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Difficulties in Emotion Regulation – A Mediator between Trauma Characteristics and PTSD-Symptoms?

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Abstract

Difficulties in positive and negative emotion regulation have been shown to influence PTSD symptom severity. Symptom severity is equally dependent on certain characteristics of the traumatic event. In this observational cross-section-study the influence of trauma type, level of exposure and age at traumatic event on PTSD symptom severity is investigated. It was also tested whether these effects are mediated by difficulties in negative emotion regulation and/or difficulties in positive emotion regulation. This study is a secondary data analysis. A sample of 401 North American adults that were recruited via Amazon's Mechanical Turk answered the Life Events Checklist, the PTSD Checklist for DSM-5, the Difficulties in Emotion Regulation Scale as well as the Difficulties in Positive Emotion Regulation Scale. Relative to accidental/injury trauma, difficulties in emotion regulation significantly mediate the effect of victimization trauma on PTSD symptom severity. Difficulties in positive emotion regulation significantly mediate the effect of predominant death threat trauma on PTSD symptom severity relative to accidental/injury trauma. Trauma exposure on the job as well as undefined trauma exposure caused heightened PTSD symptom severity, which is significantly mediated by difficulties in positive and negative emotion regulation relative to direct exposure. Difficulties in negative and positive emotion regulation act as a mediator between age at traumatic event and PTSD symptom severity. Limitations of the study are disclosed. The obtained results imply a a need for more accurate measures of level of exposure and a revision of the DERS and DERSP. With these and more diverse samples, more accurate answers to this study's questions could be possible. The study provides more evidence to the connection of trauma characteristics, Difficulties in emotion regulation and PTSD symptoms and can help to further adapt interventions to individual needs.

Keywords: PTSD, symptom severity, trauma type, level of exposure, difficulties in emotion regulation, difficulties in positive emotion regulation, age at traumatic event

Abstract (Deutsch)

Schwierigkeiten bei der Regulierung positiver und negativer Emotionen beeinflussen den Schweregrad der PTBS-Symptome. Die Symptomschwere hängt auch von bestimmten Merkmalen des traumatischen Ereignisses ab. In dieser Querschnittsstudie wird der Einfluss des Traumatyps, des Ausmaßes der Traumaexposition und des Alters zum Zeitpunkt des traumatischen Ereignisses auf die PTBS-Symptomschwere untersucht. Es wurde ebenfalls getestet, ob diese Effekte durch Schwierigkeiten bei negativen Emotionen und/oder Schwierigkeiten bei positiven Emotionen mediiert werden. Bei dieser Studie handelt es sich um eine Sekundärdatenanalyse. Eine Stichprobe von 401 nordamerikanischen Erwachsenen, die über Amazons Mechanical Turk rekrutiert wurden, beantwortete die Life Events Checklist, die PTSD-Checkliste für DSM-5, die Difficulties in Emotion Regulation Scale sowie die Difficulties in Positive Emotion Regulation Scale. Relativ zum Unfall-/Verletzungstrauma wird der Effekt von Viktimisierungstrauma auf die Schwere der PTBS-Symptome signifikant durch Schwierigkeiten bei der Emotionsregulation mediiert. Schwierigkeiten bei der positiven Emotionsregulation mediieren signifikant den Effekt von Todesgefahrtrauma auf die Schwere der PTBS-Symptome relativ zu Unfall-/Verletzungstrauma. Traumaexposition am Arbeitsplatz sowie undefinierte Traumaexposition verursachen eine erhöhte PTBS-Symptomschwere, die signifikant durch Schwierigkeiten bei der positiven und negativen Emotionsregulation im Vergleich zur direkten Exposition mediiert wird. Schwierigkeiten bei der Regulation negativer und positiver Emotionen wirken als Mediator zwischen dem Alter beim traumatischen Ereignis und dem Schweregrad der PTBS-Symptome. Limitationen der Studie werden aufgezeigt. Die Ergebnisse legen nahe, dass die Instrumente zur Erhebung von Expositionsgrad sowie der DERS und DERSP im Hinblick auf genauere Erhebung überarbeitet werden sollten. Mit angepassten Instrumenten und diverseren Samples könnten die Forschungsfragen dieser Studie umfassender im Rahmen nachfolgender Forschung beatwortet werden. Die Studie liefert neue Evidenz zum Zusammenhang der genannten Konstrukte und kann zu einer gesteigerten Anpassung von Behandlungsmethoden an individuelle Bedürfnisse beitragen.

Keywords: PTBS, Symptomstärke, Traumatyp, Expositionsgrad, Schwierigkeiten in Emotionsregulation, Schwierigkeiten in positiver Emotionsregulation, Alter zum Traumazeitpunkt

Difficulties in Emotion Regulation – A Mediator between Trauma Characteristics and PTSD-Symptoms?

A car accident, a sexual aggression, the unexpected death of a loved one, a house fire, a life-threatening diagnosis - potentially traumatic events are something many individuals will face during their lifetime. Not everybody will develop posttraumatic stress disorder (PTSD) as a result (Shalev et al., 2019). Still, PTSD has a lifetime prevalence of 1% to over 30% in the general population, depending on cultural, political, geographical and societal factors (Fekih-Romdhane et al., 2020; Knipscheer et al., 2020; Lukaschek et al., 2013; Singh & Khokhar, 2021).

Posttraumatic stress disorder brings with it a number of burdensome symptoms that will put a considerable psychological strain on the concerned person and will restrict them in their everyday life (American Psychiatric Association, 2022). The disorder is also known to have serious consequences, as it increases the likelihood for drug use (Colledge et al., 2020), suicidality (Panagioti et al., 2012), homelessness(Davies & Allen, 2017), and poor physical health (Pacella et al., 2013), which makes investigation into it's developments and manifestations an important objective for psychological research.

In contrast to other psychological disorders such as depression or anxiety disorders, where it is impossible to identify a single event as the cause, the development of PTSD is directly related to an extraordinarily stressful event or continuous unpleasant circumstances (World Health Organization, 2022). Without this event or theses circumstances, the disorder would not have developed. Although certain preexisting vulnerabilities such as a predisposition to depression or insecure living conditions can elevate the risk of suffering from PTSD in response to traumatic circumstances, they are neither necessary, nor sufficient to explain the occurrence of the disorder. Having the traumatic event as a starting engine of the disorder is a unique property of PTSD. This traumatic event will not only set off the disorder with potentially extremely harmful consequences. It will, depending on its characteristics, also determine the gravity and longevity of the disorder and influence the chances of remission (Morina et al., 2014; Norris et al., 2003; Zawadzki & Popiel, 2012). In trying to understand PTSD, the traumatic event is therefore a critical element that must be considered.

PTSD affects mood, cognition, arousal, and the experiencing of emotions (Ainamani et al., 2017; Finucane et al., 2012; Kashdan et al., 2006; Marshall et al., 2019)..

In the following we will firstly take a closer look at PTSD symptoms. We will then look at the three different trauma event characteristics that were chosen for this research, namely trauma type, degree of exposure and age at traumatic event and try to understand their relationship to PTSD symptom severity. In a third part, Difficulties in Emotion Regulation will be introduced. Their connection to PTSD symptom severity and how they relate to the

characteristics of the trauma event will be explored. The proposed hypotheses of the study will then be presented, followed by explanations of the sampling and the methodology. Results will then be shown and discussed.

Posttraumatic Stress Disorder

When describing the impact a disorder has, different perspectives are possible. On a macrolevel, PTSD causes societies economic burdens as it imposes healthcare costs and a loss in productivity as well as indirect costs derived from the two (Davis et al., 2022). Additionally, PTSD brings a considerable medical burden with itself, consuming medical and psychiatric resources and producing comorbidities that in turn will require further resources (Al Jowf et al., 2022). On a community level, trauma exposure has been shown to destabilize and contribute to the dissolution of social support networks (Magruder et al., 2017). Another level below, PTSD influences family life (Creech & Misca, 2017) as well as the quality of romantic relationships (Creech et al., 2019). On an individual level, PTSD will negatively affect the level of functioning with regard to cognition (Bisson Desrochers et al., 2021) as well as to work performance (Brenner et al., 2019) and the overall quality of life (Buhman et al., 2014). While all of these aspects in which PTSD unfolds its influence should be noted, the present study will solely focus on the symptom severity of PTSD.

PTSD Symptom Severity

When it comes to PTSD symptoms, it is necessary to mention the differences in diagnostic criteria between different diagnostic manuals. Whereas the ICD11 now distinguishes between PTSD and complex PTSD (Maercker, 2021), the DSM-5 remains with one PTSD diagnosis but introduces a new symptom cluster compared to the DSM-IV (Bisson, 2013).

Given the fact that the *PTSD Checklist for DSM-5* (PCL-5), a measure following the DSM-5 criteria, will be used to assess PTSD-symptom severity, focus in this study will lie on the symptoms listed in the DSM-5 (Blevins et al., 2015). To fulfill diagnostic criteria, patients will have to suffer from symptoms of all 8 symptom criteria (American Psychiatric Association, 2013). The patients will show intrusion symptoms, classified as Criterion B. Those can be recurrent memories and dreams of distressing nature related to the traumatic event, psychological distress of high intensity and long duration and/or physiological reactions to cues that are linked to some part of the traumatic event(s) as well as dissociation (American Psychiatric Association, 2013). Criterion C describes internal persistent avoidance of trauma-associated stimuli. Criterion D is a negative change in mood and cognition which can present as inability to remember one or multiple aspects of the traumatic event, persistent negative emotional states and beliefs, distorted cognitions, feelings of detachment and inability to experience positive emotions, as well as altered arousal and reactivity that can be

traced back to the traumatic event (Criterion E) (American Psychiatric Association, 2013). To be considered symptoms of PTSD, these symptoms need to last longer than one month (Criterion F), create significant impairment or distress (Criterion G) and cannot be due to medication, substance use or other illness (Criterion H) (American Psychiatric Association, 2013). Instead, symptoms must be connected to criterion A, the experience of a traumatic event. Compared with the broad use of the trauma term in popular culture that has evolved over the last years, the DSM-5 provides us with a rather narrow definition of events that would qualify as a traumatic event (Dalenberg et al., 2017). An individual will fulfill criterion A if they have been exposed to "actual or threatened death, serious injury, or sexual violence" (American Psychiatric Association, 2013, p.271). Exposure can be direct or indirect, meaning that an individual can also be traumatized from witnessing or learning about somebody else experiencing such an event. Additionally, they must cause the concerned individual "significant distress or impairment in social, occupational or other important areas of functioning" (American Psychiatric Association, 2013, p.272). While distressing and limiting in any case, the extent to which PTSD patients are affected by these symptoms varies between individuals. Obviously, the stronger the experience of the symptoms, the bigger the distress and impairment. But stronger symptoms will also translate negatively into other areas.

Higher severity of PTSD symptoms is connected to impaired social-psychological and cognitive functioning (Dalenberg et al., 2017) and linked to alcohol abuse and the consumption of cannabis (Romero-Sanchiz et al., 2022; Tripp & McDevitt-Murphy, 2015), and it also influences physical health (Spiller et al., 2016; Vandiver et al., 2022). These results additionally showcase the importance of understanding what exactly leads to heightened symptoms, as this understanding will, in the long run, enable improved treatment and prevention measures. Several factors on different levels are known to influence symptom severity. Individual traits (Ben-Zion et al., 2018, Meyer et al., 2019) and habits (Short et al., 2017) on a cognitive level are connected to the extent of PTSD symptoms. Personality traits (Stevanović et al., 2016) and personal convicitions (Kaiser et al., 2020; Neilson et al., 2020) are also connected to symptom severity. Parameters that can be modulated by lifestyle, such as sleep quality and gut health contribute to symptom severity as well (Pivac et al., 2023; Short et al., 2017). In this regard, PTSD has properties similar to other disorders – its severity is influenced by a number of different factors. However, the trauma event which induces the disorder also explains a big amount of symptom severity variance. More specifically, certain aspects of the traumatic event can act as predictors of symptom severity. In the following, three of these aspects will be presented.

Trauma type

There are multiple approaches in trauma research to differentiate between types of traumata. One approach comes from Lenore Terr, who proposes a differentiation into two types of traumata (Terr, 1991). This approach has been developed further with the addition of a third type (Solomon & Heide, 1999). This conceptualization only considers personal trauma and, in this field, doesn't differentiate between sexual and physical abuse. Moreover, this conceptualization has its roots in the research of childhood trauma, therefore it might not be suited for the present adult sample. In the following, we will thus make use of a conceptualization of trauma types by Contractor et al. (2020). It infers trauma type from the answers of the *Life Events Checklist* (LEC), which is based on the DSM 5 diagnosis of PTSD (Weathers et al., 2013). Using network analysis on a large LEC-sample, three trauma type clusters became apparent (Contractor et al., 2020). The first cluster, accidental/injury trauma, describes trauma evoked by accidents and injuries. Causes could be housefires, traffic accidents or natural disasters like earthquakes or hurricanes. The second cluster, victimization trauma, comprises victimizing events, for example robberies, assaults, and sexual violence. Trauma events in which the individuals in questions were threatened by death make up the final and third cluster, predominant death threat trauma. Differentiating between different trauma types is a necessary step in exploring PTSD. Different types of possibly traumatic events have different probabilities of leading to the development of PTSD, interpersonal violence being the type of traumatic event that has the highest probability of causing PTSD (Cusack et al., 2019; McLaughlin et al., 2013; Santiago et al., 2013). The trauma type also determines the probability of faster remission (Müller et al., 2018). People affected by interpersonal violence, meaning Cluster 2 trauma events, will take longer to remit from PTSD than people affected by other traumatic events (Chapman et al., 2012). The comorbidity that comes with PTSD also depends to some degree on the type of traumatic event at the root of the disorder (McMillan & Asmundson, 2016; Wanklyn et al., 2016). People that experienced non-sexual physical violence are more likely to be suffering from substance use disorders, while trauma caused by the unexpected death of a loved one increases the chances of a comorbid depressive disorder (Smith et al., 2016). Additionally, there has been shown to be a cumulative effect of different trauma types, meaning that the adverse effects of trauma increase, the more different types of traumatic events one person experiences (Agorastos et al., 2014; Lu et al., 2013). This cumulative effect also applies to chances of spontaneous remission, which are less likely the more kinds of traumatic events an individual has been subject to (Kolassa et al., 2010). Regarding the manifestation of the disorder, different types of civilian trauma have shown to produce distinct variations in symptom patterns. It was also shown that they cause different levels of symptom severity (Kelley et al., 2009). Notably betrayal, an element of victimizing trauma events, causes

PTSD patients increased suffering (Andresen et al., 2019; Kelley et al., 2012). This matches another study's results that showed heightened PTSD symptom severity in sexual trauma and non-sexual physical violence compared to other trauma types (Smith et al., 2016). Childhood sexual trauma in particular has been shown to produce unique symptomatic outcomes, making affected individuals suffer from avoidance and numbing at higher rates than other trauma types(Kelley et al., 2012), and producing overall higher symptom severity (Runyon et al., 2014). PTSD trajectories proved to vary so much that for the WHO's new version of the ICD a new diagnostic category has been constructed (World Health Organization, 2022). CPTSD, complex posttraumatic stress disorder, often is a result of childhood abuse, especially when the abuse is committed by caregivers, which creates a sentiment of inescapable suffering (Cloitre et al., 2019). But it can also derive from adulthood trauma of severe interpersonal intensity (Karatzias et al., 2017, 2019). Apart from the type of traumatic experience, the age at which trauma was experienced and the intensity are potent factors that determine the symptomatic facets of the trauma response, making said response fall into either the diagnostic category of PTSD or CPTSD.

While in this study we will remain in the framework of the DSM-5, it is still necessary to mention this split in the ICD11 categorization because it makes the big variety of symptomatic outcomes depending on trauma event characteristics just so visible. In the following, we will look at two more of these characteristics.

Level of exposure

Being affected by PTSD is not an exclusive risk for those who suffer firsthand from the traumatic event. Being a witness of a crime, learning about a loved one's accident or being exposed to the results of a natural disaster while working as a first responder are examples of cases that can also lead to PTSD. The Life Events Checklist distinguishes between different levels of trauma exposure: "Happened to me", "witnessed it", "learned about it" and "part of my job". Additionally, it offers the options "not sure" and "doesn't apply" (Weathers et al. 2013a). Work-related trauma exposure presents a special case. Helping professionals like social workers, health care providers and rescue workers are subject to secondary trauma through the accounts of the people they provide their services to. This secondary exposure has been shown to produce secondary traumatic stress (STS) which is not the same as PTSD but shares a certain overlap with the concept (Cieslak et al., 2013; Sprang et al., 2019). Furthermore, in the case of counsellors, the recurring confrontation with trauma accounts can lead to compassion fatigue, therefore hindering the processing for the patient and causing psychological strain for the counsellor (McKim & Smith-Adcock, 2014). Police officers who deal with secondary trauma through the accounts of victims but who also are in a position that makes themselves subject of threat and danger have been shown to

report differing levels of job-related PTSD, depending very much on the adaptivity of their coping mechanisms (Foley et al., 2022). Apart from trauma exposure due to one's profession, the probability of PTSD increases with closer proximity of the potentially traumatic event, making it more probable for victims of direct trauma exposure to develop the disorder in comparison to indirect trauma (May & Wisco, 2016). In line with this, research about threats that concern the general population of a certain area such as war or earthquakes has shown that people that have been closer to the catastrophic events and have been exposed to more aspects of these events will suffer from higher PTSD symptom severity. (Chatard et al., 2012; Jin et al., 2019). But also when it comes to different trauma types, individuals affected by PTSD following direct trauma exposure on average show higher symptom severity than individuals who developed the disorder in reaction to an indirect trauma event (Jakob et al., 2017; Pitts et al., 2013; Tierens et al., 2012). The degree of exposure will have effects on different areas apart from symptom severity, beginning on a neurobiological level (Lewis et al., 2020), and moving onto mother-child-interaction, where a higher degree of maternal trauma exposure has been shown to predict a higher degree of avoiding attachment behavior in children (Feldman & Vengrober, 2011). There also seems to be an influence on the association of trauma and addiction, making it stronger for direct exposure (Levin et al., 2021). Generally speaking, the degree to which an individual has been exposed to a traumatic event, acts as an indicator to how the PTSD will present.

Age at traumatic event

The age of an individual is a determining factor in whether and how individuals will develop PTSD. Being of younger age makes it more likely that a person will develop PTSD after a potentially traumatic event (Koenen et al., 2017). Traumatizing events that are experienced during childhood have an especially detrimental effect. Children are more likely to develop PTSD following traumatic events in comparison to adults (Shannon et al., 1994). Faced with the severe consequences of early trauma such as disordered attachment, impaired social cognition and difficulties in physiological and behavioral regulation, some experts in the field are advocating for implementing *developmental trauma disorder* in the diagnostic manuals (Cruz et al., 2022; Sar, 2011). So far, these efforts have been unsuccessful. Still, they highlight the special outcomes of trauma when it happens to people at a very young age. Childhood trauma not only predicts PTSD but also substance use disorder, depression and psychosis (Blacker et al., 2019; Cross et al., 2015; Powers et al., 2016). PTSD caused by childhood trauma is linked to postpartum depression, which will negatively implicate not only the woman but also her child (Oh et al., 2016).

Also, the symptom severity following childhood trauma in comparison to trauma that occurred later in life is significantly higher (Dunn et al., 2017; Schumacher et al., 2006;

Sundermann & DePrince, 2015). Comparing the symptoms and psychosocial functioning in a group of older adults, the negative effects of trauma for those that experienced traumatic events in childhood or adolescence were a lot greater than for those who were subject to traumatic experiences in their adult lives (Ogle et al., 2013). Especially traumatic events in early childhood have even more detrimental effects than traumatic events experienced in later developmental stages (Dunn et al., 2017). The point in time when a traumatic event is experienced also influences future development of PTSD in the way that prior childhood trauma aggravates symptoms in retraumatized adults (Cloitre et al., 1997; Hembree et al., 2004). But also in trauma-exposed adult samples, younger age has been shown to correlate with higher symptom severity (Dell'Osso et al., 2013; Maschi et al., 2011)

Emotion regulation and PTSD

We have now looked at trauma event characteristics with a special focus on their effect on PTSD symptom severity. In the following, another construct that is closely intertwined with PTSD will be focused on, namely emotion regulation. Before elaborating on this connection, we will first look at emotion regulation in general.
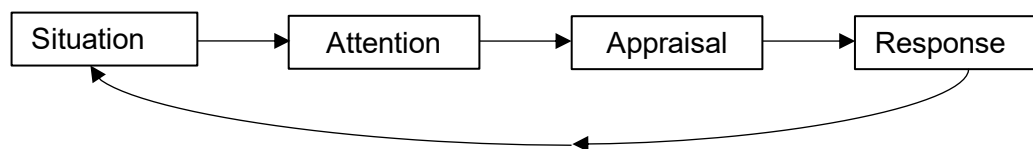
Emotion regulation

Emotions are regarded to be valenced, meaning that people experience them either as positive and pleasant or negative and unpleasant. In contrast to personality traits, they are not consistent over time and circumstances but bound to situations and limited by time frames (McRae & Gross, 2020). While emotions can sometimes feel overwhelming, most adults manage to control their emotions for the majority of time. The process of diminishing or increasing both positive and negative emotions in an effort to achieve regulation-related goals is what we call emotion regulation. Emotion regulation can be used deliberately as well as implicitly (McRae & Gross, 2020). Similarly, the regulation-related goals can be conscious or subconscious and are connected to the individual's values, developmental stage in life and personality and depend on the situation they find themselves in (Werner & Gross, 2010). While emotion regulation can also occur extrinsically, when a person aims at changing someone else's emotions, most studies will investigate intrinsic emotion regulation, the regulatory processes within an individual (McRae & Gross, 2020). In this study as well, we will look at emotion regulation from a solely intrinsic perspective.

Before trying to understand how PTSD is linked to emotion regulation, we must first understand how emotion regulation occurs. The process can be looked at on a micro as well as on a macro level. While the macro level of emotion regulation looks at the abilities to respond to emotions in an effective and adaptive way, the micro level models focus on explaining the specific situational, cognitive and behavioral strategies that an individual

performs in reaction to emotions (Tull & Aldao, 2015). We will firstly focus on the small scale level, which is described by the extended process model of emotion regulation, before moving on to macro level explanations (Gross, 2015).
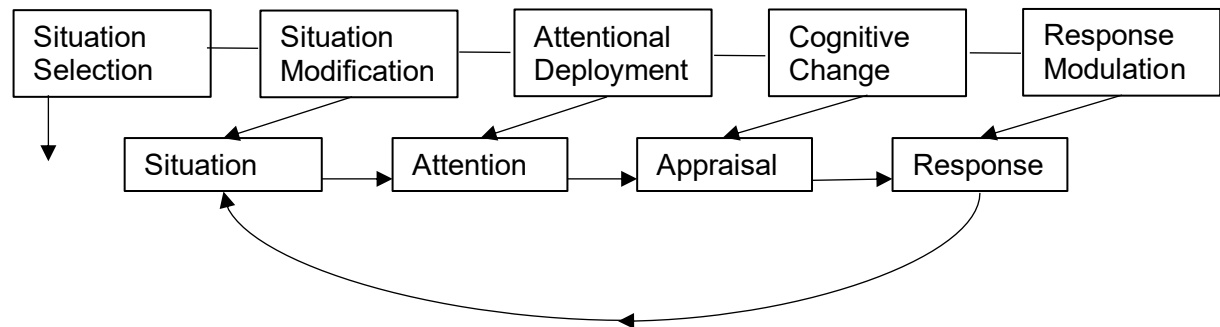
The extended process model of emotion regulation assumes three phases that are explained at three different levels. The ground level, illustrated in figure 1, describes the process of emotion generation. The generation of an emotion begins when an individual finds themselves exposed to a certain situation. They will then aim their attention to the key aspects of said situation. In a next step, they will then appraise the situation according to their situational goals. A behavioral, physiological, and experiential response will follow.

Figure 1

Level a – Emotion Generation

Situation → Attention → Appraisal → Response

Conceptualized as one level above the emotion generation, meaning on the second stage of the process model, emotion regulation occurs by one of multiple strategies. This level b is illustrated by figure 2. The process model postulates five different groups of regulation strategies. Every strategy family aims at different aspects of the emotion generation process. Situation Selection describes the process of deciding, whether an individual will even enter a potentially emotion-evoking situation. In case the decision is taken not to get into said situation, the applied emotion regulation strategy would be Avoidance. To be able to use these regulatory strategies, individuals need the ability to predict the emotions that will be elicited by the situation (Werner & Gross, 2010). Regulatory strategies belonging to the domain of situation modification are applied once an individual finds themselves in a situation that produces an emotion they wish to modify. This could mean making a direct request, for example asking somebody to switch seats or otherwise altering the situation to adapt it to one's needs. Strategies of Attentional Deployment like Distraction or Rumination are used to reduce the extent of attention an individual pays to the relevant aspects of the situation. The process of Appraisal will provoke cognitive changes. Regulatory strategies belonging to this family such as Acceptance or Cognitive Reappraisal will mitigate the emotional response by altering the interpretation of the situation. Emotions can still be regulated at later stages of the generation process as well – even the response itself can be regulated. Strategies of Response Modulation that can come into play here are Expressive Suppression, Physiological Intervention and Amplification (Demaree et al., 2004).

