emotional factors	880.757	134	0.000	0.221	0.493
Affective and Cognitive factor (correlated), 9 correlated emotional factors	203.774	99	0.000	0.096	0.929
Affective and Cognitive factor (correlated), 9 correlated emotional factors (With 2 added covariances)	172.804	100	0.000	0.080	0.951
Added covariances: Fear Affective Empathy and Disgust Affective Empathy, r = 0.49; Anger Affective Empathy and Fear Affective Empathy, r = 0.31;					

Note. r (T1/T2) is the correlation of the respective ESE subscales for time 1 and time 2.

Figure 20 shows a graphical illustration of the final ESE measurement model for time 2. The correlations between the emotion specific factors and the subscales is very high, ranging from .67 to 1. The correlations between to cognitive empathy factor and the subscales is low to zero. This was due to the variances that have been set to zero and was not avoidable.



Correlations between the emotion specific latent variables for time 2

	Anger	Sad	Fear	Disgust	Surprise	Happiness	Relief	Pride
Sad	0.71*							
Fear	0.64*	0.74*						
Disgust	0.57*	0.60*	0.69*					
Surprise	0.74*	0.85*	0.74*	0.66*				
Happiness	0.71*	0.85*	0.64*	0.40*	0.88*			
Relief	0.74*	0.83*	0.68*	0.50*	0.90*	0.94*		
Pride	0.60*	0.73*	0.53*	0.47*	0.82*	0.85*	0.88*	
Contentment	0.78*	0.83*	0.71*	0.46*	0.90*	0.98*	0.98*	0.87*

Note: * $p < .05$

Figure 20. Final ESE measurement model for time 2 with the 2 added covariances.

Discussion

Summary

We developed a German version of the emotion specific empathy questionnaire (ESE) and we added the three emotions relief, pride and contentment to it to balance it for positive emotions, resulting in a 90-item questionnaire. The goal of this study was to measure the stability of Emotion Specific Empathy. Our hypotheses stated, that we expect all the affective and cognitive emotional empathies to remain stable across the different times of measurement except for pride affective and pride cognitive empathy for reasons stated in the introduction (see **Stability of Emotion Specific Empathies**). Our results (see **Table 5**) show the correlations of the emotion specific empathy subscales between the two time points ranging from .64 to .99. The correlation of the Disgust Affective subscale was found to be the lowest with .64, followed by the correlation of the Fear Cognitive Subscale with .68. Without those, the other subscales show correlations in the range of .78 to .99 while most of the values are above .80. The correlations of the Pride Affective and Pride Cognitive subscales with .88 and .99 are among the highest, suggesting that our hypothesis regarding pride can't be supported. The highest correlations were those of the Surprise Affective subscale with .98, the Relief Cognitive subscale with .99, the Pride Cognitive subscale with .99 and the Contentment Affective subscale with .91. While the correlations of most of the other subscales are above .80, which suggests that the individual emotion specific empathies remain stable across time, they are lower than expected considering the measurement times are only three weeks apart and the amount, content as well as the order of the items did not change. The mixes correlational results are an indication that some emotional empathies might be more stable than others.

The internal consistency (see **Table 3**) of the subscales varies and ranges from not acceptable to excellent. Not very good internal consistencies, as indicated by Cronbachs' α and McDonalds' ω include the Anger Cognitive, Surprise Affective, Relief Affective, Relief

Cognitive and Contentment Affective subscales. What is noticeable is the variation of the internal consistency between the two points of measurement in some cases like the Anger Cognitive, Relief Affective or the Surprise Affective subscales. This suggests that the items of those subscales measure their construct different at both times.

Most of the individual measurement models for all the emotion specific affective and cognitive subscales differed at both time points, which is indicated by different covariances that were added. Furthermore, in one instance for the Sadness Cognitive subscale, another covariance had to be added to the combined subscale measurement model. The resulting measurement model for the full scales (**Figures 19** and **20**) was also found to be different for time 1, where 5 extra covariances had to be added, and time 2, where 2 extra covariances were added. The covariances were different at both times. This indicates that the questionnaire does not work the same in time 1 as it does in time 2.

General discussion

When we observe an emotion in another person, this same emotion gets activated within us via different brain structures (Carr et al. 2003, Goldman and Sripada 2003, Damasio 2003). Rizzolatti and Craighero (2005, p. 2) linked mirror neurons to empathy. Since these brain structures do not rapidly change within individuals, it is not surprising that we could show that empathy as a whole remains fairly stable. Since higher levels of empathy make us feel more emotions, the question becomes if we are then just generally more likely to experience all sorts of emotions, positive ones like happiness or contentment as well as negative ones such as fear, sadness or disgust more frequently or if it is just specific emotions, that we ourselves tend to feel more often. Is a person that experiences more happiness in his day to day life more likely to feel happy when he observes someone else being happy than a generally angrier person? And if so, just how large is that difference? Since we can't really control our empathetic response (de Waal, 2008, p. 13), the consequences of this non voluntary emotional absorption are huge.