Figure 2

Level b – Emotion Regulation

The third stage of the extended process model of emotion regulation describes the enactment of the strategies. There is an Identification phase during which an individual will decide whether or not to regulate an emotion. If the result of this phase is the decision that regulation should happen, they will then decide on an adapted strategy in the stage of Selection. Afterwards, the individual will then implement the selected strategy. This Implementation stage is accompanied by a Monitoring process, which serves as a control function. The Monitoring then leads back to the Identification stage, where the individual will reevaluate the need for more and/or different regulation. Figure 3 illustrates this monitoring process.

Figure 3

Level c – Monitoring of Emotion Regulation
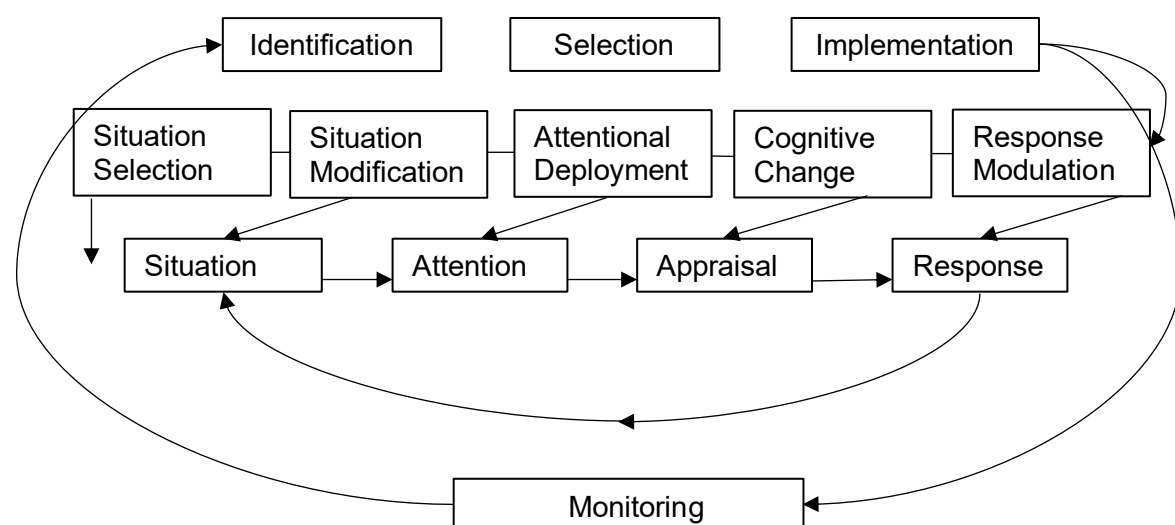
The different strategies that are used in the second stage of the process model vary in effectiveness. While Distraction or Suppression of the expression of emotion have shown to have an effect on the emotional experience, other strategies like Concentration or Suppression of the thoughts of the emotion-eliciting event have proven to be unsuccessful in studies investigating the power of different strategies (Webb et al., 2012). When looking at the effectiveness of different regulatory strategies, we must bear in mind that there are different factors at play.

The to-be-regulated emotion, the intent of the regulation as well as the frequency of use of the strategy will moderate the effectiveness of the regulatory strategy (Webb et al., 2012). People also differ in their habits of applying one kind of emotion regulation strategy over another. These tendencies can be predicted by Big-Five Personality traits, (Hughes et al., 2020; Purnamaningsih, 2017) age, and gender (Schirda et al., 2016; Zimmermann & Iwanski, 2014). However, emotion regulation patterns are not inherent personal traits that remain stable over time. Instead, they are learned and acquired skills. The biggest progress in regulation abilities is made throughout childhood but regulatory strategies stay flexible and susceptible to change through an individual's lifespan (Calkins, 1994; John & Gross, 2007). Human beings show a big variety of emotion regulation strategy usage. It is dependent on the degree of their context sensitivity, on how well they can perceive demands and opportunities that are linked to a situation, on their repertoire of different strategies, and on their ability to monitor and use feedback in the regulatory process (Bonanno & Burton, 2013).

Difficulties in Emotion Regulation

If we move on from the mere explanations of emotion regulation processes, we will quickly come across the notion of difficulties in emotion regulation. When talking about difficulties in emotion regulation, in this study like in psychological research in general, we generally talk about negative emotions. Positive emotions have only lately begun to receive more attention in this context (Weiss et al., 2015). For this study, where both concepts will be treated, it is important to bear in mind that difficulties in emotion regulation refers only to negative emotions. When positive emotions will be concerned, it will always be mentioned explicitly.

Coming back to the notion of difficulties in emotion regulation, it introduces the question of successful and unsuccessful handling of emotions and takes us from emotion regulation strategies to emotion regulation abilities (Tull & Aldao, 2015). But how do we establish a line between successful, adaptive, and unsuccessful, maladaptive emotion regulation and what makes somebody able or unable to regulate their emotions? Some strategies, such as avoidance, have been deemed maladaptive in research (Tull et al.,

2020). In some contexts, however, and if not used excessively, strategies such as avoidance can be beneficial to achieve a desired emotional state. The valorization of some strategies over others may be too general and would not pay enough respect to the great variance of situations in which emotions arise and require regulation. Instead of ranking strategies, a more productive approach is looking at the abilities of people to choose appropriate strategies that fit the situation as well as possible and will lead them to their desired emotional states. This requires high regulatory flexibility (Bonanno & Burton, 2013). To conclude, adaptive, therefore effective, emotion regulation can be defined as a process in which strategies are chosen and implemented that are "appropriate for the context, appropriate for how controllable the internal and external events are and are in accordance with one's long-term goals" (Werner & Gross, 2010).

Having to find these adapted, appropriate strategies gives us an idea that effective emotion regulation comes with certain challenges and will demand certain efforts from the individual. Personality traits like Trait Self-Control and Action Orientation as well as cognitive abilities like Working Memory Capacity and Emotional Updating Ability have been shown to be correlated positively with successful emotion regulation (Hofmann & Kotabe, 2014; Koole & Fockenberg, 2011; Pe et al., 2015). Based on what is known about emotion regulation, it can be assumed that difficulties in emotion regulation could arise when strategies are used in inflexible ways, are not sufficiently adapted to the context, will contradict a person's long-term personal goals, and fail to achieve the desired regulation of the target emotion. Such difficulties could stem from compromised regulation capabilities, from an immature or missing repertoire of emotion regulation strategies or from emotions of high intensity that overtax a person's regulation abilities (Werner & Gross, 2010).

The *Difficulties in Emotion Regulation Scale* (DERS) (Gratz & Roemer, 2004) provides a way to broadly measure difficulties in emotion regulation. This instrument captures difficulties at the macro level of emotion regulation. It focuses on the capacities and abilities required for using effective emotion regulation strategies, and can be linked to the extended process model of emotion regulation (Tull & Aldao, 2015). The DERS follows the general assumption that adaptive emotion regulation consists of modulating the experience of emotions through influencing the intensity or duration rather than eliminating an emotion. Strategies of chronic avoidance or constant control of emotions are therefore regarded as rather maladaptive.

The DERS builds on six factors that form its underlying structure: Nonacceptance of Emotional Responses, Difficulties in Engaging in Goal-directed Behavior, Impulse Control Difficulties, Lack of Emotional Awareness, Limited Access to Emotion Regulation Strategies and Lack of Emotional Clarity. These factors can be hindering in the use of situationally adapted strategies of emotion regulation. While there have also been proposals for a five-

factor model that would discard the Lack of Emotional Awareness factor (Bardeen et al., 2012; Kökönyei et al., 2014), confirmatory factor analyses have also found supporting evidence for the six factor model (Fowler et al., 2014). So far, there have been no empirical attempts to connect the factors of the DERS and the extended process model of emotion regulation. On a theoretical level however, we can assume some links, as Tull et al. (2020) and Tull and Aldao (2015) have done as well. Some of the difficulties in emotion regulation could relate to the second stage of the extended process model, where the different strategy families are described. Nonacceptance of Emotional Responses would imply that the emotional responses themselves are rejected by the individual. Response Modulation could therefore not occur or be significantly restricted. Difficulties in engaging in Goal-directed Behavior could negatively affect Response Modulation as well as Situation Modification. Impulse Control Difficulties could have an impact on the domains of Attentional Deployment, Cognitive Change, and Response Modulation.

On the third stage of the model, when it comes to the actual deployment of the ER strategies, Lack of Emotional Awareness can obstruct the Identification stage as well as the Monitoring process. Lack of Emotional Clarity makes the selection of a regulation strategy more difficult and more prone to errors. These assumptions are backed by studies showing a correlation between negative emotion differentiation, which relates to emotional clarity and awareness, and the ability to use emotion regulation strategies (Barrett et al., 2001). Seen from the other side, using maladaptive regulation strategies repeatedly might limit the modulation ability, and reinforce Nonacceptance of Emotions (Tull et al., 2020). The processes on both levels, more specifically strategies and abilities are therefore assumed to influence each other in both directions (Tull & Aldao, 2015).

Difficulties in positive emotion regulation

So far, we have only discussed difficulties in regulating negative emotions. Negative emotions are at the center of research regarding emotion regulation and psychopathology. Nevertheless, the importance of regulating positive emotions is receiving more and more attention. Not without reason, because the ability to regulate positive emotions is correlated with lower depression, higher self-esteem as well as higher overall life satisfaction (Tugade & Fredrickson, 2007). Being able to up- and downregulate as well as to maintain positive emotions in accordance to one's short and long-term goals is an important skill for a balanced general well-being (Carl et al., 2013). Inversely, difficulties in the regulation of positive emotions are connected to harmful behaviors including increased substance use (Weiss et al., 2018), delinquent acts (Velotti et al., 2020), risky sexual conduct (Weiss et al., 2015) and more risk taking in general (Weiss et al., 2018). The DERS-Positive is an instrument that captures difficulties in positive emotion regulation. Like the DERS, it

functions on a macro level, measuring regulation abilities of positive emotions. Its three-factor structure is comprised of Nonacceptance of Positive Emotions, Difficulties in engaging in Goal-directed Behavior and Impulse Control Difficulties (Weiss et al., 2015). As explained above, these factors will negatively impact the process of emotion generation and regulation, hindering an individual from managing their positive emotions in a way that will serve their situation-dependent emotional goal.

Difficulties in Emotion regulation and PTSD

There is a considerable body of evidence for a connection between emotion regulation and psychopathology. There are certain emotion regulation strategies that are applied significantly more often by people that have a particular disorder (Aldao et al., 2010). Difficulties in the regulation of both positive and negative emotions are correlated with psychopathology (Weiss et al., 2018), more specifically with disorders like bipolar disorder (Velotti et al., 2020), anorexia nervosa (Santos & Haynos, 2023) or anxiety disorders (Sheppes et al., 2015). For some disorders, difficulties in emotion regulation even make up defining criteria (Gross & Jazaieri, 2014). This is the case for PTSD. The ICD11 postulates strong or overwhelming emotions that accompany the reexperiencing of the traumatic event as a symptom of PTSD. As a consequence, PTSD-affected individuals will have more negative and less positive emotions than healthy control groups (Finucane et al., 2012; Kashdan et al., 2006). Most prominent are fear and anxiety, but negative posttraumatic cognitions will also provoke increased shame and guilt (McLean & Foa, 2017). As a way to avoid more distressing trauma-related feelings, some PTSD-affected people will also feel more anger (McLean & Foa, 2017). Additional clinical features listed in the manual are the maladaptive emotion-regulation behaviors such as e.g. drug or alcohol abuse (World Health Organization, 2022). In the connection between PTSD and harmful coping strategies like impulsive aggression, alcohol and marihuana misuse and non-suicidal self-injury, difficulties in emotion regulation take on a moderating role (World Health Organization, 2022). Through the exceptionally stressful nature of trauma, affected individuals will experience highly intense negative emotions they are not used to feeling. The reexperiencing of traumatic memories that is unique to PTSD brings back these emotions with each flashback in unrestrained intensity, making the survivors live through this stress again and again. They are therefore exposed to negative emotions not only in an extraordinary intensity but also with an extraordinary frequency (Tull et al., 2007). Additionally, some PTSD-affected people will also experience extended periods of emotional numbing, interrupted by intense emotional experiences (Litz et al., 2002). All of these symptoms could confront the affected person with a palette of emotional experiences that might be incomparable to the one they knew before the traumatic event. The individual's usual techniques of managing emotions

would then be largely insufficient. Additionally, the impression might arise that emotions are unpredictable and uncontrollable phenomena. This could then result in fear of one's emotions. As with many anxiety-ridden subjects, emotions will then be met with suppression or avoidance (Tull et al., 2007, 2020). If emotion- and therefore fear-inducing situations are avoided, confrontation with trauma-relevant cues, which could be helpful in reintegrating the traumatic memory, becomes impossible. This chain reaction finally leads to maintained, potentially even aggravated PTSD-symptoms (Tull et al., 2007). From another angle, difficulties in regulating one's emotions will have a negative impact on interpersonal relationships and on the general level of functioning, leading to further maintenance or aggravation of PTSD-symptoms (Tull et al., 2007). While this explanation sees difficulties in emotion regulation as an a posteriori consequence of trauma, there are also some indications that prior existing difficulties in emotion regulation can increase the risk of developing PTSD and heighten the chances of developing chronic PTSD (Bardeen et al., 2013; Pencea et al., 2020). Given that most research is done with cross-sectional data, it is difficult to clearly establish the direction of the link. The results of this link are described in many studies investigating different samples. Students (Tull et al., 2007), veterans (Miles et al., 2016) and residents in residential substance use treatment (McDermott et al., 2009) have shown positive correlations between exposition to trauma, probable PTSD and elevated levels of emotional nonacceptance, more difficulties in controlling impulsive behaviors when distressed, limited access to emotion regulation strategies perceived as effective, more difficulties in engaging in goal-directed behaviors when distressed, lower levels of emotional clarity and awareness (Frewen et al., 2012; Tull et al., 2007; Weiss et al., 2012) and increased reliance on putatively maladaptive emotion regulation strategies (Seligowski et al., 2015). Overall difficulties in emotion regulation (Badour & Feldner, 2013) and more precisely, the usage of a maladaptive emotion regulation strategy pattern (Chang et al., 2018; Chesney & Gordon, 2017), meaning high levels of suppression, avoidance and rumination (Badour & Feldner, 2013; Chang et al., 2018; Chesney & Gordon, 2017; Pugach et al., 2020), are strong predictors for higher PTSD symptom severity. Reversely, symptom severity is diminished by treatment with selective serotonin reuptake inhibitors that promote adaptive emotion regulation involving prefrontal cortex areas (MacNamara et al., 2016).

Difficulties in regulating positive emotions are known to negatively influence symptom severity as well (Weiss et al., 2019). Higher levels of nonacceptance of positive emotions, stronger difficulties engaging in goal-directed behaviors when confronted with positive emotions, as well as increased difficulties with impulsive behaviors when experiencing positive emotions are positively correlated with higher levels of symptom severity (Weiss, Dixon-Gordon, et al., 2018; Weiss et al., 2015). PTSD-affected individuals also have an increased use of strategic withholding of positive emotions (Roemer et al., 2001). This could

have its roots in a generalization of high arousal levels that occur in threatening situations but also in strong positive emotional situations (Kuppens et al., 2013). A pleasant rush of excitement could provoke the same arousal as a fright reaction and is therefore going to be suppressed or avoided. Feeling positive emotions leads to a broadening of the visual field (Masuda, 2015; Schmitz et al., 2009). Hypervigilance, which is a byproduct of PTSD, cannot be upheld if the visual field is broadened. Thus, positive emotions are rejected, so that safety can be ensured through a constant state of increased vigilance.

Difficulties in regulating positive and negative emotions are thus strongly linked to the severity of PTSD symptoms. Apart from directly influencing symptom severity, emotion regulation abilities serve as a mediator between PTSD symptoms and other constructs such as self-compassion (Scoglio et al., 2018), depression symptoms (Chang et al., 2018), problematic alcohol use (Radomski & Read, 2016), cocaine dependency (Tull et al., 2016), perceived racial discrimination (Cole et al., 2023) and attitudes towards masculinity (Berke et al., 2018; Kaiser et al., 2020; Neilson et al., 2020). This leads us to the other trauma-related factors we presented earlier. We will now look at them in connection to emotion regulation difficulties.

Difficulties in Emotion Regulation and Trauma Type. The emotional reaction that occurs during and after a traumatic experience has been shown to differ between sexual assault trauma and other kinds of traumatic events, with sexual assault trauma having the most intense negative emotional reactions (Amstadter & Vernon, 2008). In line with this observation, different kinds of Emotion Regulation Difficulties have been shown to be connected to different trauma types (Ehring & Quack, 2010). Difficulties in regulating negative emotions are stronger related to Victimization trauma than to other trauma types while difficulties in positive emotion regulation are higher in predominant death threat trauma affected individuals (Berfield et al., 2022). Studies found difficulties in negative emotion regulation to be a mediator for betrayal trauma, meaning victimization trauma and symptom severity, but not for other trauma (Goldsmith et al., 2013; Raudales et al., 2019). To potentially strengthen this claim and see if these results can be reproduced, we hypothesize the following:
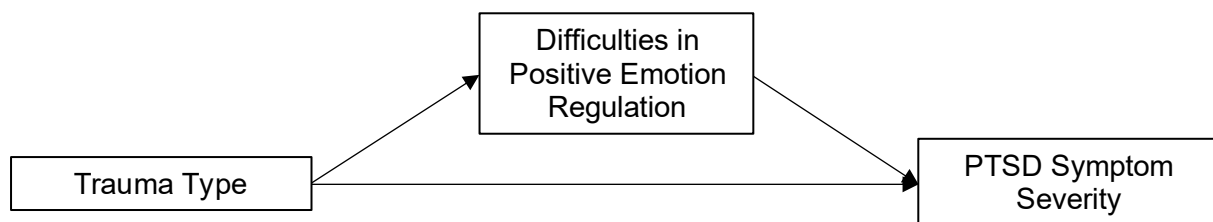
H1.1: Difficulties in Emotion Regulation mediate the effect of different trauma types on PTSD symptom severity.

Figure 4

Model of hypothesized mediation (1.1)
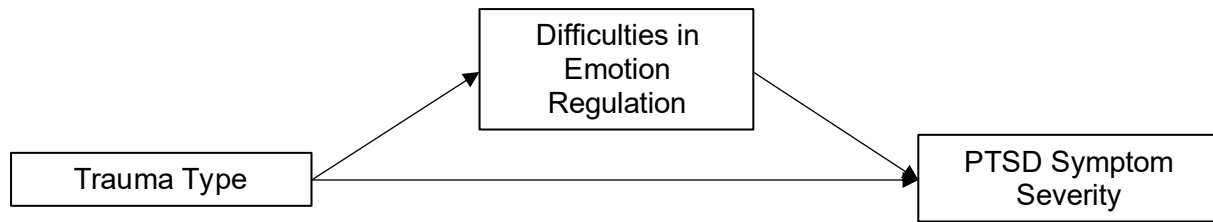
Note. Three different trauma types were tested in reference to Accidental/Injury Trauma.

As the literature so far focuses on negative emotion regulation, we want to shine light on positive emotion regulation as well and postulate:

H1.2: Difficulties in Positive Emotion Regulation mediate the the effect of different trauma types on PTSD symptom severity.

Figure 5

Model of hypothesized mediation (1.2)

Note. Three different trauma types were tested in reference to Accidental/Injury Trauma.
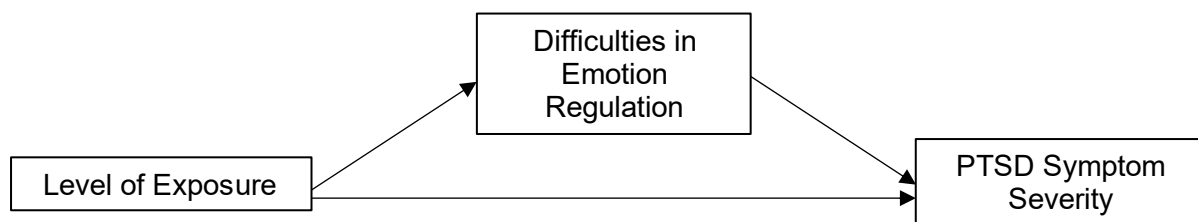
Difficulties in Emotion Regulation and Level of Exposure. In current research, the triangle of level of exposure to trauma, emotion regulation and PTSD symptom severity has not been studied in depth yet. However, some results indicate, that the combination of the three constructs could be worth investigating. It has been shown that there is a negative correlation between higher exposure and anxiety-buffering, implying that there may very well be a relevant connection between degree of exposure and emotion regulation (Chatard et al., 2012). Emotion regulation is a crucial element in promoting or reducing the transgenerational perpetuation of intimate partner violence, depending on whether the witnessing children acquire sufficient regulation abilities (Lacasa et al., 2018; Siegel, 2013). It therefore unfolds its moderating influence not only on people affected by direct trauma. When it comes to trauma exposure as a result of a job, difficulties in emotion regulation have been shown to hold a mediating role in the connection between job trauma and secondary

traumatic stress (Benuto et al., 2022; Tessitore et al., 2023). As the connection between level of exposure and PTSD symptom severity has already been laid out, we can already conclude with the resulting hypotheses:

H2.1: The connection between the level of exposure to trauma and PTSD symptom severity is mediated by Difficulties in Emotion Regulation.

Figure 6

Model of hypothesized mediation (2.1)

```
                    ┌──────────────┐
                    │ Difficulties in│
                    │   Emotion    │
                    │  Regulation  │
                    └──────────────┘
               ↗                      ↘
┌──────────────────┐           ┌──────────────┐
│ Level of Exposure │─────────→│ PTSD Symptom │
└──────────────────┘           │   Severity   │
                               └──────────────┘
```

Note. Four different levels of exposure were tested in reference to Immediate Exposure.

H2.2: The connection between the level of exposure to trauma and PTSD symptom severity is mediated by Difficulties in Positive Emotion Regulation.

Figure 7

Model of hypothesized mediation (2.2)

```
                    ┌──────────────┐
                    │ Difficulties in│
                    │Positive Emotion│
                    │  Regulation  │
                    └──────────────┘
               ↗                      ↘
┌──────────────────┐           ┌──────────────┐
│ Level of Exposure │─────────→│ PTSD Symptom │
└──────────────────┘           │   Severity   │
                               └──────────────┘
```
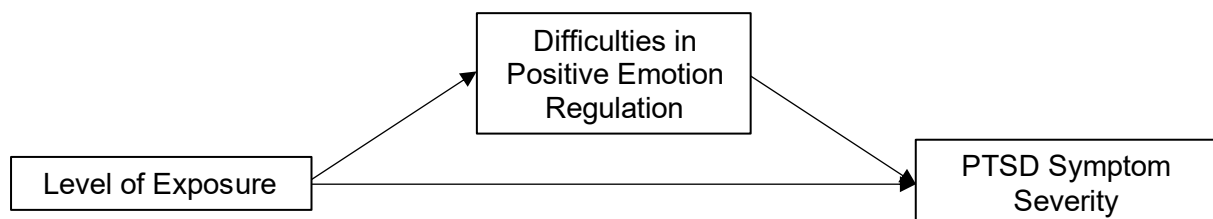
Note. Four different levels of exposure were tested in reference to Immediate Exposure.
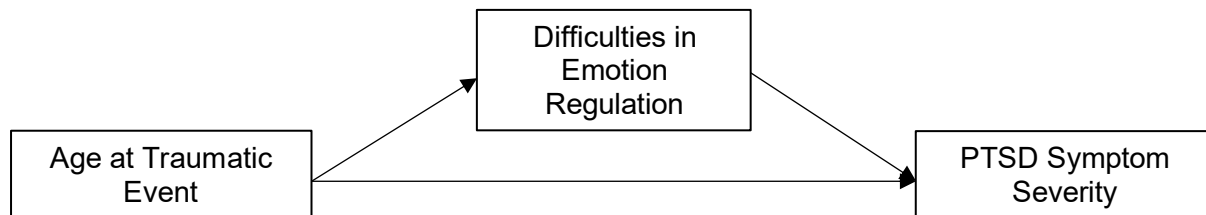
Difficulties in Emotion Regulation and age at traumatic event. Being able to manage one's emotions is a skill, that is acquired and improved throughout the course of a lifetime. Most of this acquisition happens in childhood, where we learn through observing the people around us as well as through modeling and social referencing (Morris et al., 2007). If trauma happens in the formative stages, this acquisition will be hampered. As such, it has been shown that emotional dysregulation follows child maltreatment and predicts psychopathology

(Hébert et al., 2018; Weissman et al., 2019). Emotion regulation can even worsen negative effects of child abuse. Reversely however, when applied adaptively, it can also function as a buffer and support coping against the adverse outcomes of child maltreatment (Gruhn & Compas, 2020). Traumatic events occurring before the age of 15 have been shown to negatively influence PTSD symptom severity as well as the development of adaptive emotion regulation strategies (Dragan, 2020). Especially trauma exposure happening between age 6 and 10 has been shown to have the most harmful consequences to the development of regulatory abilities, implying that these years might be a sensitive period in the development of effective emotion regulation (Dunn et al., 2017). As it is obvious that there are connections between age at traumatic event, PTSD-symptom severity and difficulties in emotion regulation, we can conclude the following hypotheses:

H3.1: Difficulties in Emotion Regulation act as a mediator in the connection between age at the traumatic event and PTSD symptom severity.

Figure 8

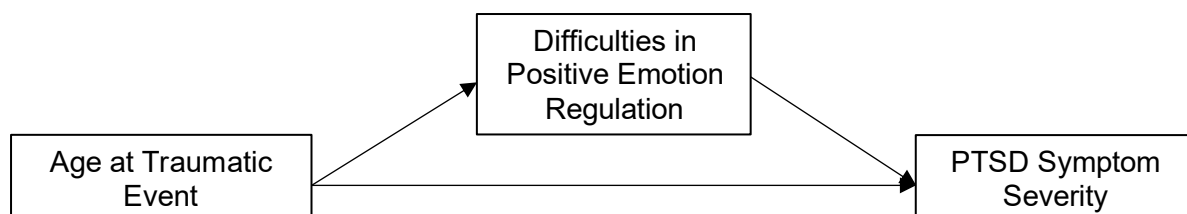*Model of hypothesized mediation (3.1)*

and

H3.2: Difficulties in Positive Emotion Regulation act as a mediator in the connection between age at the traumatic event and PTSD symptom severity.

Figure 9

Model of hypothesized mediation (3.2)

Method

Sample

The data for this secondary analysis was collected by Contractor et al. (2020) in January 2019 using Amazon's Mechanical Turk (MTurk) (https://www.mturk.com). This online platform allows researchers to connect with people that are willing to participate in their research projects. In exchange, they receive a small monetary compensation (Mason & Suri, 2012). The sample was therefore a convenience sample. Through this recruiting tool, Contractor et al. (2020) obtained information from 461 individuals. Inclusion criteria was to be 18 years or older, to live in North America and to be fluent in English. All participants that reported the presence of PTE(s) screened with the Primary Care PTSD Screen for DSM-5 (Prins et al., 2015) were able to proceed further in the survey, meaning that everybody whose answers were included in the final dataset had experienced a potentially traumatic life event. Participants were asked for their informed consent. This meant that they were told about inclusion criteria as well as the duration and content of the questionnaires. After they had completed the 45-60 minutes survey validly, they received $1.25. The ethics vote was granted by the University of North Texas Institutional Review Board.

The average age of the remaining 401 participants was 35,91 years (SD = 11.208). 40.9% of participants identified as male, 57.9% as female and 1,5% as something other than male or female. On average, the people in the sample had obtained 15.31 years of schooling (SD = 2.387), 16 years meaning graduation from college. Most were working full time (71.1%), some part time (15.7%). The remaining were retired (3.2%), unemployed (8%) or unemployed students (2%). About two-thirds were in committed relationships or marriages (69,1%). Three quarters of participants answered to be white/Caucasian. The remaining participants were 13% Hispanic, 9.5% Black/African American, 11% Asian, 4.7% Native American and 0.7% Pacific Islander. 1.5% did not disclose any information about their racial background. At the time of the data collection, 11.2% had indicated to be in therapy. 44.4% answered that they had received therapy for mental health or emotional problems in the past. 16.5% were on medication such as antidepressants or anxiety pills at the time of data collection. 18.7% answered that they had been on such medication in the past.

Measures and Covariates

For the research purposes of the primary study, the following measures were applied in the data collection: *Life Events Checklist for DSM-5*, *Posttrauma Risky Behavior Questionnaire*, *PTSD Checklist for DSM-5*, *Patient Health Questionnaire-9*, *The Difficulties in Emotion Regulation Scale-16* and *The Difficulties in Emotion Regulation Scale-Positive*.

Instruments

Out of these, only the following four will be relevant in this study:

Life Event Checklist for DSM-5

This self-report measure consists of 17 items and allows to assess different types of potentially traumatic lifetime events (Weathers et al., 2013a). For each potential trauma event, respondents are asked to indicate the degree of exposure by a rating with six response options ("Happened to me", "Witnessed it", Learned about it", "Part of my job", "Not sure", "Doesn't apply"). Positive trauma endorsement was constated if they selected either of the first four response options, in line with diagnostic criterion A of PTSD following the DSM-5 (Weathers et al., 2013a). Examples of items would be "Physical assault (for example, being attacked, hit, slapped, kicked, beaten up)" or "Combat or exposure to a war-zone (in the military or as a civilian)". The Life Events Checklist has a very good internal consistency (Cronbach's α = .831).

To establish the variable Trauma Type, the LEC-5 item LEC_mosttraumatic was used. It asked respondents to indicate which of the events they reported they would classify as most traumatic to them. Using the responses to this item, the variable Trauma Type was then created. This meant the recoding of the LEC answers into the trauma type clusters proposed by Contractor et al. (2020). Life events "natural disaster", "fire or explosion", "transportation accident", "serious accident at work" and "life-threatening illness or injury" were regrouped into Cluster 1. Cluster 2 contains LEC events "physical assault", "sexual assault" and "other unwanted or uncomfortable sexual experience". In Cluster 3 items "exposure to toxic substance", "assault with a weapon", "combat or exposure to a war-zone", "captivity", "Severe human suffering", "sudden violent death", "Sudden accidental death", "Serious injury, harm, or death you caused to someone else" are combined. "Any other very stressful event or experience", "I did not experience any of these events" and "prefer not to respond" were classified as Cluster 4. In the dataset used, however, cases having checked "I did not experience any of these events" were no longer included. Cluster 4 does not exist in the theory of LEC trauma type clusters (Contractor et al., 2020) but has been added out of feasibility reasons.

PTSD Checklist for DSM–5

As a measure of symptom severity, participants were asked to fill out the 20 items of the checklist. They rated how much they felt bothered by different symptoms on a 5-level scale (*not at all* to *extremely*). The highest possible score in total over all items would be 100. A higher score indicates that the respondent was suffering from more severe PTSD symptoms. When reflecting upon their symptoms, respondents were asked to refer to the event they indicated as most distressing on the LEC-5 (Weathers et al., 2013b). Examples of this are "Repeated, disturbing, and unwanted memories of the stressful experience?" and

"Having strong negative beliefs about yourself, other people, or the world (for example, having thoughts such as: I am bad, there is something seriously wrong with me, no one can be trusted, the world is completely dangerous)?". This scale has excellent internal consistency (Cronbach's α = .963).

To obtain the variable Year of the Trauma Event and Degree of Exposure, the item PCL_mosttraumatic was used. In said item, respondents had been asked to briefly describe the life event they deemed most traumatic. They indicated what kind of event happened to them and the year in which this event took place. Going off the information respondents provided in this item, the variable Year of the Trauma Event was manually created for each case. At the same time, the variable Degree of Exposure was created manually as well. For this, respondents' answers to the instruction to name the event which they wanted to classify as the most traumatic one was compared with the score they had assigned the LEC item in question.

Difficulties in Emotion Regulation Scale-16

This questionnaire is a self-report measure concerning troubles in regulating negative emotions (Bjureberg et al., 2016). Although it doesn't explicitly state it in the title, the measurement only treats negative emotions, not emotions in general. Respondents were asked to rate the frequency with which they use certain behaviors on a 5-level scale, from *almost never* up to *almost always*. Increased difficulties are implied by higher scores, the highest possible total score over all items being 80. It is a shortened version of the DERS, containing only 16 in comparison to 36 items, allowing for a more economic use (Gratz & Roemer, 2004). Two examples of items are "When I am upset, I believe that I will remain that way for a long time." and "When I am upset, I become irritated with myself for feeling that way.". Its internal consistency is excellent too (Cronbach's α = .965).

Difficulties in Emotion Regulation Scale-Positive

With this self-report measure, positive emotion dysregulation was estimated. Similar to the DERS, the DERSP asked participants to indicate how often they applied certain behaviors on a 5-level scale, from *almost never* up to *almost always*. Just as in the case of the DERS, higher DERSP scores point to more difficulties in the regulation of positive emotions (Weiss et al., 2015). Over all 13 items, the highest possible total score would be 65. "When I'm happy, I feel ashamed with myself for feeling that way." and "When I'm happy, I become scared and fearful of those feelings." are example items for this questionnaire. Its internal consistency is excellent as well (Cronbach's α = .965).

Data Diagnostics

The data provided had already been cleaned by Contractor et al. (2020) to some extent. Cases that did not fulfill inclusion criteria (being over the age of 18, speaking English fluently, living in North America and endorsing at least one LEC event) were excluded from analysis, as well as cases that did not pass all four validity checks. These validity checks tested the attention and comprehension of the participants. They additionally served to detect bots. One example of a validity check item is "Rate the following item on the scale. - I am using a computer currently." There were also some cases with missing values on all measures that had been removed from the dataset. The dataset provided to me then had an *N* of 464. Departing from there, the data was inspected. Cases that did not pass comprehension and attention items as well as cases that were missing more than 30% on the PCL, LEC, DERS and DERSP respectively were eliminated. This decision was made because scales that were missing more than 70% of answers were deemed as not reliable enough to provide information that could be processed in the analysis.

The process of creating the variable Degree of Exposure was also used to manually scan the data for potentially logically flawed cases. After this inspection, certain cases in which accidentally filling in the wrong information seemed highly likely were modified to ensure the logic of the data. A table that describes changes to the data and the reasoning behind it can be found in Appendix C. It also contains some cases where modification was contemplated but not performed. For transparency reasons, the audience should also have access to the unmodified ones, as this will allow the individual reader to come to their own conclusion about the nature of these cases.

This then led to *N* = 402 cases of data to be analyzed. Among these cases, 10.2% had incomplete answers. In reaction to these missing values, a multiple imputation procedure was performed using SPSS Statistics. This method was chosen in an effort to avoid bias. In contrast to the more commonly applied listwise deletion, multiple imputation conserves cases with missing values on some items and therefore reduces the loss in power (van Ginkel et al., 2020). To be eligible for multiple imputation, a dataset needs to have missing values that are missing completely at random. A Little's MCAR test was performed (χ^2 = 129.669; *df* = 166; *p* = .983). As its result was insignificant, it is safe to assume that the missing values are missing completely at random. This allowed for multiple imputation to be used. The multiple imputation model contained as many variables as possible to create the richest possible basis for the imputation algorithm. Values were only imputed for the dependent and independent variables as well as for the mediators, not for demographic variables. These variables, however, were used as indicators to enrich the algorithm. Although experts in the field have argued that outcome variables, in this study's case PTSD Symptom Severity, can very well be included in the imputation model (van Ginkel et al.,

2020), I refrained from doing so. This decision was based on the instructions for pooling the results of analyses performed on multiply imputed data. Here, it was stated that the median-p-rule could only be applied in multiply imputed data if the outcome variable had not been included in the imputation model (Heymans & Eekhout, 2019). Following the imputation process, sum scores were created for all variables of interest. For the variable Exposure Degree, the answering categories 5 ("not sure") and 6 ("doesn't apply") were joined in an effort to make analysis more efficient. The joining created a bigger, slightly more comparable group and did not significantly alter the interpretability. Additionally, the variable "Age at traumatic event" was constructed. Because respondents had not indicated their year of birth but only their current age, the indicated age was subtracted from the year of data collection, 2017, resulting in the variable "year of birth". Subtracting the year of birth from the year of the most traumatic event then led to the age at traumatic event. Outlier analyses were then performed for all variables to be investigated using boxplots and stem-and-leaf plots (Appendix A). Unfortunately, the statistic software used for this study does not allow for more complex constraints that would involve another variable to be imputed. Therefore, there was a possibility that the algorithm could assign a year of traumatic event that would lie before the year of birth which would in turn lead to a negative, therefore illogical age at traumatic event. This problem was solved pragmatically with a filter variable that would exclude any such cases from analysis. After this final intervention, an N of 401 remained.

Analysis

The mediation hypotheses were investigated through calculating linear regression models in SPSS Statistics. The sum score of the PCL was the outcome variable in all regression models. Predictors were Degree of exposure, Trauma Type and Age at most traumatic Life Event individually, while sum scores of Difficulties in Emotion Regulation and Difficulties in Positive Emotion Regulation were mediators. As correlation between both mediators was high, separate analyses were performed, six in total. This decision will be reflected in the discussion.

To test mediation hypotheses, different strategies are possible. In this study, the state of the art method of using PROCESS in SPSS Statistics was used. In contemporary mediation analysis, the estimation of the indirect effect and testing of its significance is used.

To be eligible for a mediation analysis using PROCESS, the data needs to fulfill four conditions. Linearity of the association between the variables, normal distribution of the residuals, homoscedasticity and independence need to be given (Hayes, 2017). Linearity was checked visually for every hypothesis in each split up imputed data set through scatter plots after LOESS smoothing (Appendix A). Following Hayes' (2017) recommendations, the big sample size and the robustness of the process analysis would allow us to assume

normal distribution and homoscedasticity to be fulfilled. To be sure, they were additionally tested using QQ-Plots and the scatterplots. The obtained results can be found in Appendix B. The method of recruiting participants via M-Turk and questioning them online ensures with a high probability the independence of the data. While SPSS provides automatic analysis of multiply imputed data for several statistical tests, there is no combination technique for PROCESS mediation analysis. Following the stance of van Ginkel et al. (2020), a lack of combination rules does not mean that multiple imputation could not be applied here. To avoid having to decide between the advantages of either of the methods, the multiply imputed data was split into single files, with which the mediation analysis was individually performed. To obtain one single result for each hypothesis, the five results per hypothesis derived from the five imputed data sets were pooled following Rubin's rules (Heymans & Eekhout, 2019). More precisely, the regression coefficients were averaged. Standard deviations were pooled, considering the within imputation variance as well as the between imputation variance. Instead of t-values, the application of Rubin's rules provides pooled Wald statistics for mediation paths of each model (Heymans & Eekhout, 2019). In case of Hypotheses 1 and 2, which contained continuous predictors, the regression coefficients were tested for statistical significance using the Wald statistic. Based on adjusted degrees of freedom, a critical t-value was obtained, which could in turn be compared with the Wald statistic, revealing significant or non-significant effects (Van Buuren, 2018). As the other four hypotheses had categorical predictors, the median-p-value-rule was applied, meaning that for each hypothesis, the p-values of the five different datasets were calculated to serve as the estimate for statistical significance (Heymans & Eekhout, 2019).

Results

Descriptive Statistics

The distribution of trauma types and exposure degrees are presented in tables 1 and 2 respectively while figure 10 shows the distribution of age at traumatic event.

Table 1

Trauma type

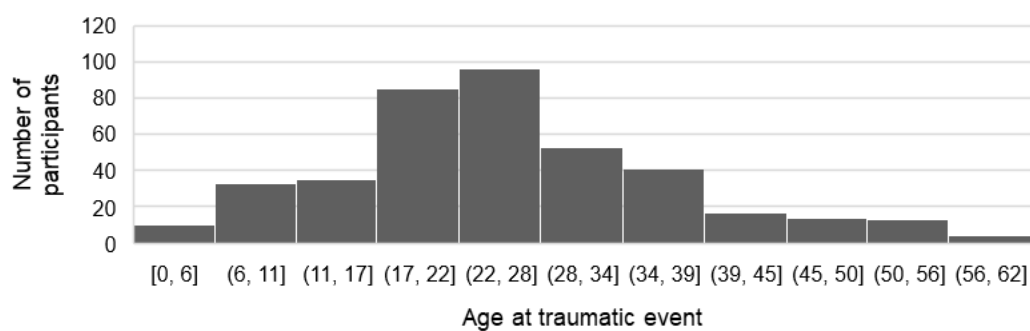| Trauma type	N	%
Accidental/Injury Trauma (Cluster 1)	183	45,6%
Victimization Trauma (Cluster 2)	100	24,9%
Predominant Death Threat (Cluster 3)	94	23,4%
Other Trauma	24	6%

Table 2

Degree of exposure

Degree of exposure	N	%
Happened to me	286	71,3%
Witnessed it	77	19,2%
Learned about it	22	5,5%
Part of my Job	8	2,0%
Not sure	8	2,0%

Figure 10

Distribution Age at traumatic event

The average sum scores of the DERS and the DERSP were 34.65 (*SD* = 15.72) and 18.76 (*SD* = 10.53) respectively. Regarding PTSD symptom severity, the average sum score of the PCL was 24.94 (*SD* = 20.10).

Inference Statistics

The number of investigated cases for all conducted analyses was *n* = 401. When investigating mediation with a categorical predictor using PROCESS, one looks at relative effects (Hayes & Preacher, 2014). This means that there is a reference category that all other categorical expressions of the predictor are compared with. The chosen reference category in hypotheses 1.1 and 1.2 was trauma type cluster 1, Accidental/Injury trauma. As demonstrated earlier, difficulties in emotion regulation seem to be linked more strongly to victimization trauma, making it more interesting to look at the mediating role of difficulties in emotion regulation in trauma type clusters 2 and 3 relative to cluster 1 trauma.

Between Cluster 2 and PTSD Symptom Severity there is a significantly stronger connection than between Cluster 1 and PTSD Symptom Severity (*b* = 5.509, *Wald* = 4.776, *df* = 397.277, *p* = .031, 95% CI [0.557; 10.460]). Cluster 3 (*b* = -0.061, *Wald* = 0.001, *df* = 397.703, *p* = .996, 95% CI [-5.108; 4.986]) and Cluster 4 (*b* = 6.852, *Wald* = 2.571, *df* = 397.907, *p* = .107, 95% CI [-1.548; 15.252]) and PTSD Symptom Severity however were not significantly closer related than Cluster 1 and PTSD Symptom Severity. Cluster 2 trauma is significantly more strongly connected to Difficulties in Emotion Regulation than Cluster 1 trauma (*b* = 5.043, *Wald* = 6.421, *df* = 395.676, *p* = .013, 95% CI [1.138; 8.947]), Cluster 3 (*b* = 0.554, *Wald* = 0.082, *df* = 397.923, *p* = .770, 95% CI [-3.257; 4.365]) and Cluster 4 (*b* = 7.952, *Wald* = 3.563, *df* = 397.996, *p* = .059, 95% CI [-0.330; 16.233]) however are not. Difficulties in Emotion Regulation also significantly predicts PTSD symptom severity (*b* = 0.735, *Wald* = 169.952, *df* = 397.956, *p* > .001, 95% CI [0.624; 0.846]). The connection, however, does not remain significant when controlling for any trauma type cluster (Cluster 1: *b* = 1.801, *Wald* = 0.720, *df* = 398.013, *p* = .397, 95% CI [-2.373; 5.974]; Cluster 2: *b* = -0.468, *Wald* = 0.051, *df* = 397.782, *p* = .832, 95% CI [-4.529; 3.594]; Cluster 3: *b* = 1.005, *Wald* = 0.090, *df* = 397.910, *p* = .757, 95% CI [-5.573; 7.583]). Relative to Cluster 1, Difficulties in Emotion Regulation significantly mediates the connection between Cluster 2 Trauma and PTSD Symptom Severity (*b* = 3.708, 95% CI [0.845; 6.705]). Here, and in all following reports of indirect effects, statistical significance is assumed if the confidence interval does not include zero. The relative indirect effect quantifies the estimated difference in standard deviations of the dependent variable that can be attributed to a standard deviation difference on the independent variable that operates through a mediator (Hayes, 2017). To make the sizes of effects more comparable, the partially standardized regression coefficients for X, in this case the cluster of trauma type, are used, as they are the estimated

difference in standard deviations of Y between the different categories. In case of the relative indirect effect of Cluster 2 Trauma on PTSD Symptom Severity, the partially standardized coefficient is $\beta = 0.184$.
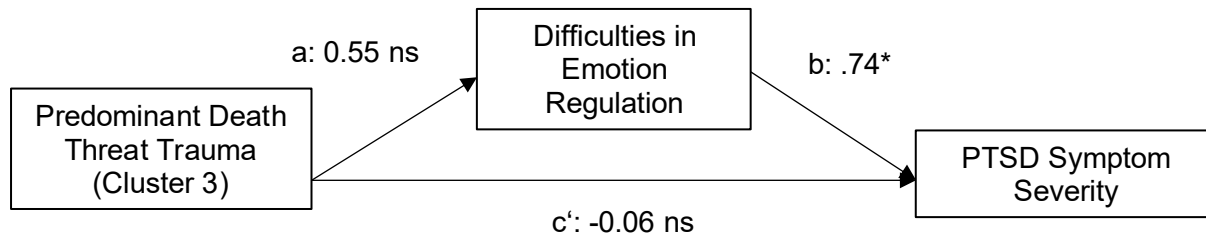
Figure 11

Model of Relative Mediation for Cluster 2
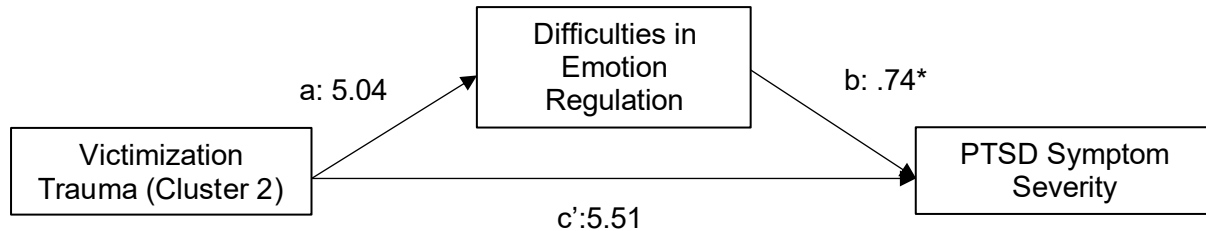
> *Note.* Values are the unstandardized coefficients. C' is the direct effect of Cluster 2 on PTSD Symptom Severity. *p < .001.
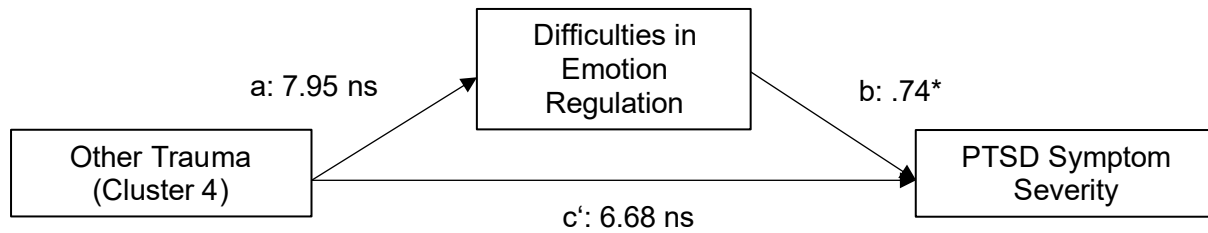
Difficulties in Emotion Regulation does not significantly mediate the connection between Cluster 3 (*b* = 0.407, 95% CI [-2.335; 3.258], β = 0.020) and Cluster 4 (*b* = 5.847, 95% CI [-0.011; 12.166], β = 0.290) relative to Cluster 1.

Figure 12

Model of Relative Mediation for Cluster 3

> *Note.* Values are the unstandardized coefficients. C' is the direct effect of Cluster 3 on PTSD Symptom Severity. *p < .001.
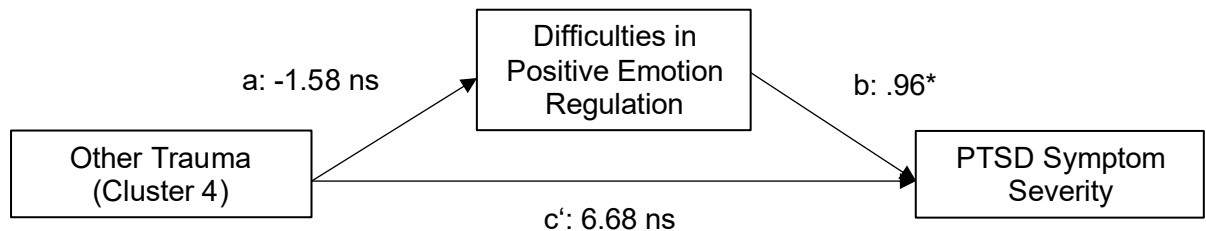
Figure 13

Model of Relative Mediation for Cluster 4


```
                        ┌──────────────┐
                        │ Difficulties │
            a: 7.95 ns  │      in      │  b: .74*
                        │   Emotion    │
                        │  Regulation  │
                        └──────────────┘
┌──────────────┐                              ┌──────────────┐
│ Other Trauma │                              │ PTSD Symptom │
│  (Cluster 4) │ ──────────────────────────►  │   Severity   │
└──────────────┘         c': 6.68 ns          └──────────────┘
```

Note. Values are the unstandardized coefficients. C' is the direct effect of Cluster 4 on PTSD Symptom Severity. *p* < .001.

Looking at hypothesis 1.2, we can see the same significantly stronger connection of Cluster 2 in relation to Cluster 1 with PTSD Symptom Severity (*b* = 5.509, *Wald* = 4.776, *df* = 397.277, *p* = .031, 95% CI [0.557; 10.460]). Just as we have observed in the case of negative emotion regulation, Cluster 3 (*b* = -0.061; *Wald* = 0.001, *df* = 397.703, *p* = .996, 95% CI [-5.108; 4.986]) and 4 (*b* = 6.852, *Wald* = 2.571, *df* = 397.907, *p* = .107, 95% CI [-1.548; 15.252]) have not differed significantly in their correlation to PTSD Symptom Severity from that of Cluster 1. The connection of Cluster 2 to Difficulties in Positive Emotion Regulation is not significantly stronger than the connection of Cluster 1 and Difficulties in Positive Emotion Regulation (*b* = -0.623, *Wald* = 0.205, *df* = 397.240, *p* = .665, 95% CI [-3.328; 2.082]). Cluster 3, however, does have a significantly stronger link to Difficulties in Positive Emotion Regulation than Cluster 1 (*b* = -2.981, *Wald* = 6.125, *df* = 397.976, *p* = .014, 95% CI [-5.349; -0.613]). No significantly stronger relation to Difficulties in Positive Emotion Regulation relative to the reference group was found in the case of Cluster 4 (*b* = -1.584, *Wald* = 0.438, *df* = 397.954, *p* = .509, 95% CI [-6.287; 3.119]). We can observe just as in hypothesis 1.1 a significant prediction by Difficulties in Positive Emotion Regulation for PTSD Symptom Severity (*b* = 0.956, *Wald* = 171.645, *df* = 396.420, *p* < .001, 95% CI [0.813; 1.100]). When controlling for trauma type Cluster 1 (*b* = 6.104, *Wald* = 7.858, *df* = 395.237, *p* = .006, 95% CI [1.833; 10.375]) and Cluster 4 (*b* = 8.367, *Wald* = 1.500, *df* = 397.576, *p* = .050, 95% CI [0.004; 16.730]), the correlation remains significant. If we control for Cluster 3 however, it does not (*b* = 2.790, *Wald* = 3.868, *df* = 397.920, *p* = .214, 95% CI [-1.686; 7.266]). Difficulties in Positive Emotion Regulation do not significantly mediate the connection of Cluster 2 (*b* = -0.595, 95% CI [-3.207; 1.996], β = -0.030) and Cluster 4 (*b* = -1.515, 95% CI [-5.801; 3.134], β = -0.075) relative to Cluster 1.