If you are highly empathetic, just how much of an emotion does another person need to show and for how long does he have to show it for you to feel that same emotion too? People around us feel all sorts of emotions all the time, sometimes they tell us what they feel and sometimes you can see it in their faces or in their behavior. But many times, they do neither of those, and you can just see glimpses of the emotions they feel by short, involuntary facial expressions, for instance. Would very empathetic people pick up these signals that might be hard to notice for the average person and would that impact the emotion they are feeling, too? If so, to what extend? Can those people be exhausted from spending too much time in larger social groups, since they involuntarily pick up too many emotions? While Berkhout & Malouff (2016) showed, that empathy training can very well be effective, could empathy also be lowered to prevent highly empathetic people from an overload? Our results indicate that some emotional empathies are more stable than others, which could be an indication that empathy training would probably work better on less stable emotional empathies, which are more likely to be influenced and change, than on the more stable ones. Another interesting question is, if the stability of our emotional empathies is influenced by our general stability or instability to experience emotions. Are neurotic people also more unstable when it comes to being empathetic?

Stability of Empathy

Most studies cited in our introduction stated that empathy remains stable over time (Grühn, Rebucal, Diehl, Lumley, & Labouvie-Vief, 2008; Quince, Parker, Wood, & Benson, 2011; Davis, & Franzoi, 1991). We could replicate this finding with our current study measuring empathy with the German version of the emotion specific empathy questionnaire (ESE) at two different time points three weeks apart. Most of the correlations listed in **Table 5** are above .80, some >.90 and only two of the subscales correlate less than .70.

Stability of emotion specific empathies

The least stable emotion specific empathy was found to be the Disgust Affective (.64) and the Disgust Cognitive (.78) subscale. In another study, the correlation measured with The Three Domains Of Disgust Scale (TDDS) was found to be .64. Other researchers have found Disgust to be stable (Haidt, Mccauley, & Rozin, 1994). While we could show that disgust specific empathy does remain stable, it is not as stable as we would have expected it to be.

Tracy & Robins (2007) argued for the existence of two separate states of pride, authentic and hubristic pride. The former is activated by your actions, the latter is a more general state of pride you experience. That lead us to believe that pride will not remain as stable, since you are not always proud of your actions. However, contrary to our expectations, pride was found to be one of the most stable emotional empathies with the Pride Affective subscale showing a correlation of .88 and the Pride Cognitive subscale showing a correlation of .99 between both times. Also, your proclivity to experience relief, where there has not been a lot of research done yet, seems to be among the most stable emotional empathies with .83 for the Relief Affective subscale and .99 for the Relief Cognitive subscale.

Limitations

Since one item for the Surprise Cognitive subscale was measured twice by accident as number 47 and 85, one item measuring the Surprise Affective subscale was missing. This has a negative influence on the internal consistency of the subscale which was found to be the lowest. Thus, the results for the Surprise Affective subscale are less accurate and representative. Our sample consisted mainly of younger white German adults, mostly female, who were educated. This implies that our sample might not be representative of the whole German population. Furthermore, our sample is part of a society which Henrich, Heine, & Norenzayan (2010) describe as the WEIRD sample. WEIRD stands for Western, Educated, Industrialized, Rich and Democratic. In their article they conclude, that results that are drawn from these samples can't be generalized to the whole human population, since their motivation, behavior, self-concepts,

moral reasoning and reasoning styles for instance differ from other subpopulations such as the Chinese.

Since all the covariances that were added to the measurement models 2 (see **Figure 19** and **20**) imply that our scale does not work the same in time 1 as it does in time 2, it seems that some of the scales' items have to be altered. We had done a power analyses prior to making this study that suggested that the sample size we had was more than enough for the correlations, however perhaps a larger sample size would be required for all of the measurement models.

Future directions

For future research, the questions of the subscales with the lowest internal consistencies should be looked at and potentially be reworked for improvement. Furthermore, the stability of the emotion specific empathies should be tested using two timepoints that are farther apart from each other to see if that makes the stability decrease further. Measuring emotion specific empathy each year for 10 years could be one option.

Since our WEIRD sample can't be used to generalize our results across different populations, looking at emotion specific empathy in different subpopulations, such as the more collectivist Asian cultures, would be useful. Will the same emotional empathies, that we stable in this study, be stable again when this approach is replicated?