Figure 14

Model of Relative Mediation for Cluster 2
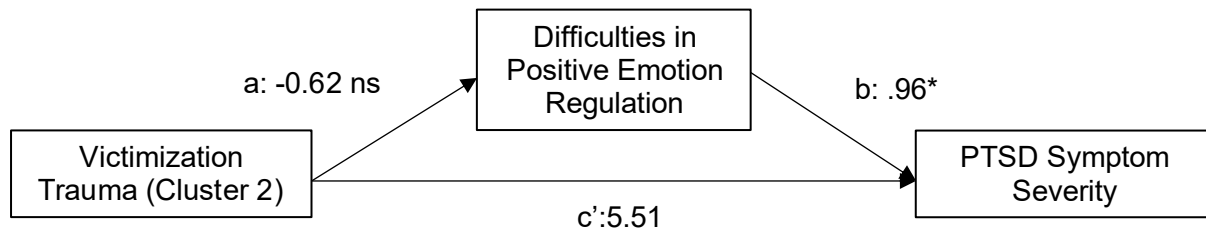
Note. Values are the unstandardized coefficients. C' is the direct effect of Cluster 2 on PTSD Symptom Severity. *$p < .001$.
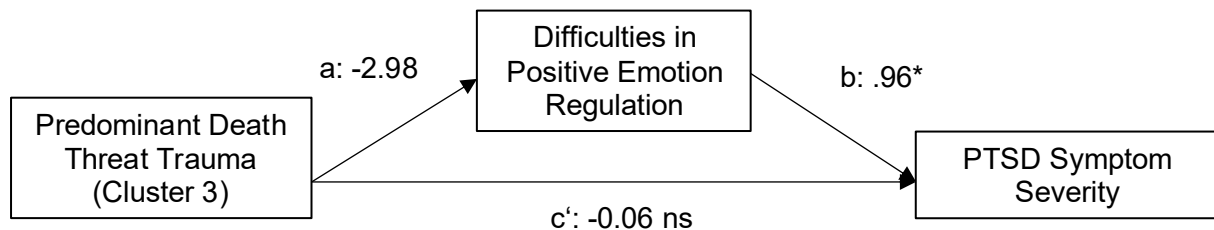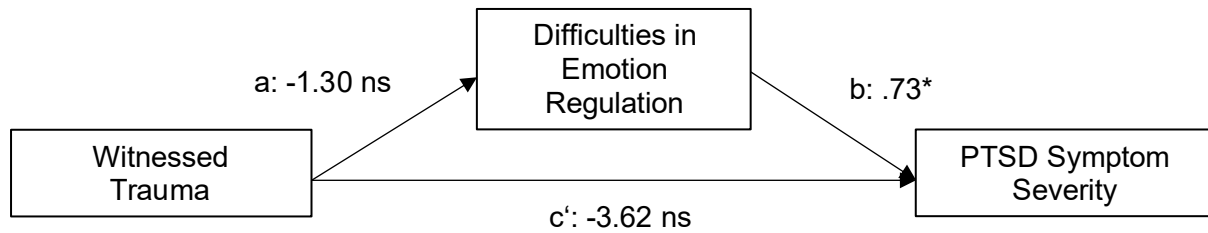
Figure 15

Model of Relative Mediation for Cluster 4

Note. Values are the unstandardized coefficients. C' is the direct effect of Cluster 4 on PTSD Symptom Severity. *$p < .001$.

Difficulties in Positive Emotion Regulation do however take on a significantly stronger mediating role for the connection of Cluster 3 and PTSD Symptom Severity ($b = -2.851$, 95% CI [-5.229; -0.557]). The partially standardized relative indirect effect here is $\beta = -0.142$.

Figure 16

Model of Relative Mediation for Cluster 3

Note. Values are the unstandardized coefficients. C' is the direct effect of Cluster 3 on PTSD Symptom Severity. *$p < .001$.

In hypotheses 2.1 and 2.2, with level of exposure as a multicategorical predictor, a reference category needed to be determined as well. Previous research has established that indirect trauma exposure can equally lead to PTSD, but that it is less likely than direct exposure to elicit the disorder (May & Wisco, 2016; Neria et al., 2008). Therefore, direct trauma exposure as a PTSD elicitor is more prevalent than indirect trauma exposure and is often treated as the default mode in trauma research. It was therefore deemed more interesting to look at the different forms of indirect trauma exposure and to use direct trauma as the reference group that other forms of exposure are compared with. This corresponds to the answer option "happened to me" on the LEC.

For hypothesis 2.1 we can see non-significant connections of Witnessed Trauma (b = -3.616, *Wald* = 1.984, *df* = 395.906, p = .168, 95% CI [-8.652; 1.421]), Learned about Trauma (b = -5.054, *Wald* = 1.777, *df* = 393.678, p = .179, 95% CI [-12.480; 2.373]) and Not sure/Doesn't apply (b = 6.944, *Wald* = 0.712, *df* = 397.914, p = .394, 95% CI [-9.232; 23.119]) with PTSD Symptom Severity respectively relative to Direct trauma and PTSD Symptom Severity. There is, however, a significantly stronger connection of Job Trauma and PTSD Symptom Severity (b = 19.380, *Wald* = 31.708, *df* = 321.351, p < .001, 95% CI [12.764; 25.995]) than Direct Trauma and PTSD Symptom Severity. Relative to the link of Direct Trauma and Difficulties in Emotion Regulation, there were no significant correlations of Witnessed Trauma (b = -1.302, *Wald* = 0.448, *df* = 394.981, p = .500, 95% CI [-5.118; 2.514]) and Learned about Trauma (b = -0.545, *Wald* = 0.023, *df* = 338.215, p = .874, 95% CI [-7.509; 6.418]) with Difficulties in Emotion Regulation each. Job Trauma (b = 10.135, *Wald* = 3.797, *df* = 226.141, p = .028, 95% CI [0.348; 19.923]) and Not sure/Doesn't apply (b = 14.263; *Wald* = 4.704, *df* = 397.926, p = .031, 95% CI [1.336; 27.191]) were, however, significantly more closely connected to Difficulties in Emotion Regulation than Direct Trauma. Difficulties in Emotion Regulation and PTSD Symptom Severity are yet again significantly correlated (b = 0.734, *Wald* = 171.612, *df* = 397.821, p < .001, 95% CI [0.623; 0.844]). If controlled for Witnessed trauma (b = -2.660, *Wald* = 1.358, *df* = 393.565, p = .238, 95% CI [-7.133; 1.813]), Learned about Trauma (b = -4.654, *Wald* = 1.951, *df* = 335.934, p = .140, 95% CI [-11.078; 1.770]), and Not sure/Doesn't apply (b = -3.519, *Wald* = 0.300, *df* = 397.959, p = .585, 95% CI [-16.151; 9.114]), the connection does not remain significant, but it does remain significant when controlling for Job Trauma (b = 11.946, *Wald* = 7.698, *df* = 392.650, p = .007, 95% CI [3.522; 20.371]). Relative to Direct Trauma, Difficulties in Emotion Regulation does neither significantly mediate the relationship between Witnessed Trauma (b = -0.955, 95% CI [-3.768; 1.885], β = -0.047) and PTSD Symptom Severity, nor the relationship between Learned about Trauma and PTSD Symptom Severity (b = -0.399, 95% CI [-5.321; 4.737], β = -0.020).
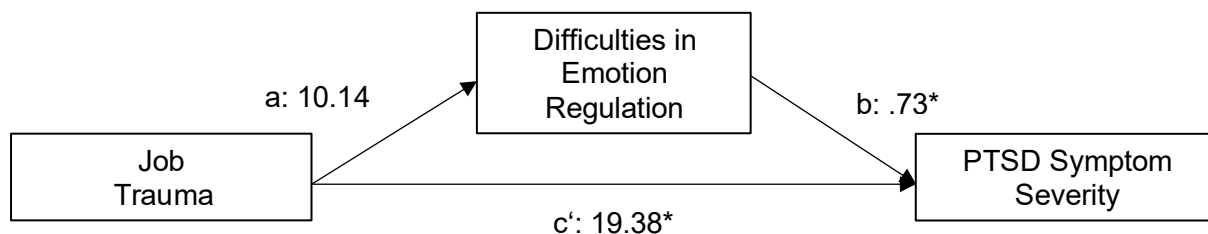
Figure 17

Model of Relative Mediation for Witnessed Trauma

Note. Values are the unstandardized coefficients. C' is the direct effect of Witnessed Trauma on PTSD Symptom Severity. *$p < .001$.

Figure 18

Model of Relative Mediation for Learned about Trauma
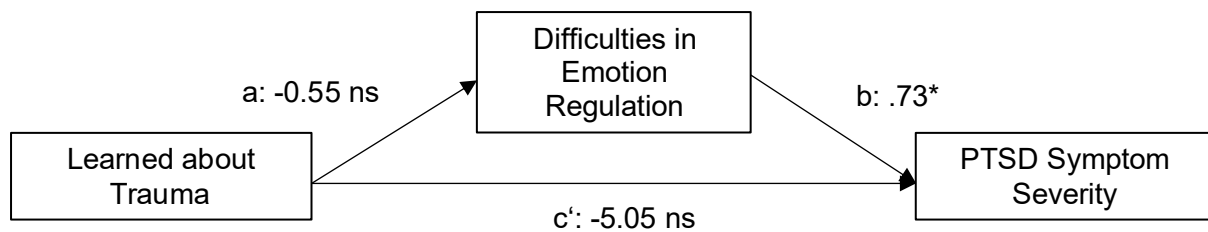
Note. Values are the unstandardized coefficients. C' is the direct effect of Learned about Trauma on PTSD Symptom Severity. *$p < .001$.

But for Job Trauma ($b = 7.434$, 95% CI [0.332; 14.362], $\beta = 0.370$) and Not sure/Doesn't apply ($b = 10.462$, 95% CI [1.170; 19.629], $\beta = 0.520$), Difficulties in Emotion Regulation mediate the connection to PTSD Symptom Severity significantly more than for Direct Trauma.

Figure 19

Model of Relative Mediation for Job Trauma

Note. Values are the unstandardized coefficients. C' is the direct effect of Job Trauma on PTSD Symptom Severity. *$p < .001$.

Figure 20
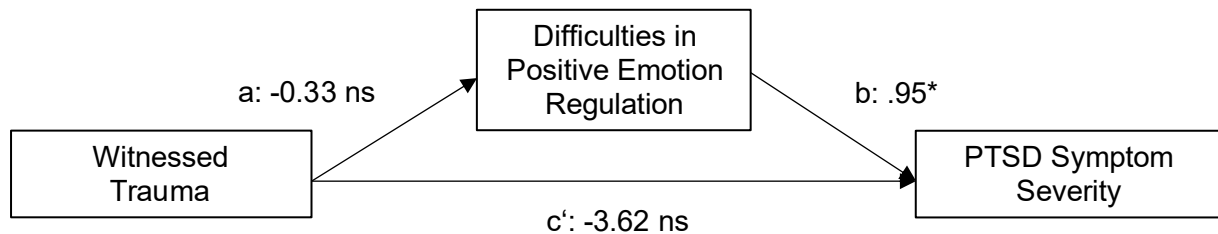
Model of Relative Mediation for Not sure/Doesn't apply
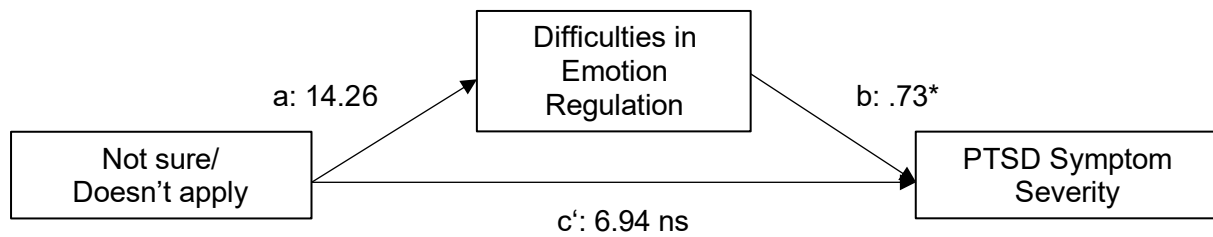
Note. Values are the unstandardized coefficients. C' is the direct effect of Not sure / Doesn't apply Trauma on PTSD Symptom Severity. *p < .001.

Investigating the next hypothesis, namely 2.2, we can see the same non-significant connections of Witnessed Trauma (*b* = -3.616, *Wald* = 1.984, *df* = 395.906, *p* = .168, 95% CI [-8.652; 1.421]), Learned about Trauma (*b* = -5.054, *Wald* = 1.777, *df* = 393.678, *p* = .179, 95% CI [-12.480; 2.373]) and Not sure/Doesn't apply (*b* = 6.944, *Wald* = 0.712, *df* = 397.914, *p* = .394, 95% CI [-9.232; 23.119]) with PTSD Symptom Severity respectively relative to Direct trauma and PTSD Symptom Severity as in the section discussing hypothesis 2.1. We can equally observe the relative significant correlation of Job Trauma and PTSD Symptom Severity (*b* = 19.380, *Wald* = 31.708, *df* = 321.351, *p* < .001, 95% CI [12.764; 25.995]). Just as in their relationship with negative emotion regulation, Witnessed Trauma (*b* = -0.330, *Wald* = 0.070, *df* = 360.782, *p* = .741, 95% CI [-2.753; 2.093]) and Learned about Trauma (*b* = -1.642, *Wald* = 0.710, *df* = 385.127, *p* = .163; 95% CI [-5.059; 1.776]) are not significantly closer related to Difficulties in Positive Emotion Regulation than Direct Trauma. In contrast to this, Job Trauma (*b* = 20.075, *Wald* = 49.090, *df* = 358.316, *p* < .001, 95% CI [14.524; 25.626]) and Learned about Trauma (*b* = 12.378, *Wald* = 4.636, *df* = 397.903, *p* = .032, 95% CI [1.078; 23.677]) show a significantly stronger correlation with Difficulties in Positive Emotion Regulation than Direct Trauma. Just like before, we can see the significant correlation between Difficulties in Positive Emotion Regulation and PTSD Symptom Severity (*b* = 0.947, *Wald* = 151.672, *df* = 390.280, *p* < .001, 95% CI [0.796; 1.097]). Controlling for any kind of exposure degree, the correlation does not remain significant (Witnessed Trauma (*b* = -3.303, *Wald* = 2.131, *df* = 396.617, *p* = .143, 95% CI [-7.746; 1.139]), Learned about Trauma (*b* = -3.498, *Wald* = 0.961, *df* = 365.185, *p* = .336, 95% CI [-10.424; 3.428]), Job Trauma (*b*=0.375, *Wald* = 0.006, *df* = 254.767, *p*=0.847, 95% CI [-8.836; 9.585]), Not sure/Doesn't apply (*b*=-4.773, *Wald* = 0.299, *df* = 397.983, *p*=0.585, 95% CI [-21.944; 12.397])). A significant mediating effect of Difficulties in Positive Emotion Regulation, relative to that on the relationship of Direct Trauma on PTSD Symptom Severity, cannot be observed in the relationships between Witnessed Trauma and PTSD Symptom Severity (*b*=-

0.312, 95% CI [-2.555; 2.079], β = -0.016) and Learned about Trauma and PTSD Symptom Severity (b=-1.556, 95% CI [-4.503; 1.823], β = -0.077).
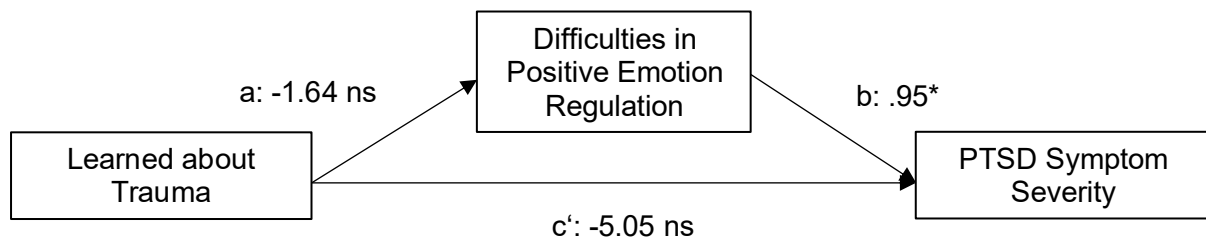
Figure 21

Model of Relative Mediation for Witnessed Trauma

Note. Values are the unstandardized coefficients. C' is the direct effect of Witnessed Trauma on PTSD Symptom Severity. *p < .001.
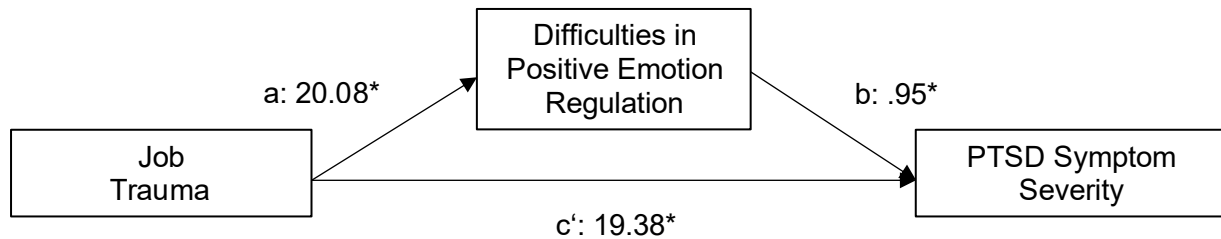
Figure 22
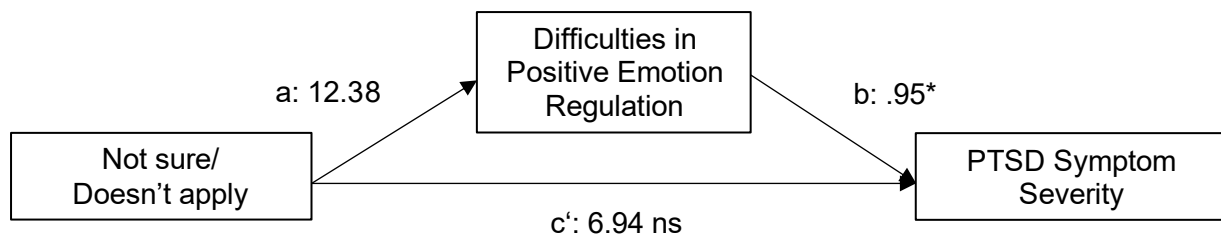
Model of Relative Mediation for Learned about Trauma

Note. Values are the unstandardized coefficients. C' is the direct effect of Learned about Trauma on PTSD Symptom Severity. *p < .001.

When it comes to Job Trauma (b=19.005, 95% CI [13.535; 25.460], β = 0.945) and Not sure/Doesn't apply (b=11.717, 95% CI [1.521; 22.761], β = 0.583), Difficulties in Positive Emotion Regulation mediate their relationships with PTSD Symptom Severity to a significantly higher degree than the relationship between Direct trauma and PTSD Symptom Severity.
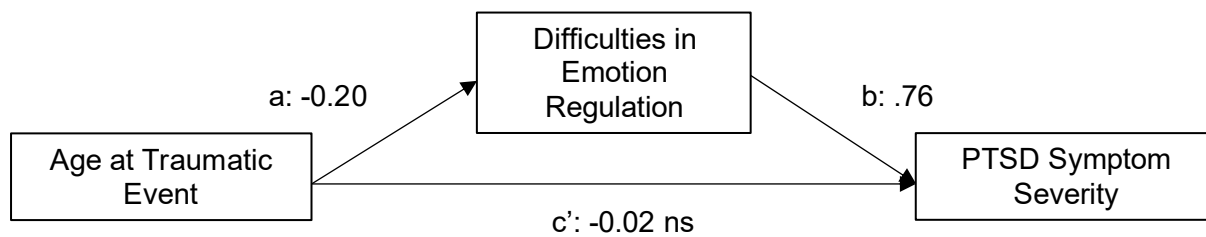
Figure 23

Model of Relative Mediation for Job Trauma

Note. Values are the unstandardized coefficients. C' is the direct effect of Job Trauma on PTSD Symptom Severity. *$p < .001$.

Figure 24
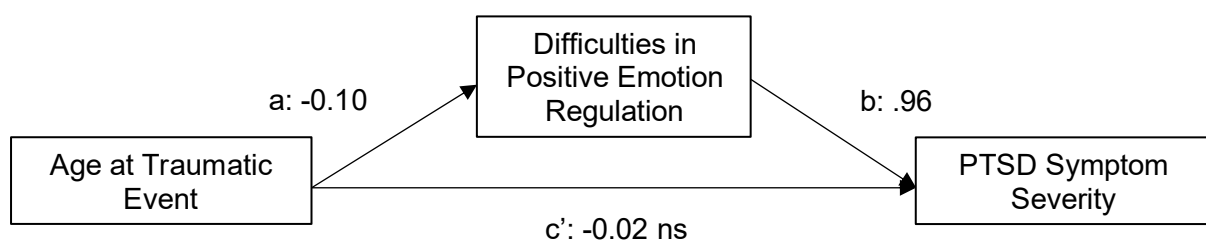
Model of Relative Mediation for Not sure/Doesn't apply

Note. Values are the unstandardized coefficients. C' is the direct effect of Not sure/Doesn't apply Trauma on PTSD Symptom Severity. *$p < .001$.

For hypothesis 3.1, there was no total effect of Age at Traumatic Event on PTBS symptom severity (*b*= -0.018, *Wald* = 0.050, *df* = 395.461, *p*>.05, 95% CI [-0.179; 0.142]). Apart from the total effect, however, there were significant paths between the different constructs. Path a describes the significant correlation between independent variable Age at Traumatic Event and mediator Difficulties in Emotion Regulation (*b*= -0.203, *Wald* = 10.121, *df* = 386.190, *p*<.05, 95% CI [--0.328; -0.078]). Just like for all previous tests of hypotheses, a significant connection between Difficulties in emotion regulation and PTSD Symptom Severity was found (*b*= 0.759, *Wald* = 191.281, *df* = 397.558, *p*<.05, 95% CI [0.651; 0.867]). When controlling for Age at Traumatic Event, there is a significant correlation between Difficulties in Emotion Regulation and PTSD Symptom Severity, shown by path c' (*b*=.136, *Wald* = 5.004, *df* = 389.183, *p*<.05, 95% CI [0.017; 0.255]. Most importantly, we can observe a significant indirect effect of Age at Traumatic Event on PTSD Symptom Severity, mediated by Difficulties in Emotion Regulation (*b*= -0.154; 95% CI [-0.253; -0.058]). Given that the direct effect remains significant, we can assume a partial Mediation of Difficulties in Emotion Regulation between Age at Traumatic Event and PTSD Symptom Severity. The completely standardized indirect effect is β = -0.091.

Figure 25

Model of Mediation Age at Traumatic Event

Note. Values are the unstandardized coefficients. C' is the direct effect of Age at traumatic event on PTSD Symptom Severity. *p < .001.

The regression model performed to test hypothesis 3.2, not surprisingly, also detected the absence of a significant correlation between Age at Traumatic Event and PTSD Symptom Severity (*b*= -0.018, *Wald* = 0.050, *df* = 395.461, *p*>.05, 95% CI [-0.179; 0.142]. Nevertheless, Age at Traumatic Event is significantly correlated with Difficulties in Positive Emotion Regulation (*b*= -.097, *Wald* = 8.896, *df* = 332.489, *p*<.05, 95% CI [-0.160; -0.034]) and so are Difficulties in Positive Emotion Regulation and PTSD Symptom Severity (*b*= 0.955, *Wald* = 179.872, *df* = 395.247, *p*<.05, CI [0.815; 1.095]). The latter correlation does not remain significant when controlling for Age at Traumatic Event (*b*= 0.074, *Wald* = 0.990, *df* = 385.282, *p*>.05, 95% CI [-0.071; 0.220]). Similar to the results concerning hypothesis 3.1, the indirect effect of Age at traumatic event on PTSD symptom severity, mediated by Difficulties in Positive Emotion Regulation, is significant (*b*= -0.093, 95% CI [-0.154; -0.032]). This leads to the conclusion that there is a complete mediation of Difficulties in Positive Emotion Regulation between Age at Traumatic Event and PTSD Symptom Severity. The completely standardized indirect effect is β = -0.055.

Figure 26

Model of Mediation Age at Traumatic Event

Note. Values are the unstandardized coefficients. C' is the direct effect of Age at traumatic event on PTSD Symptom Severity. *p < .001.

Discussion

All tested hypotheses assumed mediations. Difficulties in emotion regulation significantly mediated the effects of victimization trauma, trauma exposure on the job, unspecified trauma exposure (not sure/doesn't apply) and age at traumatic event on PTSD symptom severity respectively. Difficulties in Positive emotion regulation significantly mediated the effects of predominant death threat trauma, trauma exposure on the job, unspecified trauma exposure (not sure/doesn't apply) and age at traumatic event on PTSD symptom severity respectively. Following state of the art guidelines for the interpretation of mediation analysis, it was decided to focus on the very relevant findings of significant indirect effects (Rucker et al., 2011; Zhao et al., 2010).

In 1.1 it was assumed that difficulties in emotion regulation would mediate the connection between different trauma types and PTSD symptom severity. Cluster 1, accidental/injury trauma, served as a reference group that the other trauma type clusters were compared with. Relative to accidental/injury trauma, difficulties in emotion regulation fully mediate the effect of victimization trauma on PTSD symptom severity. They do not significantly mediate the relationships of predominant death threat and other trauma with PTSD symptom severity. The hypothesis was therefore confirmed for the trauma type victimization trauma. This finding is in accordance with prior research that found victimization trauma to be an especially strong predictor for both difficulties in emotion regulation difficulties and PTSD symptom severity (Berfield et al., 2022; Smith et al., 2016). The full mediation suggests that the reason for heightened PTSD symptom severity in individuals that had been exposed to victimization trauma is not the victimization trauma itself but the difficulties in emotion regulation that occur more often in individuals that were subject to this trauma type. Following this explanatory model, victimization trauma would, compared to accidental/injury trauma, cause more difficulties in emotion regulation. These would then aggravate PTSD symptoms. The observed coefficient of the partially standardized relative indirect effect hints to a rather small effect with $\beta = 0.184$, if we follow the standard rules of thumb (Leppink et al., 2016).

In hypothesis 1.2, it was supposed that difficulties in positive emotion regulation would mediate between different trauma types and PTSD symptom severity, relative to accidental/injury trauma. Here, we found no significant mediating role of difficulties in positive emotion regulation for the link of victimization trauma and other trauma with PTSD symptom severity. We did however discover a full mediation of the connection between predominant death threat trauma and PTSD symptom severity relative to accidental/injury trauma. Thus, hypothesis 1.2 was confirmed for predominant death threat trauma. This resonates with prior work that found a correlation between predominant death threat trauma and difficulties in positive emotion regulation (Berfield et al., 2022). This result suggests that

increased difficulties in emotion regulation, due to predominant death threat trauma; will lead to more severe PTSD symptoms. The observed effect however has to be classified as rather small (Leppink et al., 2016). This shows, that apart from trauma type, mediated by difficulties in emotion regulation, other factors also explain variance in PTSD symptom severity. This realization does not come as a surprise, as at least two other influential factors are investigated in this same study as well. Establishing its mediating role on the effect of trauma type on PTSD symptom severity adds a new component to what we know about difficulties in positive emotion regulation in the context of PTSD. In addition to hypothesis 1.2, but also to hypothesis 1.1, it is important to note, that while we obtained results regarding victimization trauma and predominant death threat trauma, there is also a fourth cluster that did not demonstrate a significant mediation by difficulties in emotion regulation of its effect on PTSD symptom severity relative to accidental/injury trauma. This cluster contains all types of trauma events that did not fit the provided answering options, meaning that participants checked answering option "any other very stressful event or experience". It also contains cases in which participants chose the answering option "prefer not to respond" when asked to indicate the trauma event they deemed to be the most traumatic.

In hypothesis 2.1, once again a categorical predictor was investigated, the chosen reference group was direct trauma exposure. It must be noted that the groups that were compared with each other were of considerably different sizes as reported in the descriptive statistic results. Given that PROCESS employs Bootstrapping, it is somewhat robust to unequal sample sizes. For transparency reasons, however, this difference in category size should be reported. A significant relative indirect effect was observable for trauma experienced on the job. Because the direct effect of job trauma on PTSD symptom severity was significant relative to the reference group as well, we can conclude that difficulties in emotion regulation partially mediate the effect of job trauma on PTSD symptom severity relative to direct trauma exposure. The found effect can be categorized as small (Leppink et al., 2016). A study looking at trauma-exposed ambulance workers also found a connection between difficulties in regulating emotions and PTSD symptoms, they did, however, not compare them with a control group that was experiencing trauma outside of their work environment (Shepherd & Wild, 2014). Another study looking at firefighters, however, identified high regulatory abilities to be a protective factor against developing PTSD symptoms, which is in line with the found mediation (Levy-Gigi et al., 2016). The regression coefficient for the effect of Job Trauma on Difficulties in Emotion Regulation shows that trauma exposure on the workplace predicts greater difficulties in emotion regulation. These in turn predict more severe PTSD symptoms. As the mediation is a partial one, Job trauma itself, possibly through other mediators not explored in this study, causes part of the symptom severity as well. One can reflect on possible reasons for the higher likelihood of

difficulties in emotion regulation when trauma exposure happens in the work context. If an individual must come back to their workplace after a traumatic event out of financial obligations, they could be exposed to triggers to a higher degree, putting a bigger strain on their emotion regulation capacities than if they could freely choose if and when they want to be confronted with potential trigger cues. Staying in this frame, the professional role the individual would need to fill in this highly loaded environment could constrain the range of available regulation strategies, leading to even more difficulties. These possible explanations call for more investigating.

A relative mediation through difficulties in emotion regulation was not detected for individuals that witnessed or learned about a traumatic event. A full mediation through difficulties in emotion regulation was found however for the exposure category "not sure/doesn't apply" and PTSD symptom severity relative to direct exposure. The partially standardized relative indirect effect suggests a medium effect size (Leppink et al., 2016). The uncertainty of this result is already implied in the "not sure". We do not know how exactly the affected people were exposed to the traumatic event, so we can only speculate. Maybe they were witnessing a traumatic event happening to a close person over the phone, maybe they were watching a natural disaster happening over live television, maybe they were actively involved in a car crash were they also witnessed other people suffer severe injuries and felt unable to decide between "happened to me" and "witnessed it". We can therefore not come to any definite conclusions concerning this exposure category. It does in turn show a big limitation of the Life Events Checklist. In trying to make a construct as complex as a traumatic event easily measurable and comparable, some more intricate cases will fall victim to this reduction and simplification and their informative content will get lost. When looking at inferences derived from LEC answers, it is indispensable to keep in mind that this data will never do justice to the whole human experience of trauma.

The above results are complemented by the results of hypothesis 2.2. Here, there was no mediation by difficulties in positive emotion regulation for witnessed or learned about trauma and PTSD symptom severity relative to direct exposure either. There were however full mediations by difficulties in positive emotion regulation for the effects of job trauma and not sure/doesn't apply-trauma on PTSD symptom severity. Said effects were of big size in the case of job trauma and of medium size in the case of notsure/doesn't apply-trauma. While the result surrounding the "not sure/doesn't apply"-option gives rise to more questions instead of providing an answer, just as mentioned above, the result concerning job trauma fits into the current state of research (Levy-Gigi et al., 2016). To be able to really go forward with the obtained results concerning trauma in the work context, it would be necessary to have more information about the nature and circumstances of these jobs. A possible explanation for the complete relative mediation of difficulties in positive emotion regulation of

the effect of trauma exposure at work on PTSD symptom severity could be found in the constructs trust and cooperation and the ways in which they are related to positive emotions and work. Research on the effect of positive emotions on efficiency and wellbeing in the workplace has established a clear link between positive emotions and cooperation (Diener et al., 2020). A necessary prerequisite for cooperation however is trust (Balliet & Van Lange, 2013), which can be limited in people affected by PTSD (Bell et al., 2019). One could imagine that working in a triggering environment makes cooperation more difficult due to a lack of trust. This in turn could hinder positive emotions to be formed. Reversely, a lack of trust might also lead to the suppression of positive emotions. Further research would be needed to test these considerations.

Hypothesis 3.1 stated that difficulties in emotion regulation would mediate the effect of age at traumatic event on PTSD symptom severity. This was the case. However, as the direct effect of age at traumatic event on PTSD symptom severity was significant as well, it is merely a partial mediation. These results therefore confirm those of earlier research, where younger age was found to be connected to increased PTSD symptom severity (Dunn et al., 2017; Schumacher et al., 2006; Sundermann & DePrince, 2015) as well as to more difficulties in emotion regulation (Dragan, 2020; Dunn et al., 2017). The increased difficulties in emotion regulation that come with traumatization a younger age therefore explain part of the more severe PTSD symptoms. It needs to be mentioned that this indirect effect is quite small in size (Leppink et al., 2016). The other part however is explained by age at traumatic event itself or other potential mediators. It is known that trauma at a young age not only negatively influences how a person learns emotion regulation, but also how they develop and form beliefs and cognitions (Malarbi et al., 2017). This in turn could contribute to aggravated PTSD symptoms as well.

Lastly, let's look at hypothesis 3.2, which postulated a mediation of difficulties in positive emotion regulation of the effect of age at traumatic event on PTSD symptom severity. This hypothesis was confirmed as well. There is a full mediation of the link between age at traumatic event and PTSD symptom severity through difficulties in positive emotion regulation. The age at traumatic event therefore predicts difficulties in positive emotion regulation which then predicts PTSD symptom severity. Again, identifying difficulties in positive emotion regulation as a mediator and finding its connections to age at traumatic event and PTSD symptom severity is a valuable addition to the knowledge we have so far over the construct in the context of trauma. However, the effect is very small, suggesting that other characteristics such as trauma type or exposure degree contribute more to explaining the variance in PTSD symptom severity (Leppink et al., 2016).

To conclude, the findings of this study for the most part fit in with what is known so far about the investigated trauma characteristics, difficulties in regulating positive and

negative emotions and PTSD symptoms. They serve as additional support and contribute to consolidating existing knowledge. This study first showed that difficulties in emotion regulation take on a mediating role between a set of trauma characteristics and PTSD symptom severity. Relative to accidental/injury trauma, the effect of predominant death threat trauma on PTSD symptom severity is fully mediated by difficulties in positive emotion regulation. Compared to direct trauma exposure, the effect of trauma exposure on the job and the effect of "not sure/doesn't apply"-trauma-exposure on PTSD symptom severity are significantly fully mediated by difficulties in positive emotion regulation. Lastly, difficulties in positive emotion regulation are a significant full mediator for the effect of age at traumatic event on PTSD symptom severity. Compared with difficulties in negative emotion regulation, difficulties in positive emotion regulation fully mediate the effects of the trauma characteristics on PTSD symptom severity, not just partially. This gives an indication of how crucial a role they seem to be playing in PTSD. To broaden and assure these results, they should be subject to replication efforts with other, more diverse samples. Results concerning the exposure degree option "not sure/doesn't apply" on the other hand stimulate reflection and open up questions of how instruments measuring trauma exposure could still be improved. These will be discussed in the following section.

Limitations

As with any empirical results, interpretations should be made with certain reservations. The self-report nature of the questionnaires as well as the obtained data's cross-sectional structure limit its interpretability. Whenever we rely on volunteers to share personal information, we cannot be sure about the legitimacy of the answers. Especially in the context of online questionnaires, it is impossible to ensure complete honesty. In this study, Amazon's mechanical Turk was used to collect the data. This method has been subject to substantial criticism. Validity threats stemming from increased inattention among MTurk participants compared to college student samples, self-selection bias, high attrition rates, inconsistent English language fluency, the non-naivete that comes with participating repeatedly in similar studies, a social desirability bias that is increased by the financial incentive and vulnerability to web robots or "bots", limit the quality of the data (Aguinis et al., 2021). To face the threat of robots, validity checks, as mentioned above, had been implemented. Some validity concerns however, such as self-misrepresentation or exchange among participants can occur in diverse settings of data collection and are not a sole challenge for MTurk recruiting (Aguinis et al., 2021). At the same time, apart from offering researchers flexible options concerning research design and easily accessible, speedy data collection at a reasonable cost, MTurk's biggest advantage is the possibility to access a large and diverse pool of participants (Aguinis et al., 2021). Given the high prevalence of

occupationally homogenous samples, oftentimes including only college students, research conducted with more diverse samples contribute to increased generalizability of psychological research (Shen et al., 2011). Advantages and disadvantages of the here applied method of participant recruiting should therefore be considered when drawing conclusions from the obtained results. As the composition of the sample was already mentioned, it is also worth noting that, while relatively diverse, the sample was still rather young and to three quarters made up of white people. This is a point worth criticizing, because there already is a great white-leaning bias in psychological research that also includes mostly white samples (Roberts et al., 2020). Most importantly, the sample was exclusively American. Its generalizability to populations residing in other parts of the world could therefore be limited, as certain potentially traumatic events such as gun violence or certain natural disaster are more likely to happen in the US than in Europe for example. At the same time, other potentially traumatic events like war or kidnapping would be more prevalent in other regions of the world than they were in the investigated sample. A property of the sample that makes it difficult to draw definite conclusions from the results is the fact that a portion of the participants had been receiving treatment in the form of therapy and/or medication in the past and/or was receiving treatment in the form of therapy and/or medication at the moment of data collection. Their levels of symptom severity might therefore have been lowered through therapy. This brings us to a big flaw of the study design. As it was a cross-sectional study, it is impossible to pay respect to time effects. Longitudinal studies have however been able to show, that while some symptoms of PTSD remain stable, others are subject to change and development, increasing and decreasing in frequency and intensity, depending on overall developmental changes (Haag et al., 2020; Weems et al., 2023). This point is especially relevant when looking at childhood trauma, as we did among other things in this study. The data does not allow us to understand the trajectory of each individual's symptom development. Additionally, there is considerable variance in when traumatization happened, with the years where traumatic events occurred ranging between 1965 and 2018. Another general point I want to make regarding all tested hypotheses concerns the question of causality. The predictors are certain aspects of traumatic events. The outcome variable in all hypotheses is PTSD symptom severity. By definition, PTSD can only arise in reaction to a traumatic experience. It is therefore safe to assume that the predictors, namely the trauma event characteristics, precede the PTSD symptoms in time. This allows us to assume a causal effect of trauma type, degree of exposure and age at traumatic event on PTSD symptom severity (Hayes, 2017). Having said this, such temporal order cannot be assumed for the relationship between difficulties in emotion regulation and both the predictor and the outcome variable, which is why we have to consider found effects here to be of simply correlational nature.

On another note, there are some considerable limitations that arise from the properties of the applied instruments. As already mentioned earlier, the Life Events Checklist, while it enables researchers and practitioners to quickly and efficiently evaluate participants and patients on the topic of trauma, it is somewhat reductionistic in only providing four different forms of trauma exposure degrees. Concerning the type of traumatic event, the LEC also leaves some room for uncertainty. The fourth trauma type cluster we investigated prompts two reflections. First, it demonstrates once again the limits of data collection with multiple choice style questionnaires, that will never be prepared for every possible kind of traumatic event humans can experience and therefore will never be able to provide a complete and exact depiction of trauma. Secondly, it opens questions about how and why participants might not feel comfortable and/or willing to report their most traumatic event and if that implies a lack of trustworthiness in the obtained data in general. Fortunately, in the present sample, only four participants preferred not to disclose their most traumatic experience. Still, especially when envisioning future research with the Life Events Checklist, strategies to enhance participant's trust in researchers should be developed. Another point of critique that should be issued about the LEC concerns its worst-event method. When limiting the participant in asking them to refer to only one out of possibly multiple events, other experiences and their effects could be neglected (Bardeen & Benfer, 2019). It also does not pay sufficient respect to cumulative effects of repeated exposure to one or multiple kinds of traumatic events (Agorastos et al., 2014; Lu et al., 2013). A particular difficulty that comes with this study's distinct interest in trauma types on the one hand and degrees of exposure on the other hand is a certain overlap of both constructs when it comes to the traumatic events involving death. "Sudden violent death" and "sudden accidental death" can, logically, only be experienced from an indirect point of view. Because it is impossible to die a sudden violent death and fill out a questionnaire afterwards, for some participants it might be so obvious that this death implies another person, and they might check answering option "happened to me". A number of participants that answered these items in this manner can be found in Appendix C. Others, however, could follow the same answering logic as in the other items, relate the events directly to themselves and in turn choose an indirect exposure degree like "witnessed it" or "learned about it". Clearer instructions should therefore be brought into place. To avoid the uncertainty that the results concerning the exposure category "not sure/doesn't apply" brought about, it seems necessary to further differentiate the exposure options. To do so, individuals that checked these options, should be given the possibility to describe the nature of their traumatic event and/or express why they are not sure which option to choose. Based on these answers, more categories could be created, and instructions could be clarified. Another instrument applied in this study is the DERS. While it is a widely used and generally accepted measure

of emotional dysregulation, it should be noted that its authors have also been criticized for not establishing clearer, more systematic links to the micro-level of emotion regulation (Salas et al., 2019). Regarding the present study's design, it must be disclosed that the two Mediators DER and DERP are highly correlated (r = .470). This made the parallel evaluation of both concepts in one model impossible, as collinearity would have been too high. We must therefore keep in mind that there is significant overlap between both concepts and their influences should be considered as overlapping as well. We cannot clearly distinguish between the two.

Implications

The presented study revealed significant mediations of the effect of certain trauma event characteristics on PTSD symptom severity by difficulties in negative emotion regulation and difficulties in positive emotion regulation. It shows the important role that difficulties in positive and emotion regulation take on in the context of trauma. Regarding difficulties in negative emotion regulation, it confirmed preexisting knowledge about the subject and helped build more solid understanding of the link between the constructs. When it comes to difficulties in positive emotion regulation, this study discovered their mediating role for connections between predominant death threat trauma, job trauma, other trauma, and age at traumatic event and PTSD symptom severity. Hereby, the study helped shine light on a so far understudied phenomenon in trauma related disorders.

Better understanding the critical role that emotional dysregulation plays in PTSD could be used to improve and adapt preventive and interventional measures to be more precisely fitted to an individual's need. Individuals affected by victimization trauma could benefit from an intensified focus on regulation of negative emotions, while PTSD-patients that experienced predominant death threat trauma might benefit more from a special emphasis on regulation of positive emotions. The findings could also provide more information to the debate about how much room should be given to the reinforcement of emotion regulation abilities in therapy (Dyer & Corrigan, 2021). Professionals in support of an extra, chronologically preceding stabilization stage dedicated among other things to strengthening emotion regulation abilities in therapy of trauma related disorders argue that this extra work is necessary for preparing patients for exposition to trauma cues and narratives and ultimately for long-term therapeutic success (Zaleski et al., 2016). There is, however, significant critique, deeming the preceding stage to be an inefficient use of scarce resources like time, money, and treatment capacities. Opposed professionals argue that it causes an unnecessary delay in confrontation with the traumatic memories and to waste a patient's time. More drastically viewed, the stabilization stage in treatment programs is seen as an interfering element that leads to patients being withheld from entering the therapeutic stage

of trauma confrontation that is regarded as being the actual healing part of trauma treatment (Dyer & Corrigan, 2021). It should be noted that this stabilization phase entails more than just therapeutic work on emotion regulation, but trying to improve regulatory abilities makes up a significant part. The results of this study suggest that there might not be a definite answer to the question whether such extra focus on emotion regulation is necessary or not. The characteristics of the trauma event could provide practitioners with an indication how much support in emotion regulation the individual patient might need. The actual practice is already individualized, with therapists using a sort of methodological eclecticism, depending on what they deem appropriate for the individual needs of their patients (Dyer & Corrigan, 2021). Making therapeutic methods more adapted to the patient's unique needs on the one hand and more comparable and based on empirical evidence on the other hand would require more knowledge about the finer links between involved constructs. With the presented study I hope to have contributed a part in achieving this goal. The obtained results can be groundwork for subsequent longitudinal investigations answering questions of causality and development of symptoms over time.

Directions for future research

As with all new findings, results implying a significant mediation of difficulties in positive emotion regulation of the effect of predominan death threat trauma, trauma exposure on the job and age at traumatic event on PTSD symptom severity respectively should be subject to replication efforts with other, ideally more diverse samples.

Based on the small effect sizes for age at traumatic event as a predictor for PTSD symptom severity, a more balanced sample that would allow for intergroup comparisons between childhood and adulthood trauma might be woth taking into consideration, an approach that hasn't been used a lot in preexisting research concerning age at traumatic event, difficulties in emotion regulation and PTSD symptom severity. In further projects it would be necessary to investigate trauma types in different regions of the world to introduce more diverse knowledge on how cultural, political, and geographical factors will influence the prevalence of certain trauma events. This should also help in making results more widely applicable to different populations. Difficulties in emotion regulation as a Mediator in PTSD resulting from traumatization on the job should be investigated more closely. The comparison with people that experienced trauma in a private as opposed to a professional role seems very relevant, as most studies only treat one or the other. A comparison between different work fields in regard to Difficulties in Emotion Regulation would be necessary as well. In contrast to the presented study, achieving a sample with comparable groups of equal size should be a goal of subsequent projects. Future research should aim as well at improving measures for exposure degree. Perhaps taking a step back and making use of

qualitative methods could be helpful in trying to build a more inclusive, comprehensive instrument. In upcoming scientific work, a new instrument combining the DERS and the DERSP to measure overall difficulties in emotion regulation might be useful. As the two constructs seem to be so closely connected, it might be more sensible to treat them as different forms of the same phenomenon as opposed to two separable constructs. An inclusive, single instrument could allow for a more precise, individual portrayal of difficulties in emotion regulation. In a similar effort, it might be worth incorporating more recent knowledge about micro levels of emotion regulation into the DERS and allowing for more multilayered analyses. When trying to replicate the results found in the present study, controlling for treatment and for how far in the past the trauma event happened should be a part of the analysis, to prevent time effects from distorting the picture of PTSD symptoms.

Conclusion

The present study investigated a sample of 401 North American adults that had been exposed to at least one potentially traumatic event. The results revealed the significant mediating role difficulties in positive and negative emotion regulation take on in the connection between characteristics of the traumatic event and PTSD symptoms. Difficulties in negative and positive emotion regulation act as a mediator between age at traumatic event and PTSD symptom severity. Relative to accidental/injury trauma, difficulties in emotion regulation significantly mediated the effect of victimization trauma on PTSD symptom severity, while difficulties in positive emotion regulation significantly mediated the effect of predominant death threat trauma on PTSD symptom severity. Trauma exposure on the job as well as undefined degree of trauma exposure cause heightened PTSD symptom severity, which is significantly mediated by difficulties in positive and negative emotion regulation relative to direct exposure. These findings provide new insights and confirm existing results of prior studies. This study can help contribute to improving therapeutic guidelines and initiate further, more in-depth research.