Because we have collected evidence to support the hypothesis that various emotional empathies differ in their stability, it would make sense to next look at how those emotional empathies vary in specific subpopulations. An interesting research question would be, if you show more emotional empathy towards emotions that you yourself feel more regularly. Highly neurotic or depressed people, who are significantly more likely to experience negative emotions (Milkler, Vachon, & Lynam, 2009), could be grouped together while the same could be done with more extraverted people, who generally experience more happiness (Tan, Low, & Viapude, 2018).

These two groups would then be tested for their emotional empathies with the ESE. Afterwards, their emotional empathies could be compared. Do you feel more empathy towards negative emotions when you experience more negative emotions yourself? Are you more likely to experience empathy towards positive emotions when you are happier more often? Is there a difference between those groups?

Conclusions

In our current study we could replicate previous findings and support the hypothesis, that empathy as a whole remains stable across time. We could also gather evidence that there is a difference in experiencing emotions when it comes to empathy. Knowing and feeling when another person experiences disgust seems to be among the least stable emotional empathies, while especially pride and relief, but also surprise and contentment are among the most stable emotional empathies.

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Appendix

Table 1

English version of the 90 item ESE with original ESE numbers (Olderbak, Sassenrath, Keller, & Willhelm, 2014, distributed under CC BY 3.0, https://creativecommons.org/licenses/by/3.0/)

Number	Subscale	Item
1	AA1	I am not easily infected by the anger of other people. (-)
2	SDA1	I am not easily infected by the sadness of other people. (-)
3	FC1	It is easy for me to understand why others become scared when something frightening happens to them.
4	FA1	I feel scared when I see that something is happening to a stranger that makes him/her feel scared.
5	DC1	It is difficult for me to understand what makes my friends disgusted. (-)
6	FA2	I am not easily infected by the fear of other people. (-)
7	SA1	When I see that my friend is surprised about something, I easily feel surprise as well.
8	DC2	If someone tells me about an event that made him/her feel disgusted, I can easily understand why that event made him/her disgusted.
9	SA2	I am not easily infected by the surprise of other people. (-)
10	DA1	If a friend told me about an event in his/her life that made him/her feel disgust, I will easily feel disgusted as well.
11	FC2	I can easily think about events that will make my friends scared.
12	SDC1	I can easily think about events that will make my friends sad.
13	HC1	It is easy for me to understand why others become happy when something pleasant happens to them.
14	DC3	I can easily think about events that will make my friends disgusted.
15	SDC2	It is easy for me to understand why others become sad when something heartbreaking happens to them.
16	SC1	It is easy for me to understand why others become surprised when something unexpected happens to them.
17	HC2	I can easily think about events that will make my friends happy.
18	AC1	I have a hard time predicting what situations will make other persons angry. (-)
19	SA3	I easily feel surprise when the people around me feel surprise.
20	AA2	I feel angry when I see that something is happening to a stranger that makes him/her feel angry.
21	SC2	I have a hard time predicting what situations will make other persons surprised. (-)
22	AA3	When I see that my friend is angry about something, I easily feel angry as well.
23	DA2	When I see that my friend is disgusted about something, I easily feel disgust as well.
24	DA3	I feel disgust when I see that something is happening to a stranger that makes him/her feel disgust.
25	AC2	I can easily think about events that will make my friends angry.
26	FC3	I have a hard time predicting what situations will make other persons scared. (-)