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Content of figures

Content of tables

Appendix A

Boxplots and PP-Plots

Figure A1

Boxplot PTSD Symptom Severity (Sumscore PCL) Imputed data set 1
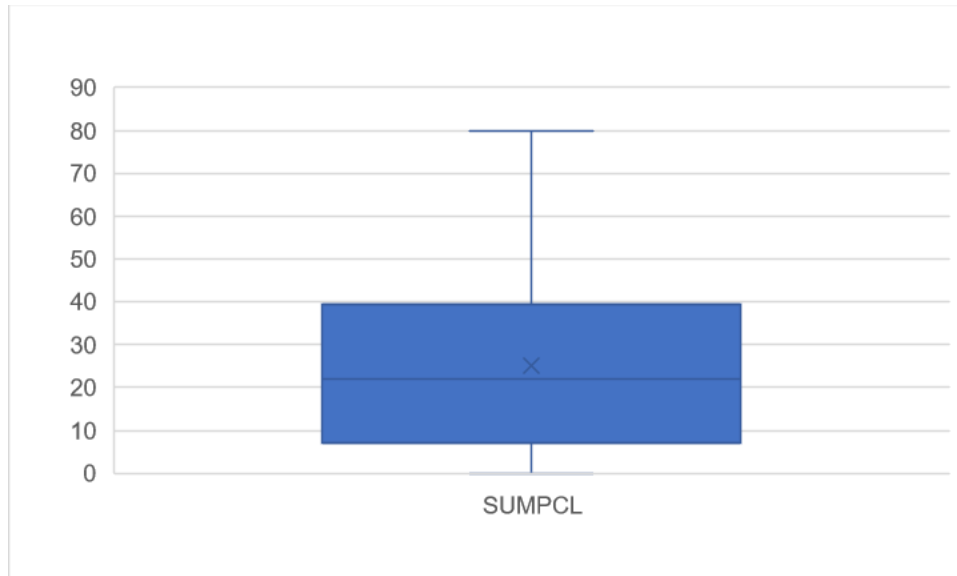
Figure A2

Stem-Leaf-Diagram PTSD Symptom Severity (Sumscore PCL)Imputed data set 1
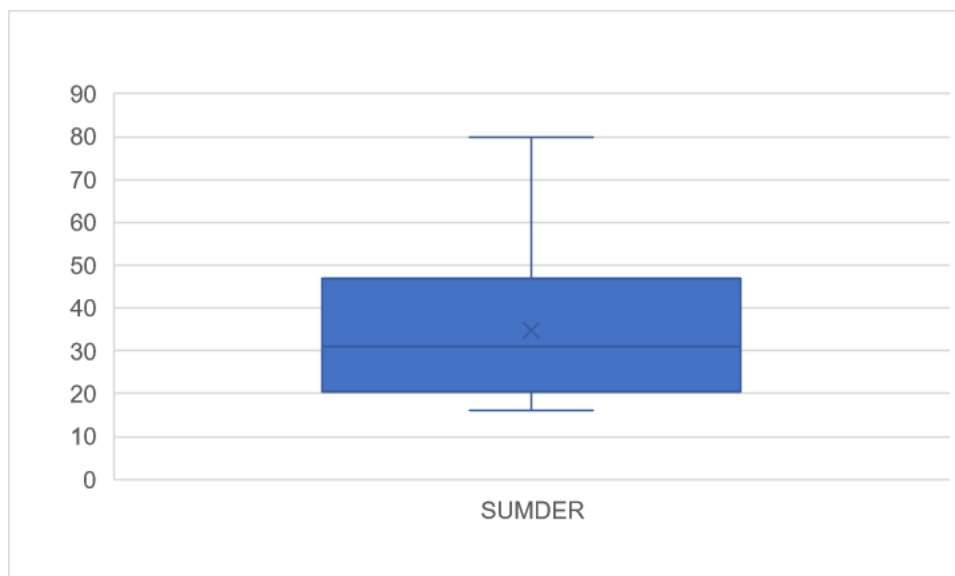
```
SUMPCL Stengel-Blatt-Diagramm

 Häufigkeit  Stem &  Blatt

    70.00         0 .
00000000000000000000000000001111111111122222222223333333344444444
44
    56.00         0 .
55555555555556666666777777777788888888888889999999999
    33.00         1 .  000000011111111112222233334444444
    30.00         1 .  555566666667777788888889999999
    25.00         2 .  0001111111222222333333444
    30.00         2 .  555555555566666666777788899999
    28.00         3 .  0000011112222233333333333344
    29.00         3 .  55555566666677777888899999999
    23.00         4 .  00000000001111222223334
    22.00         4 .  5555566667778888888999
    12.00         5 .  001122233334
    19.00         5 .  5667777777888899999
     5.00         6 .  00112
    10.00         6 .  5666667779
     5.00         7 .  00134
     2.00         7 .  55
     2.00         8 .  00

 Stammbreite:     10.00
 Jedes Blatt:        1 Fälle
```

Figure A3

Boxplot Difficulties in Emotion Regulation (Sumscore DERS) Imputed data set 1

Figure A4

Stem-Leaf-Diagram Difficulties in Emotion Regulation (Sumscore DERS) Imputed data set 1

```
SUMDER Stengel-Blatt-Diagramm

 Häufigkeit  Stem &  Blatt

    84.00       1 .
6666666666666666666666666666666666666666666677777777778888888888888888
8999999999999999
    56.00       2 .
000000000000000011111111111111111222223333333334444444
    45.00       2 .  555555555566666666777777777788888888888999999
    40.00       3 .  0000000001111111122222222222222333344444
    30.00       3 .  555555555566667777788889999999
    30.00       4 .  00000000011111122233333333444444
    32.00       4 .  555555556666667777788888888899999
    28.00       5 .  000111222222222333444444444444
    25.00       5 .  5555666666677777888889999
    13.00       6 .  0000111123344
     8.00       6 .  55567777
     7.00       7 .  0022234
     2.00       7 .  56
     1.00       8 .  0

 Stammbreite:     10.00
 Jedes Blatt:        1 Fälle
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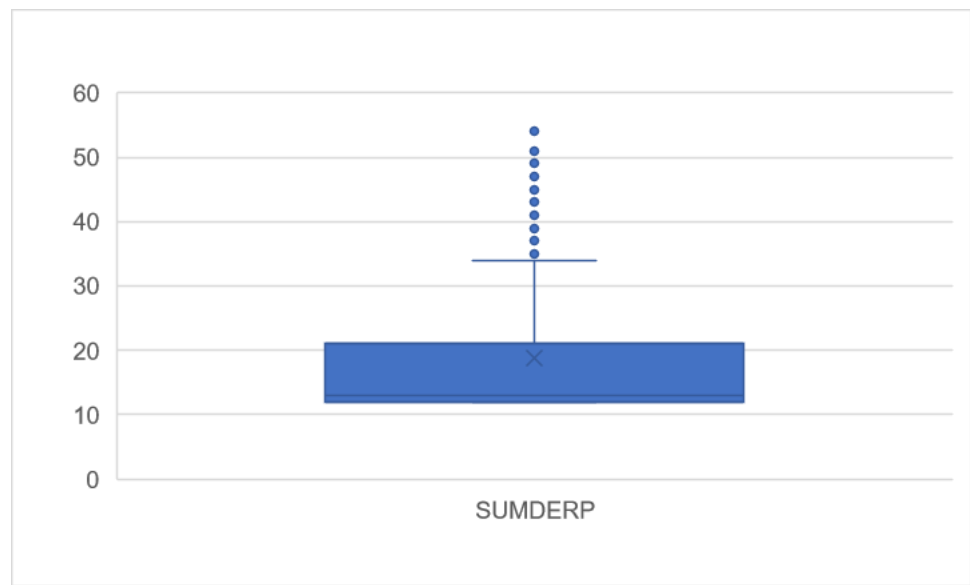
Figure A 5

Boxplot Difficulties in Positive Emotion Regulation (Sumscore DERSP) Imputed data set 1

Figure A6

Stem-Leaf-Diagram Difficulties in Positive Emotion Regulation (Sumscore DERSP) Imputed data set 1

```
SUMDERP Stengel-Blatt-Diagramm

 Häufigkeit   Stem &  Blatt

      .00        1 .
   205.00        1 .
2222222222222222222222222222222222222222222222222222222233333333333
     54.00        1 .  444444444455555555
     23.00        1 .  6667777
      9.00        1 .  889
     16.00        2 .  00111
      3.00        2 .  3&
      7.00        2 .  445
     11.00        2 .  677
      5.00        2 .  8&
      7.00        3 .  01
      5.00        3 .  23
      3.00        3 .  4
     53.00 Extremwerte (>=35)

 Stammbreite:      10.00
 Jedes Blatt:       3 Fälle
 & denotes fractional leaves.
```

Figure A7

Boxplot Trauma Type Imputed data set 1

Figure A8

Stem-Leaf-Diagram Trauma Type Imputed data set 1

```
Mosttraumatic LEC categorized into LEC-Cluster Stengel-Blatt-
Diagramm

 Häufigkeit   Stem &  Blatt

   183.00        1 .
0000000000000000000000000000000000000000000000000000000000000000
000000000000000000000000
      .00        1 .
      .00        1 .
      .00        1 .
      .00        1 .
   100.00        2 .
00000000000000000000000000000000000000000000000000
      .00        2 .
      .00        2 .
      .00        2 .
      .00        2 .
    94.00        3 .
000000000000000000000000000000000000000000000000
      .00        3 .
      .00        3 .
      .00        3 .
      .00        3 .
    24.00        4 .  000000000000

 Stammbreite:         1
 Jedes Blatt:       2 Fälle
```
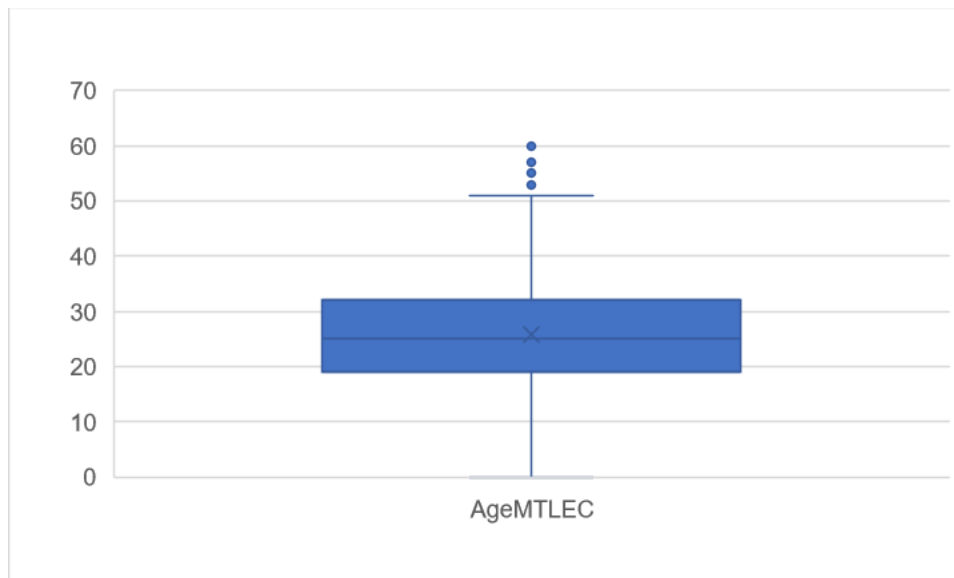
Figure A9

Boxplot Exposure Degree Imputed data set 1

Exposure degree of the mosttraumatic LEC-event

Figure A10

Stem-Leaf-Diagram Exposure Degree Imputed data set 1

```
Exposure degree of the mosttraumatic LEC-event Stengel-Blatt-
Diagramm

 Häufigkeit  Stem &  Blatt

   286.00         1 .
000000000000000000000000000000000000000000000000000000000000000000
0000000000000000000000000000
       .00         1 .
       .00         1 .
       .00         1 .
       .00         1 .
    77.00         2 .  0000000000000000000000000000
       .00         2 .
       .00         2 .
       .00         2 .
       .00         2 .
    22.00         3 .  0000000
    16.00 Extremwerte (>=4.0)

 Stammbreite:      1.00
 Jedes Blatt:       3 Fälle
```

Figure A11

Boxplot Age at traumatic event Imputed data set 1

Figure A12

Stem-Leaf-Diagram Age at traumatic event Imputed data set 1

```
AgeMTLEC Stengel-Blatt-Diagramm

 Häufigkeit  Stem &  Blatt

   10.00         0 .  0122234444
   24.00         0 .  6666666777777777788999999
   30.00         1 .  000011111122233333333334444444
   51.00         1 .
5555555556666666677777777888888888899999999999999999
   80.00         2 .
0000000000000001111111111122222222222222222233333333333333333333333344444
44444444444
   74.00         2 .
5555555555555556666666666666666666667777777777777788888888888888889999
999999
   51.00         3 .
00000000000000011111111111111122222223333333344444444
   33.00         3 .  555555555566666666667788889999999
   15.00         4 .  000001112233344
   13.00         4 .  5557777888899
    6.00         5 .  000111
   14.00 Extremwerte (>=53)

 Stammbreite:     10.00
 Jedes Blatt:       1 Fälle
```
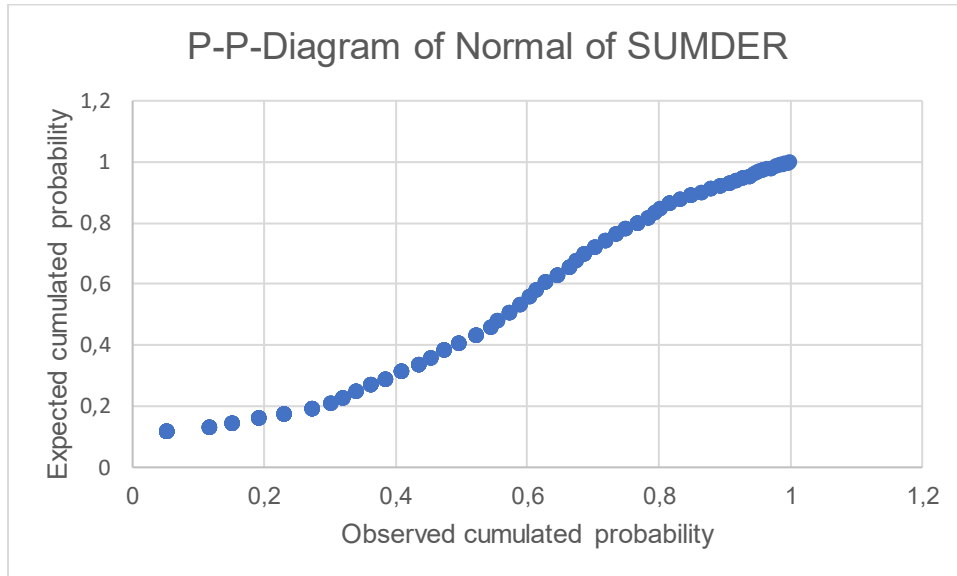
Figure A13

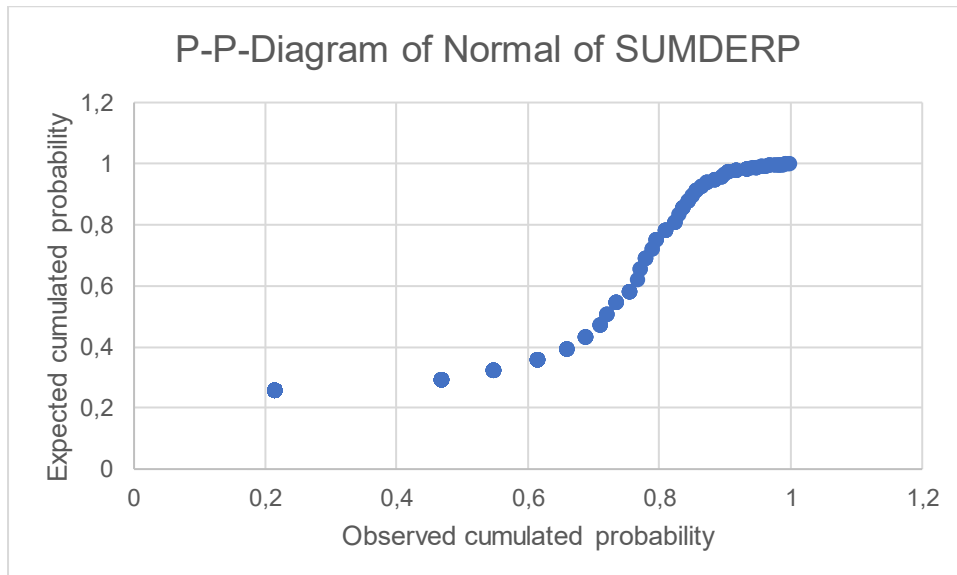*P-P-Diagram of Normal Distribution of PTSD Symptom Severity (Sumscore PCL) Imputed data set 1*
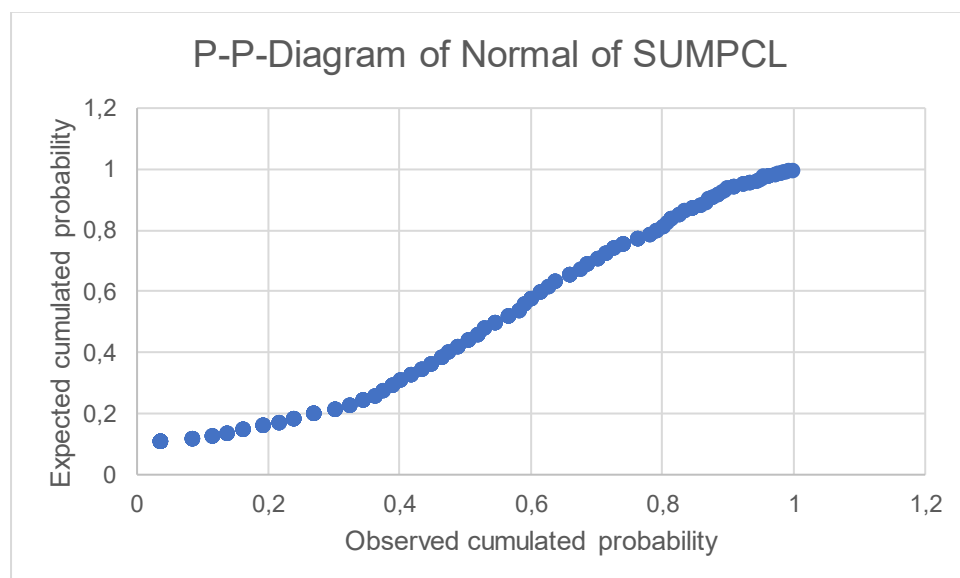
Figure A14

P-P-Diagram of Normal Distribution of Difficulties in Emotion Regulation (Sumscore DERS)
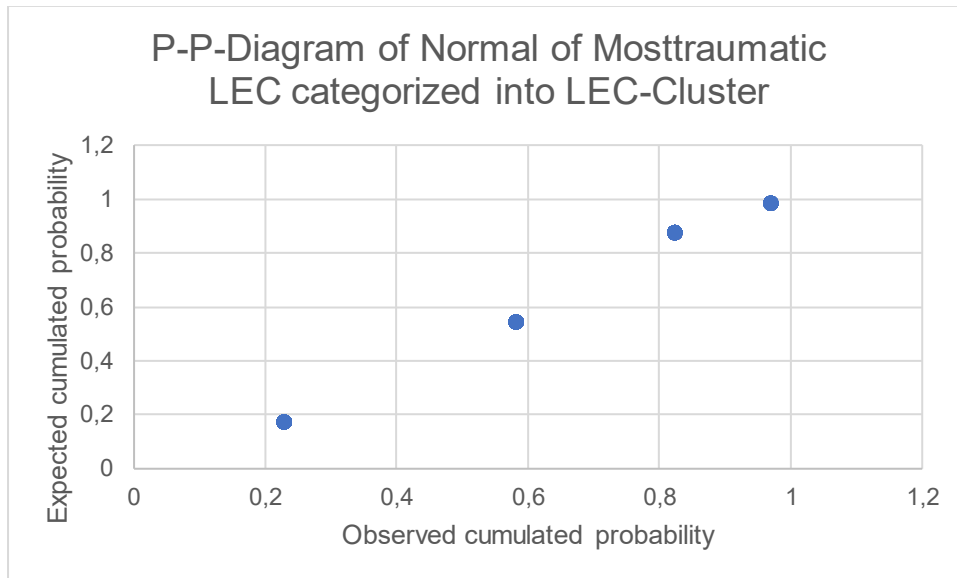*Imputed data set 1*

Figure A15

P-P-Diagram of Normal Distribution of Difficulties in Positive Emotion Regulation (Sumscore
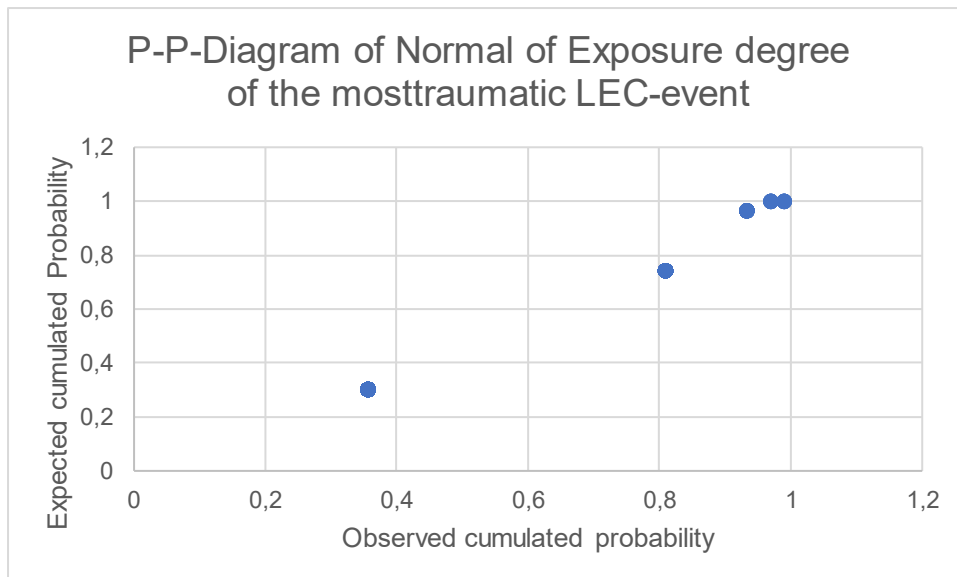*DERSP) Imputed data set 1*

Figure A16

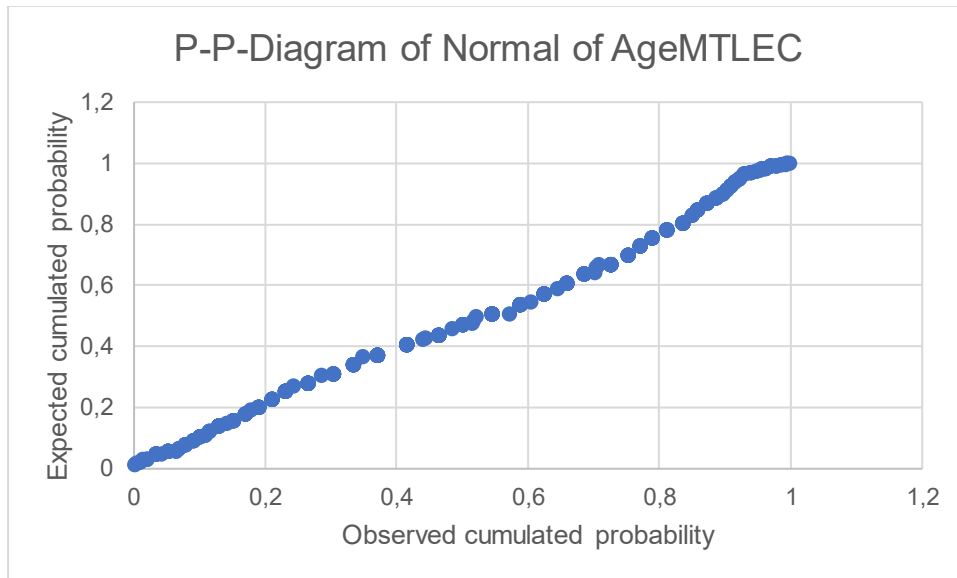*P-P-Diagram of Normal Distribution of Trauma Type Imputed data set 1*

Figure A17

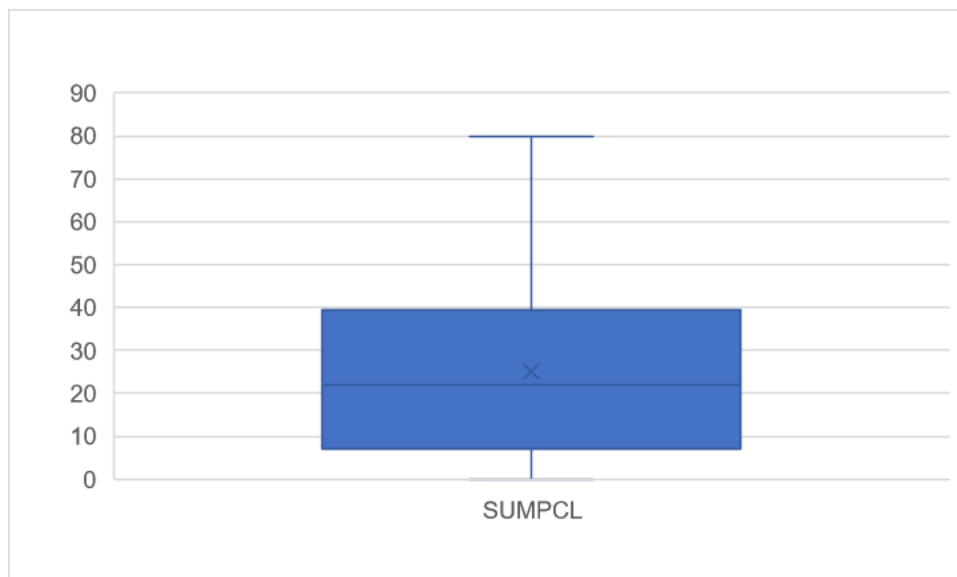*P-P-Diagram of Normal Distribution of Exposure Degree Imputed data set 1*

Figure A18

P-P-Diagram of Normal Distribution of Age at traumatic event Imputed data set 1

Imputed data set 2

Figure A19

Boxplot PTSD Symptom Severity (Sumscore PCL) Imputed data set 2

Figure A20

Stem-Leaf-Diagram PTSD Symptom Severity (Sumscore PCL) Imputed data set 2
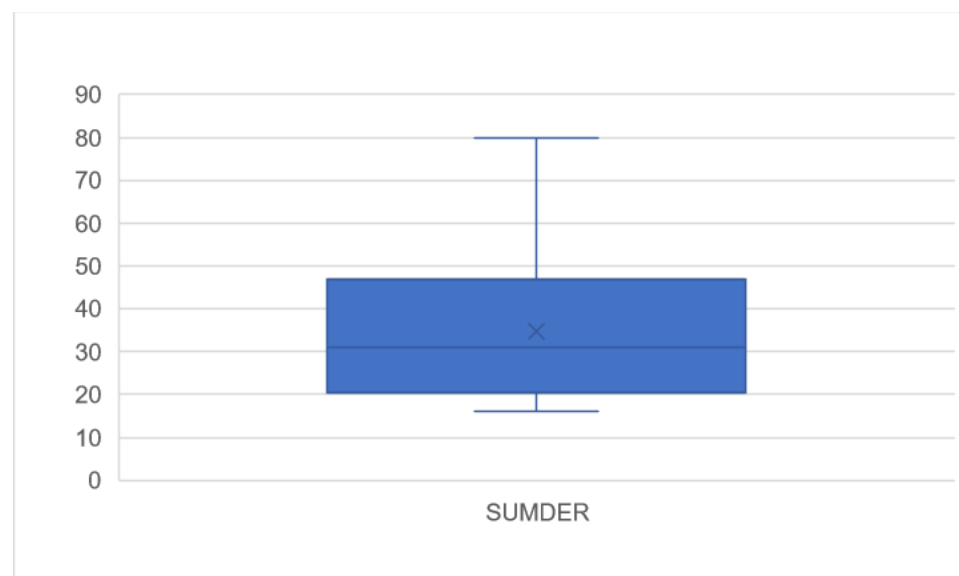
```
SUMPCL Stengel-Blatt-Diagramm

 Häufigkeit  Stem &  Blatt

    70.00        0 .
00000000000000000000000000000001111111111112222222222233333333444444444
44
    56.00        0 .
55555555555556666666777777777788888888888889999999999
    33.00        1 .  000000011111111112222233334444444
    30.00        1 .  555566666666777778888888999999
    25.00        2 .  0001111111222222333333444
    30.00        2 .  555555555566666666777788899999
    28.00        3 .  0000011112222233333333333344
    29.00        3 .  55555566666677777888899999999
    23.00        4 .  00000000001111222223334
    22.00        4 .  5555566667778888888999
    12.00        5 .  001122233334
    19.00        5 .  5667777777888899999
     5.00        6 .  00112
    10.00        6 .  5666667779
     5.00        7 .  00134
     2.00        7 .  55
     2.00        8 .  00

 Stammbreite:      10.00
 Jedes Blatt:       1 Fälle
```

Figure A21

Boxplot Difficulties in Emotion Regulation (Sumscore DERS) Imputed data set 2
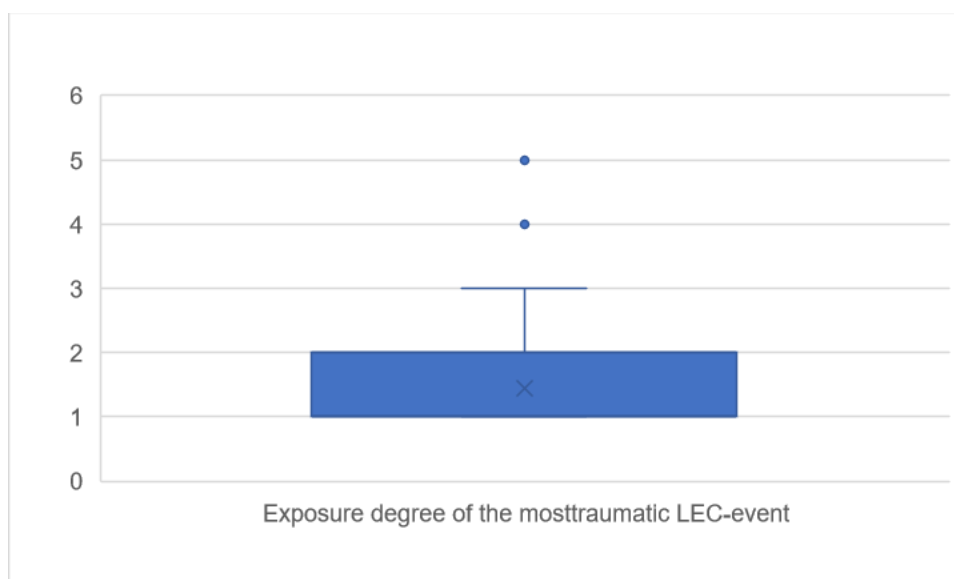
Figure A22

Stem-Leaf-Diagram Difficulties in Emotion Regulation (Sumscore DERS) Imputed data set 2

```
SUMDER Stengel-Blatt-Diagramm

 Häufigkeit  Stem &  Blatt

    84.00       1 .
66666666666666666666666666666666666666666677777777778888888888888888
8999999999999999
    56.00       2 .
00000000000000001111111111111111112222233333333334444444
    45.00       2 .  555555555566666666777777777788888888889999999
    40.00       3 .  0000000001111111112222222222222333344444
    30.00       3 .  555555555566666777788889999999
    30.00       4 .  000000001111112223333333444444
    32.00       4 .  55555555666666777778888888899999
    28.00       5 .  0001112222222223334444444444
    25.00       5 .  5555666666677777888889999
    13.00       6 .  0000111123344
     8.00       6 .  55567777
     7.00       7 .  0022234
     2.00       7 .  56
     1.00       8 .  0

 Stammbreite:      10.00
 Jedes Blatt:        1 Fälle
```

Figure A23

Boxplot Difficulties in Positive Emotion Regulation (Sumscore DERSP) Imputed data set 2

Figure A24

Stem-Leaf-Diagram Difficulties in Positive Emotion Regulation (Sumscore DERSP) Imputed data set 2

```
SUMDERP Stengel-Blatt-Diagramm

 Häufigkeit  Stem &  Blatt

      .00        1 .
   205.00        1 .
2222222222222222222222222222222222222222222222222222222222333333333333
    54.00        1 .  444444444455555555
    23.00        1 .  6667777
     9.00        1 .  889
    16.00        2 .  00111
     3.00        2 .  3&
     7.00        2 .  445
    11.00        2 .  677
     5.00        2 .  8&
     7.00        3 .  001
     6.00        3 .  23
     4.00        3 .  4
    51.00 Extremwerte (>=35)

 Stammbreite:      10.00
 Jedes Blatt:       3 Fälle
 & denotes fractional leaves.
```

Figure A25

Boxplot Trauma Type Imputed data set 2

Figure A26

Stem-Leaf-Diagram Trauma Type Imputed data set 2

```
Mosttraumatic LEC categorized into LEC-Cluster Stengel-Blatt-
Diagramm

 Häufigkeit  Stem &  Blatt

   183.00        1 .
0000000000000000000000000000000000000000000000000000000000000000000
0000000000000000000000000
       .00        1 .
       .00        1 .
       .00        1 .
       .00        1 .
   100.00        2 .
00000000000000000000000000000000000000000000000000
       .00        2 .
       .00        2 .
       .00        2 .
       .00        2 .
    94.00        3 .
00000000000000000000000000000000000000000000000
       .00        3 .
       .00        3 .
       .00        3 .
       .00        3 .
    24.00        4 .  000000000000

 Stammbreite:         1
 Jedes Blatt:       2 Fälle
```

Figure A27

Boxplot Exposure Degree Imputed data set 2

Figure A28

Stem-Leaf-Diagram Exposure Degree Imputed data set 2

```
Exposure degree of the mosttraumatic LEC-event Stengel-Blatt-
Diagramm

 Häufigkeit  Stem &  Blatt

   285.00        1 .
0000000000000000000000000000000000000000000000000000000000000000
00000000000000000000000000
      .00        1 .
      .00        1 .
      .00        1 .
      .00        1 .
    77.00        2 .  0000000000000000000000000000
      .00        2 .
      .00        2 .
      .00        2 .
      .00        2 .
    23.00        3 .  00000000
    16.00 Extremwerte (>=4.0)

 Stammbreite:      1.00
 Jedes Blatt:       3 Fälle
```

Figure A29

Boxplot Age at traumatic event Imputed data set 2
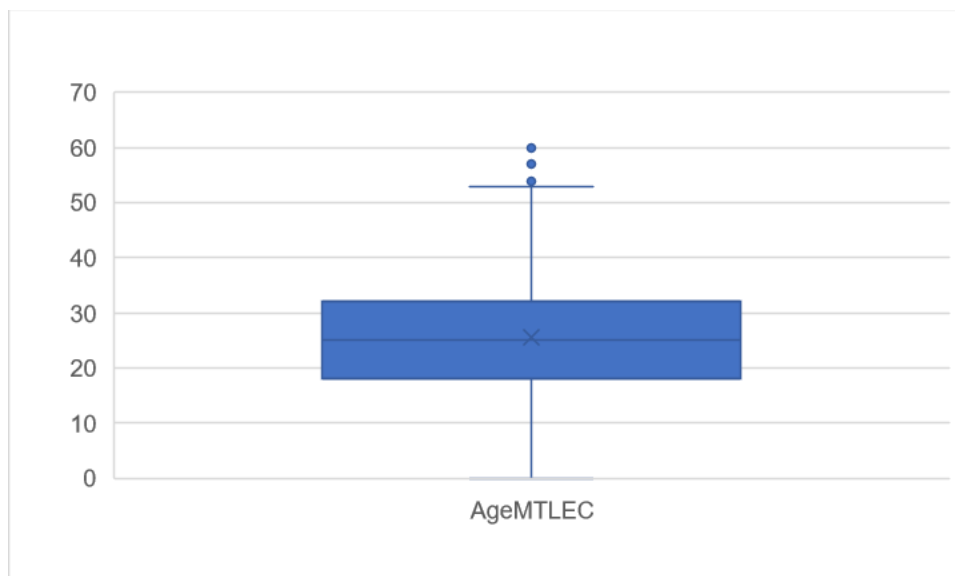
Figure A30

Stem-Leaf-Diagram Age at traumatic event Imputed data set 2

```
AgeMTLEC Stengel-Blatt-Diagramm

 Häufigkeit  Stem &  Blatt

    11.00        0 .  01222444444
    24.00        0 .  556666667777777788999999
    34.00        1 .  0000011111122233333333333344444444
    50.00        1 .
5555555566666666777777778888888889999999999999999999
    79.00        2 .
0000000000000011111111111122222222222222222233333333333333333333333444444
44444444444
    71.00        2 .
5555555555556666666666666666666666777777777777778888888888888888889999999
999
    51.00        3 .
0000000000001111111111111111222222233333333344444444
    34.00        3 .  55555555555566666666667788889999999
    16.00        4 .  0000001112233344
    12.00        4 .  557777888899
     9.00        5 .  001113333
    10.00 Extremwerte (>=54)

 Stammbreite:     10.00
 Jedes Blatt:        1 Fälle
```

Figure A31

P-P-Diagram of Normal Distribution of PTSD Symptom Severity (Sumscore PCL) Imputed data set 2
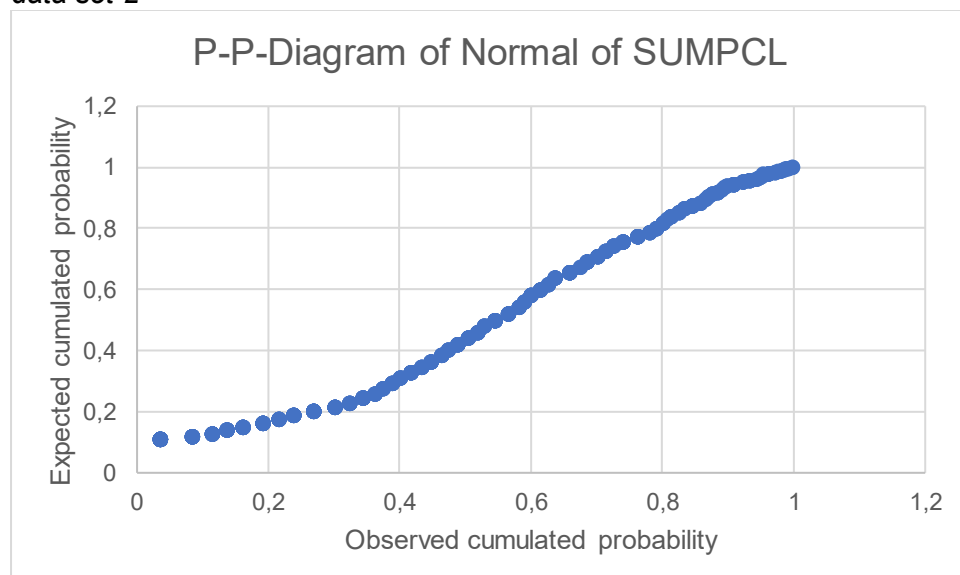
Figure A32

P-P-Diagram of Normal Distribution of Difficulties in Emotion Regulation (Sumscore DERS)
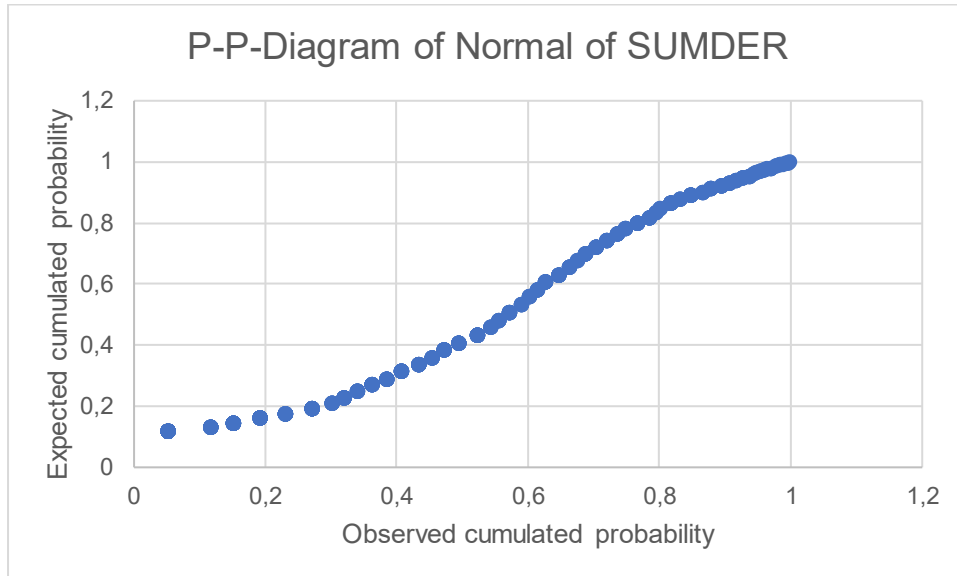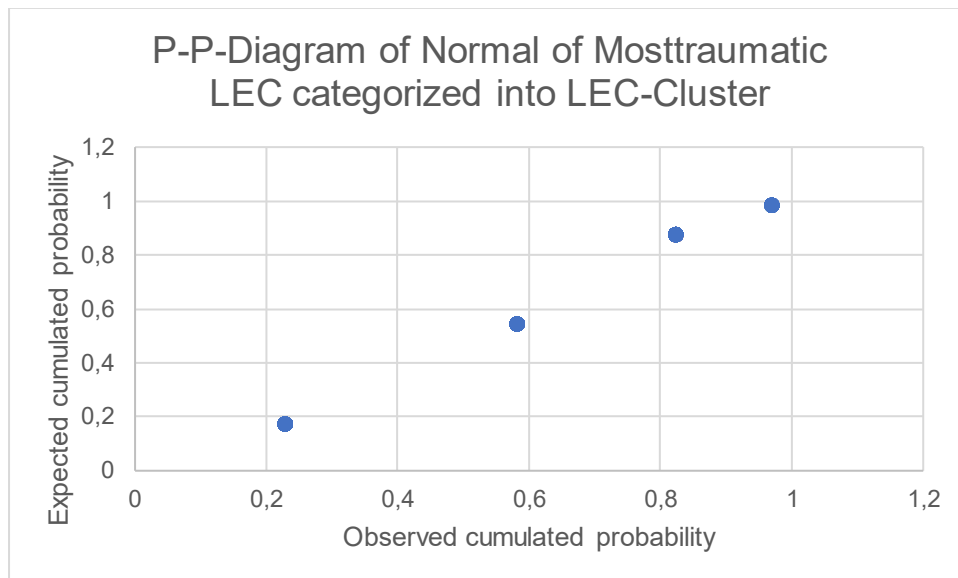
Imputed data set 2

Figure A33

P-P-Diagram of Normal Distribution of Difficulties in Positive Emotion Regulation (Sumscore DERSP) Imputed data set 2
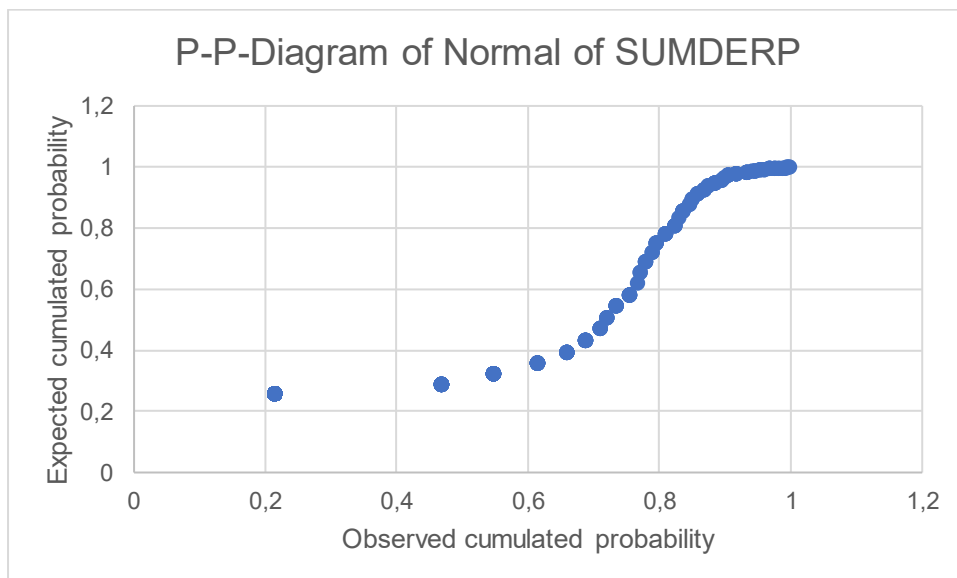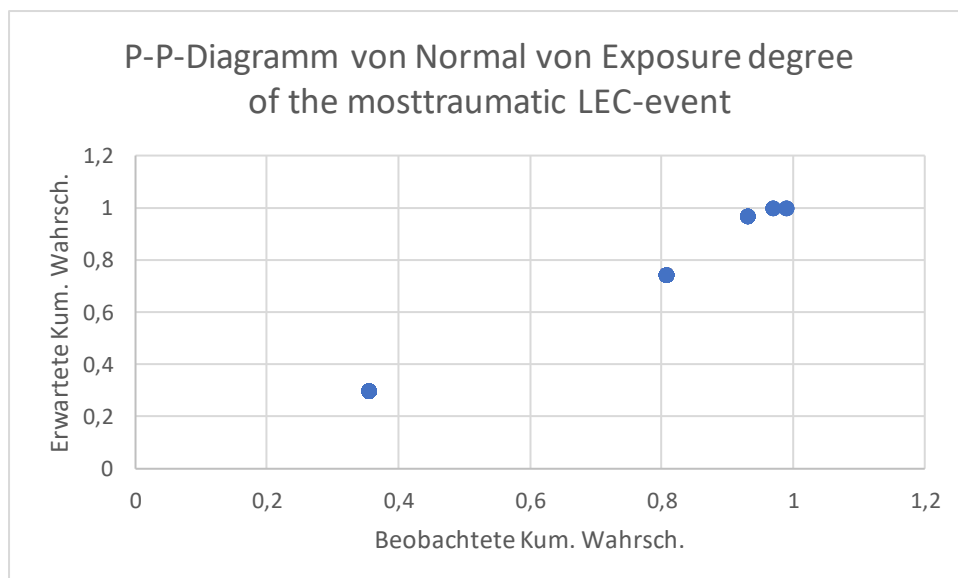
Figure A34

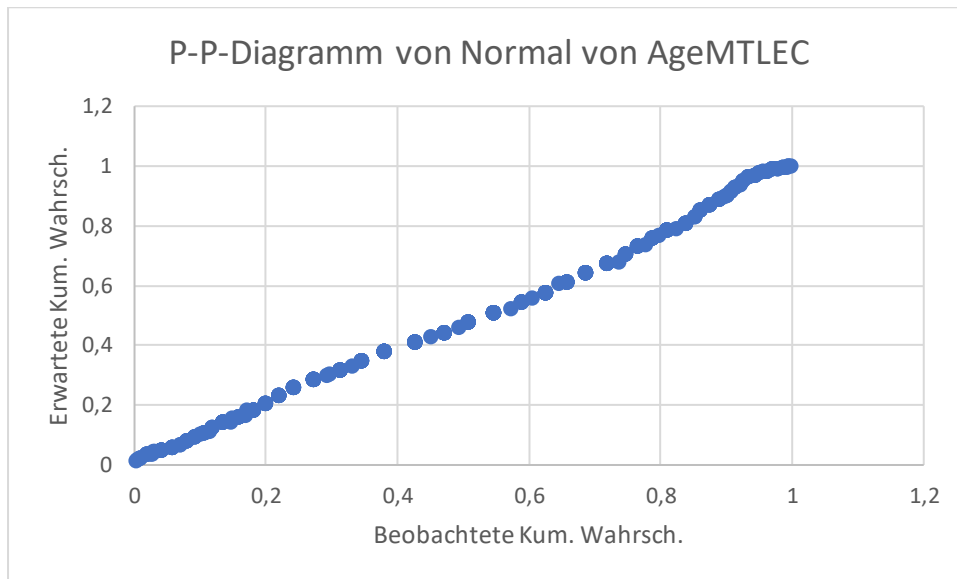*P-P-Diagram of Normal Distribution of Trauma Type Imputed data set 2*

Figure A35

P-P-Diagram of Normal Distribution of Exposure Degree Imputed data set 2
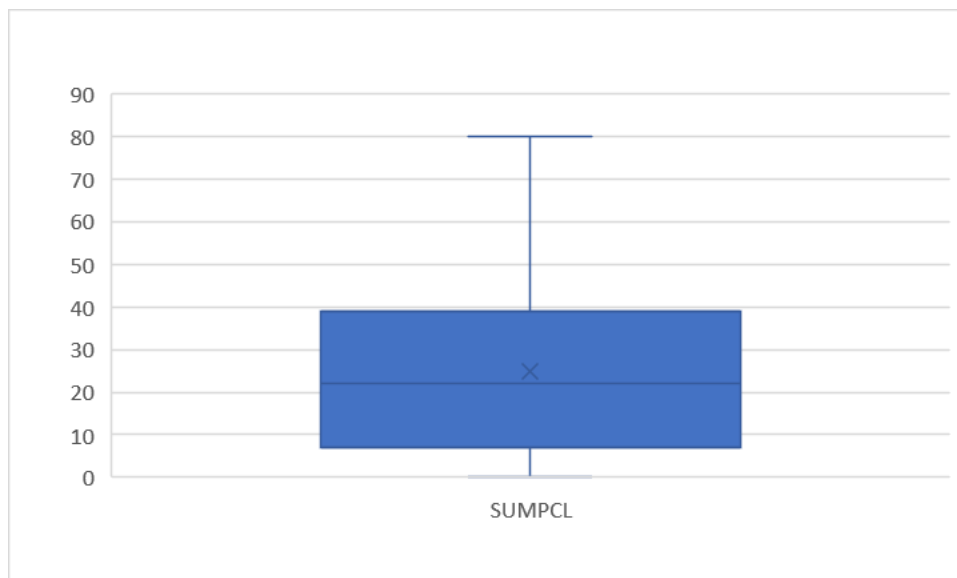
Figure A36

P-P-Diagram of Normal Distribution of Age at traumatic event Imputed data set 2

Imputed data set 3

Figure A37

Boxplot PTSD Symptom Severity (Sumscore PCL) Imputed data set 3

Figure A38

Stem-Leaf-Diagram PTSD Symptom Severity (Sumscore PCL) Imputed data set 3

```
SUMPCL Stengel-Blatt-Diagramm

 Häufigkeit  Stem &  Blatt

    71.00         0 .
00000000000000000000000000001111111111111222222222222233333333344444444
444
    56.00         0 .
55555555555556666666777777777788888888888889999999999
    33.00         1 .  000000011111111112222233334444444
    30.00         1 .  555566666666777778888888999999
    25.00         2 .  0001111111222222333333444
    30.00         2 .  555555555666666666777788899999
    28.00         3 .  0000011112222233333333333344
    29.00         3 .  55555566666677777888899999999
    23.00         4 .  00000000001111222223334
    22.00         4 .  5555566667778888888999
    12.00         5 .  001122233334
    18.00         5 .  566777777888899999
     5.00         6 .  00112
    10.00         6 .  5666667779
     5.00         7 .  00134
     2.00         7 .  55
     2.00         8 .  00

 Stammbreite:     10.00
 Jedes Blatt:       1 Fälle
```
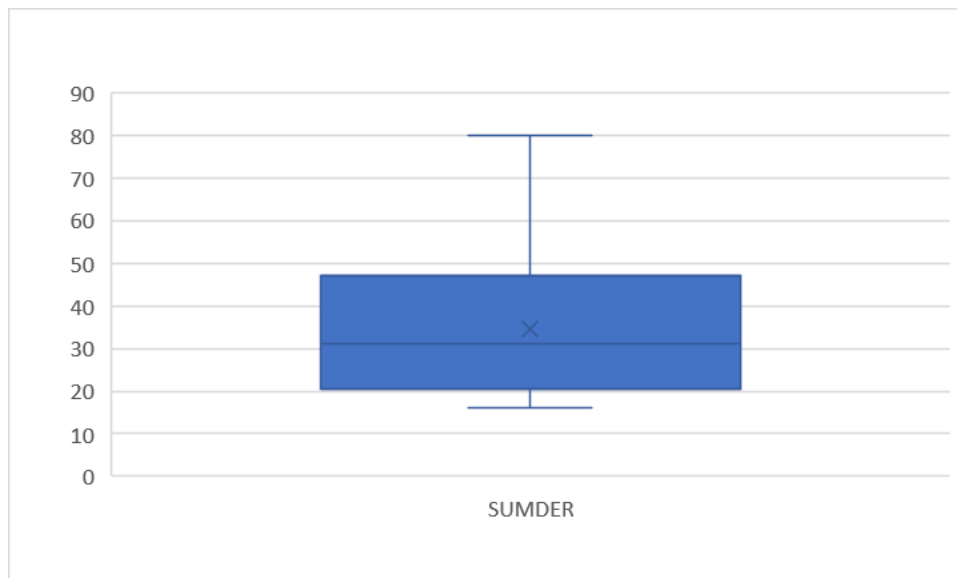
Figure A39

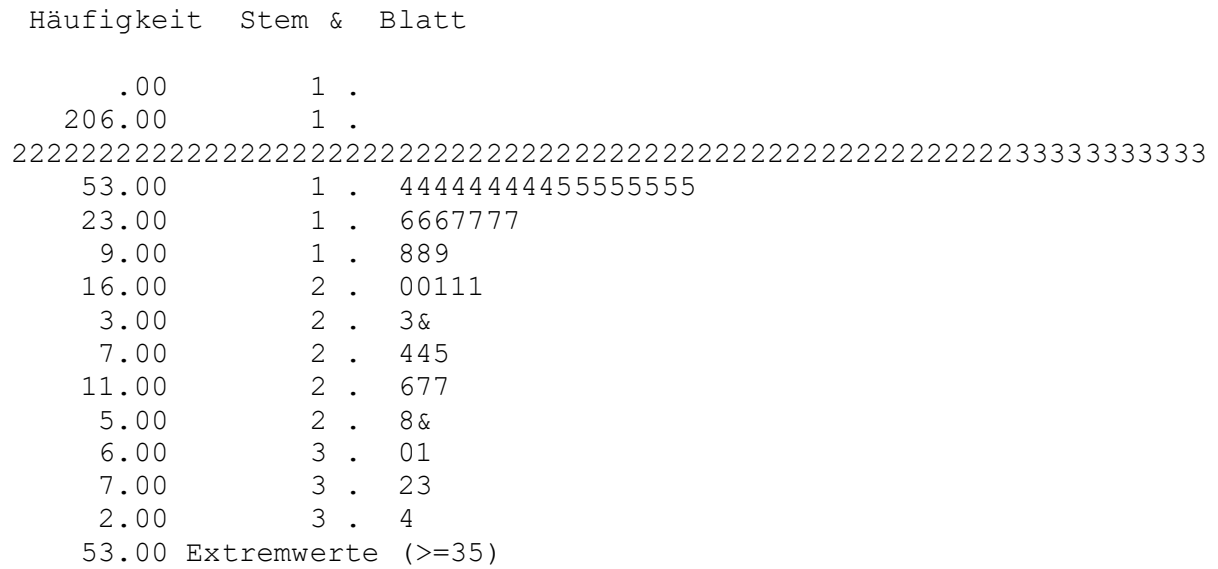*Boxplot Difficulties in Emotion Regulation (Sumscore DERS) Imputed data set 3*

Figure A40

Stem-Leaf-Diagram Difficulties in Emotion Regulation (Sumscore DERS) Imputed data set 3