27	SC3	If someone tells me about an event that made him/her surprised, I can easily understand why that event made him/her surprised.
28	HA1	When I see that my friend is happy about something, I easily feel happy as well.
29	DA4	I am not easily infected by the disgust of other people. (-)
30	FC4	It is difficult for me to understand what makes my friends scared. (-)
31	AC3	If someone tells me about an event that made him/her angry, I can easily understand why that event made him/her angry.
32	HA2	I easily feel happy when the people around me feel happy.
33	FA3	I easily feel scared when the people around me feel scared.
34	HA3	If a friend told me about an event in his/her life that made him/her feel happy, I will easily feel happy as well.
35	HA4	I am not easily infected by the happiness of other people. (-)
36	SDA2	I easily feel sad when the people around me feel sad.
37	DC4	It is easy for me to understand why others become disgusted when something awful happens to them.
38	AA4	If a friend told me about an event in his/her life that made him/her feel angry, I will easily feel angry as well.
39	AA5	I easily feel angry when the people around me feel angry.
40	SA4	If a friend told me about an event in his/her life that made him/her feel surprise, I will easily feel surprised as well.
41	HC3	It is difficult for me to understand what makes my friends happy. (-)
42	HA5	I feel happy when I see that something is happening to a stranger that makes him/her feel happy.
43	SDC3	I have a hard time predicting what situations will make other persons sad. (-)
44	SDA3	If a friend told me about an event in his/her life that made him/her feel sad, I will easily feel sad as well.
45	FA4	If a friend told me about an event in his/her life that made him/her feel scared, I will easily feel scared as well.
46	HC4	I have a hard time predicting what situations will make other persons happy. (-)
47	HC5	If someone tells me about an event that made him/her happy, I can easily understand why that event made him/her happy.
48	SDA4	When I see that my friend is sad about something, I easily feel sad as well.
49	DC5	I have a hard time predicting what situations will make other persons disgusted. (-)
50	SC4	It is difficult for me to understand what makes my friends surprised. (-)
51	AC4	It is difficult for me to understand what makes my friends angry. (-)
52	SDC4	It is difficult for me to understand what makes my friends sad. (-)
53	SA5	I feel surprise when I see that something is happening to a stranger that makes him/her feel surprise.
54	SDA5	I feel sad when I see that something is happening to a stranger that makes him/her feel sad.
55	AC5	It is easy for me to understand why others become angry when something awful happens to them.
56	FA5	When I see that my friend is scared about something, I easily feel scared as well.
57	SC5	I can easily think about events that will make my friends surprised.

58	SDC5	If someone tells me about an event that made him/her sad, I can easily understand why that event made him/her sad.
59	DA5	I easily feel disgust when the people around me feel disgust.
60	FC5	If someone tells me about an event that made him/her scared, I can easily understand why that event made him/her scared.
61	RC1	I have a hard time predicting what situations will make other persons relieved. (-)
62	RC2	I can easily think about events that will make my friends relieved.
63	RC3	If someone tells me about an event that made him/her relieved, I can easily understand why that event made him/her relieved.
64	RC4	It is difficult for me to understand what makes my friends relieved. (-)
65	RC5	It is easy for me to understand why others become relieved when something nice happens to them.
66	RA1	I am not easily infected by the relief of other people. (-)
67	RA2	I feel relieved when I see that something is happening to a stranger that makes him/her feel relieved.
68	RA3	When I see that my friend is relieved about something, I easily feel relieved as well.
69	RA4	If a friend told me about an event in his/her life that made him/her feel relieved, I will easily feel relieved as well.
70	RA5	I easily feel relieved when the people around me feel relieved.
71	PC1	I have a hard time predicting what situations will make other persons prideful. (-)
72	PC2	I can easily think about events that will make my friends prideful.
73	PC3	If someone tells me about an event that made him/her prideful, I can easily understand why that event made him/her prideful.
74	PC4	It is difficult for me to understand what makes my friends prideful. (-)
75	PC5	It is easy for me to understand why others become prideful when something encouraging happens to them.
76	PA1	I am not easily infected by the pride of other people. (-)
77	PA2	I feel pride when I see that something is happening to a stranger that makes him/her feel pride.
78	PA3	When I see that my friend is prideful about something, I easily feel prideful as well.
79	PA4	If a friend told me about an event in his/her life that made him/her feel pride, I will easily feel pride as well.
80	PA5	I easily feel pride when the people around me feel pride.
81	CC1	I have a hard time predicting what situations will make other persons contented. (-)
82	CC2	I can easily think about events that will make my friends contented.
83	CC3	If someone tells me about an event that made him/her contented, I can easily understand why that event made him/her contented.
84	CC4	It is difficult for me to understand what makes my friends contented. (-)
85	CC5	It is easy for me to understand why others become contented when something pleasant happens to them.
86	CA1	I am not easily infected by the contentment of other people. (-)
87	CA2	I feel contented when I see that something is happening to a stranger that makes him/her feel contented.
88	CA3	When I see that my friend is contented about something, I easily feel contented as well.

89	CA4	If a friend told me about an event in his/her life that made him/her feel contented, I will easily feel contented as well.
90	CC5	I easily feel contentment when the people around me feel contentment.

Note. AA = Anger Affective, AC = Anger Cognitive, SDA = Sadness Affective, SDC = Sadness Cognitive (Changed to SA / SC in the German version), FA = Fear Affective, FC = Fear Cognitive, DA = Disgust Affective, DC = Disgust Cognitive, SA = Surprise Affective, SC = Surprise Cognitive (Changed to ÜA / ÜC in the German version), HA = Happiness Affective, HC = Happiness Cognitive, RA = Relief Affective, RC = Relief Cognitive, PA = Pride Affective, PC = Pride Cognitive, CA = Contentment Affective, CC = Contentment Cognitive; A (-) behind an item indicates that the item must be reverse coded.

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Ulm, den 02.07.2019

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