```
SUMDER Stengel-Blatt-Diagramm

 Häufigkeit  Stem &  Blatt

    84.00        1 .
66666666666666666666666666666666666666666666777777777778888888888888888
8899999999999999
    56.00        2 .
0000000000000000011111111111111111122222333333333344444444
    46.00        2 .   5555555555566666666777777777788888888889999999
    40.00        3 .   0000000000111111111222222222222222333344444
    30.00        3 .   55555555556666677777888899999999
    30.00        4 .   000000001111112223333333344444
    32.00        4 .   5555555566666677777888888889999999
    28.00        5 .   0001112222222223334444444444
    25.00        5 .   5555666666667777788888889999
    12.00        6 .   000011112334
     8.00        6 .   55567777
     7.00        7 .   0022234
     2.00        7 .   56
     1.00        8 .   0

 Stammbreite:     10.00
 Jedes Blatt:      1 Fälle
```

Figure A41

Boxplot Difficulties in Positive Emotion Regulation (Sumscore DERSP) Imputed data set 3

Figure A42

Stem-Leaf-Diagram Difficulties in Positive Emotion Regulation (Sumscore DERSP) Imputed data set 3

```
SUMDERP Stengel-Blatt-Diagramm

 Häufigkeit  Stem &  Blatt

      .00      1 .
   206.00      1 .
2222222222222222222222222222222222222222222222222222222233333333333
    53.00      1 .  44444444455555555
    23.00      1 .  6667777
     9.00      1 .  889
    16.00      2 .  00111
     3.00      2 .  3&
     7.00      2 .  445
    11.00      2 .  677
     5.00      2 .  8&
     6.00      3 .  01
     7.00      3 .  23
     2.00      3 .  4
    53.00 Extremwerte (>=35)


 Stammbreite:      10.00
 Jedes Blatt:        3 Fälle
 & denotes fractional leaves.
```

Figure A43

Boxplot Trauma Type Imputed data set 3
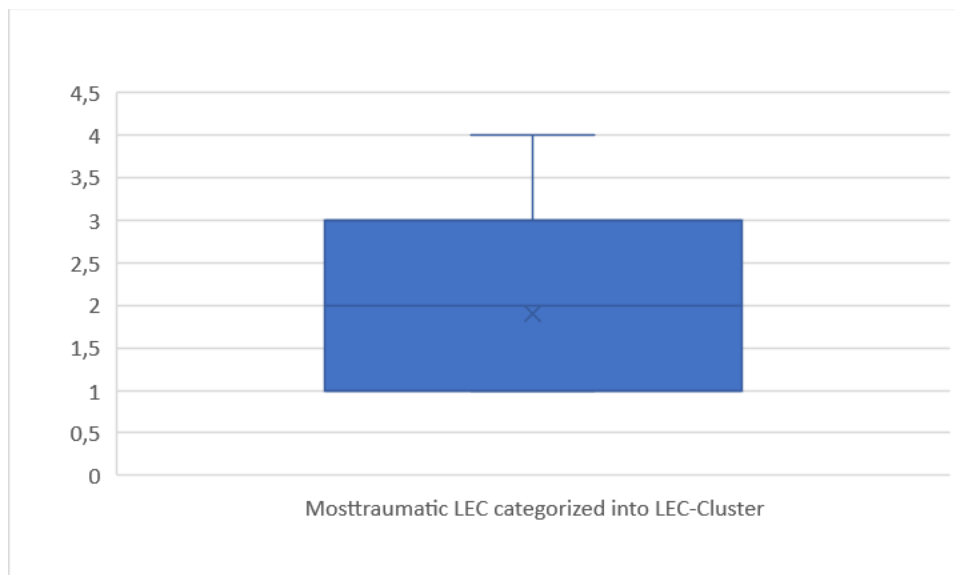
Figure A44

Stem-Leaf-Diagram Trauma Type Imputed data set 3

```
Mosttraumatic LEC categorized into LEC-Cluster Stengel-Blatt-
Diagramm

 Häufigkeit  Stem &  Blatt

   184.00       1 .
0000000000000000000000000000000000000000000000000000000000000000
00000000000000000000000000
       .00       1 .
       .00       1 .
       .00       1 .
       .00       1 .
    99.00       2 .
000000000000000000000000000000000000000000000000000
       .00       2 .
       .00       2 .
       .00       2 .
       .00       2 .
    94.00       3 .
00000000000000000000000000000000000000000000000
       .00       3 .
       .00       3 .
       .00       3 .
       .00       3 .
    24.00       4 .  000000000000

 Stammbreite:         1
 Jedes Blatt:      2 Fälle
```

Figure A45

Boxplot Exposure Degree Imputed data set 3

Exposure degree of the mosttraumatic LEC-event

Figure A46

Stem-Leaf-Diagram Exposure Degree Imputed data set 3

```
Exposure degree of the mosttraumatic LEC-event Stengel-Blatt-
Diagramm

 Häufigkeit  Stem &  Blatt

   286.00        1 .
0000000000000000000000000000000000000000000000000000000000000000
00000000000000000000000000
      .00        1 .
      .00        1 .
      .00        1 .
      .00        1 .
    77.00        2 .  00000000000000000000000000
      .00        2 .
      .00        2 .
      .00        2 .
      .00        2 .
    22.00        3 .  0000000
    16.00 Extremwerte (>=4.0)

 Stammbreite:        1.00
 Jedes Blatt:        3 Fälle
```

Figure A47

Boxplot Age at traumatic event Imputed data set 3

Figure A48

Stem-Leaf-Diagram Age at traumatic event Imputed data set 3

```
AgeMTLEC Stengel-Blatt-Diagramm

 Häufigkeit  Stem &  Blatt

     9.00        0 .  012224444
    24.00        0 .  666666677777777788999999
    31.00        1 .  0000111112222333333333344444444
    57.00        1 .
5555555555566666666777777777888888888888899999999999999999
    76.00        2 .
000000000000011111111111122222222222222222223333333333333333333334444444
44444444
    68.00        2 .
55555555555566666666666666666666677777777777788888888888888889999999999
    51.00        3 .
0000000000001111111111111111122222222333333334444444
    36.00        3 .  555555555566666666667778888899999999
    16.00        4 .  0000011112233344
    13.00        4 .  5577777888899
     5.00        5 .  00111
    15.00 Extremwerte (>=53)


 Stammbreite:     10.00
 Jedes Blatt:        1 Fälle
```

Figure A49

P-P-Diagram of Normal Distribution of PTSD Symptom Severity (Sumscore PCL) Imputed data set 3
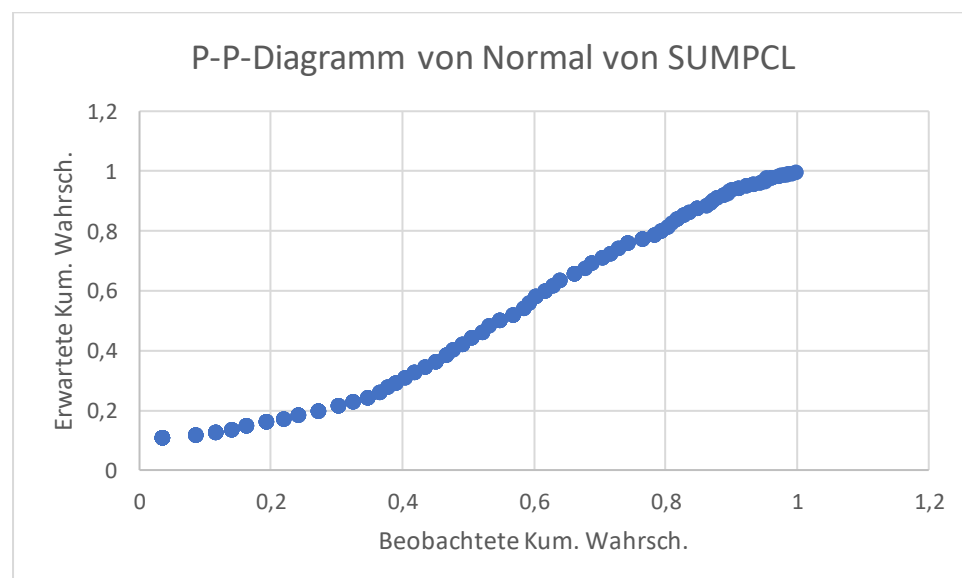
Figure A50

P-P-Diagram of Normal Distribution of Difficulties in Emotion Regulation (Sumscore DERS)
Imputed data set 3
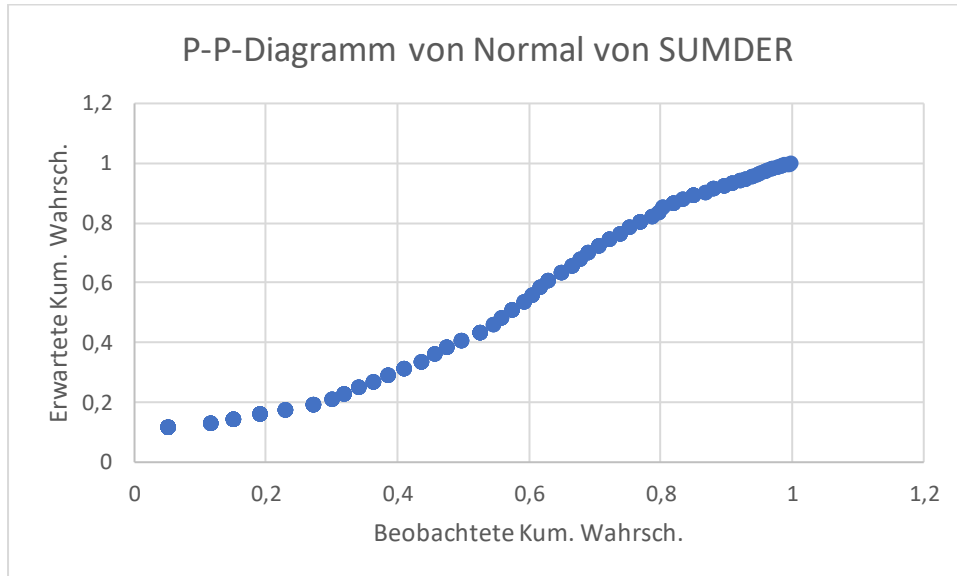
Figure A51

P-P-Diagram of Normal Distribution of Difficulties in Positive Emotion Regulation (Sumscore
DERSP) Imputed data set 3
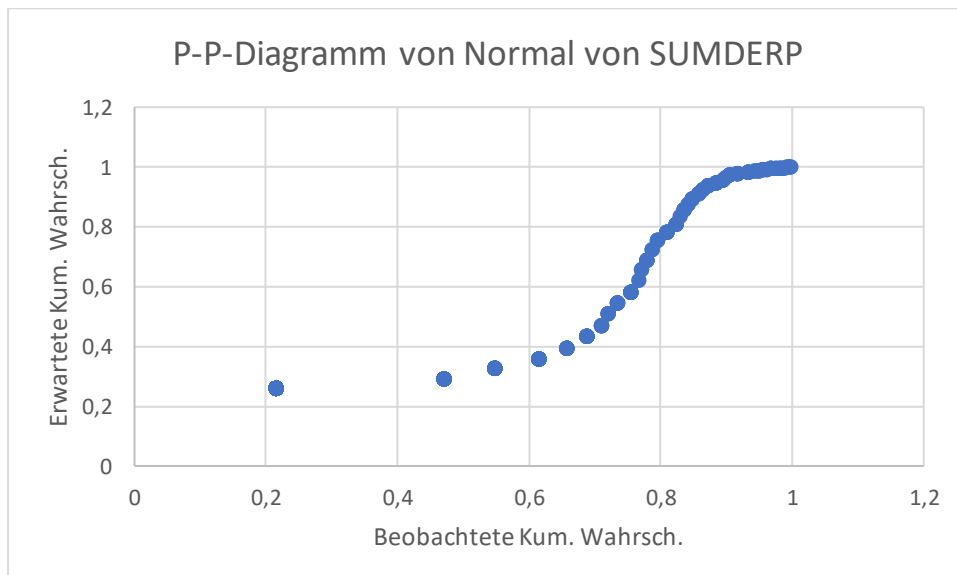
Figure A52

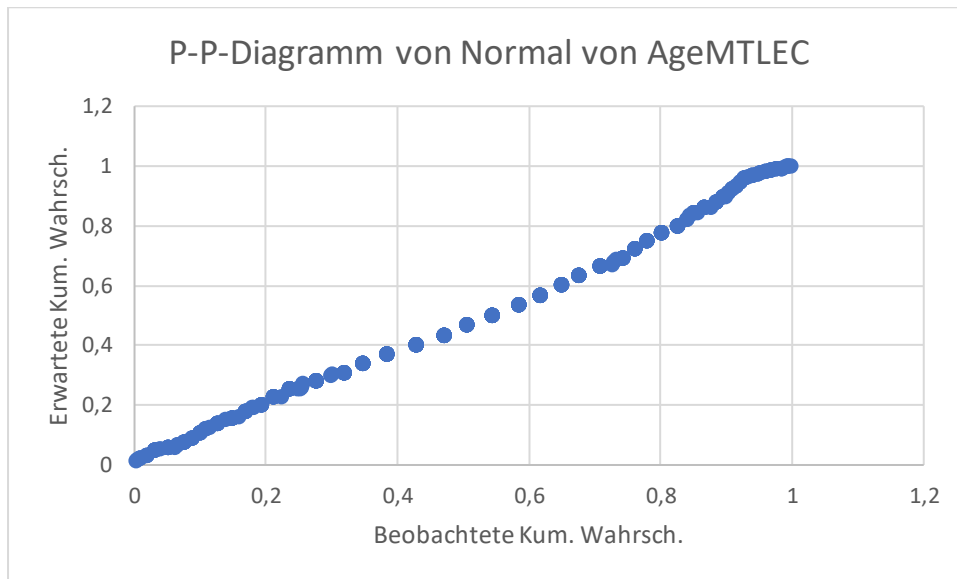*P-P-Diagram of Normal Distribution of Trauma Type Imputed data set 3*
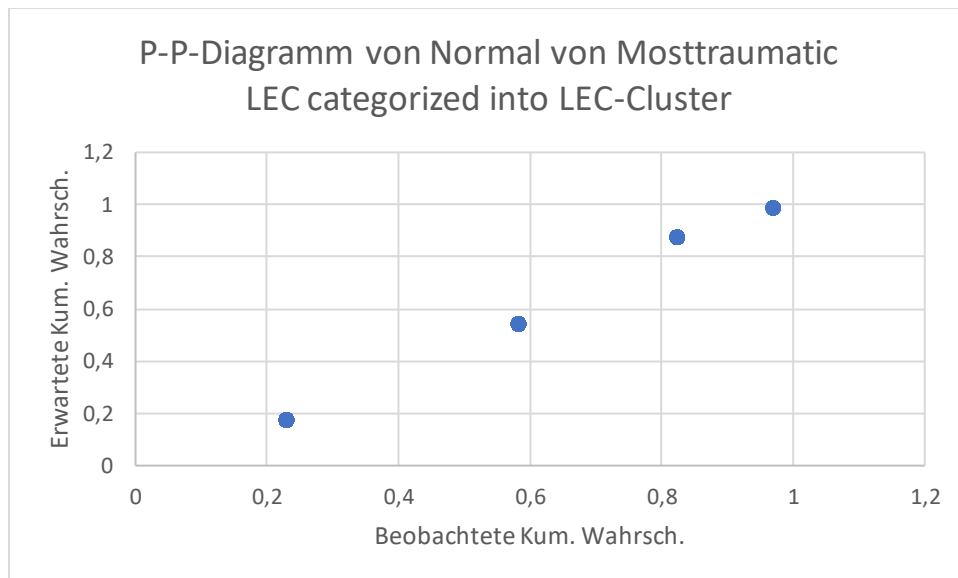
Figure A53

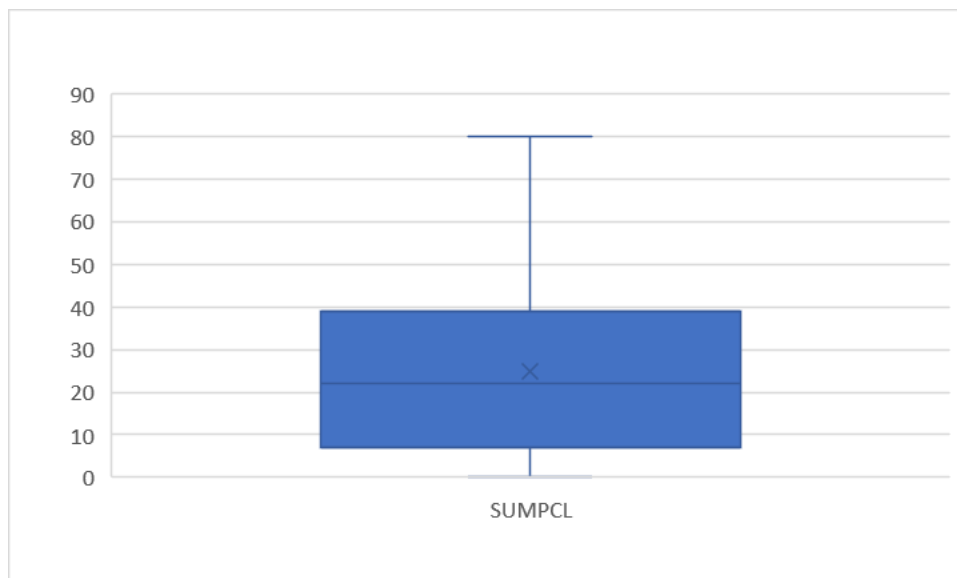*P-P-Diagram of Normal Distribution of Exposure Degree Imputed data set 3*
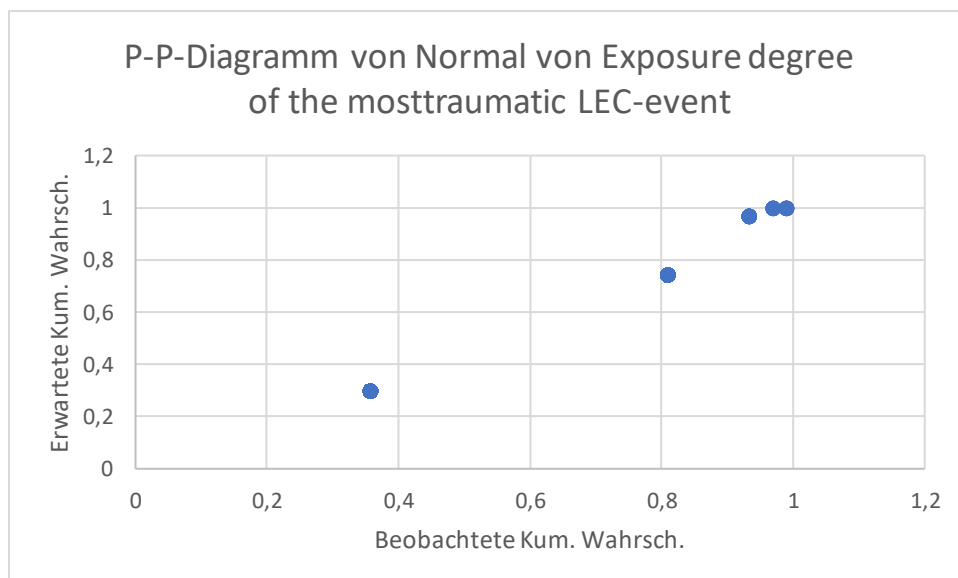
Figure A54

P-P-Diagram of Normal Distribution of Age at traumatic event Imputed data set 3

Imputed data set 4

Figure A55

Boxplot PTSD Symptom Severity (Sumscore PCL) Imputed data set 4

Figure A56

Stem-Leaf-Diagram PTSD Symptom Severity (Sumscore PCL) Imputed data set 4

```
SUMPCL Stengel-Blatt-Diagramm

 Häufigkeit  Stem &  Blatt

    71.00        0 .
0000000000000000000000000000001111111111112222222222223333333344444444
444
    56.00        0 .
5555555555555666666677777777778888888888888899999999999
    33.00        1 .  000000011111111112222233334444444
    30.00        1 .  555566666666777778888888999999
    25.00        2 .  0001111111222222333333444
    30.00        2 .  555555555566666666777788899999
    28.00        3 .  0000011112222233333333333344
    29.00        3 .  55555566666677777888899999999
    23.00        4 .  00000000001111222223334
    22.00        4 .  5555566667778888888999
    12.00        5 .  001122233334
    18.00        5 .  566777777888899999
     5.00        6 .  00112
    10.00        6 .  5666667779
     5.00        7 .  00134
     2.00        7 .  55
     2.00        8 .  00

 Stammbreite:     10.00
 Jedes Blatt:       1 Fälle
```

Figure A57

*Boxplot Difficulties in Emotion Regulation (Sumscore DERS) Imputed data set 4*
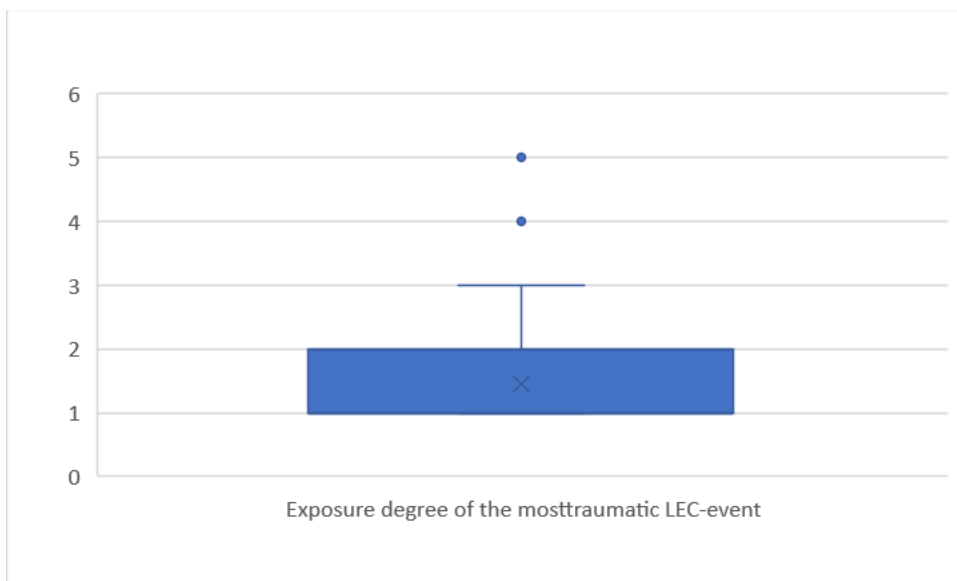
Figure A58

Stem-Leaf-Diagram Difficulties in Emotion Regulation (Sumscore DERS) Imputed data set 4

```
SUMDER Stengel-Blatt-Diagramm

 Häufigkeit  Stem &  Blatt

    84.00        1 .
66666666666666666666666666666666666666667777777777788888888888888888
8999999999999999
    56.00        2 .
000000000000000011111111111111111122222333333333334444444
    46.00        2 .   5555555555566666666777777777788888888889999999
    40.00        3 .   0000000001111111112222222222222333344444
    31.00        3 .   5555555555666667777888899999999
    29.00        4 .   00000001111112223333333444444
    32.00        4 .   55555555666666777778888888899999
    28.00        5 .   0001112222222223334444444444
    25.00        5 .   5555666666677777888889999
    12.00        6 .   000011112334
     8.00        6 .   55567777
     7.00        7 .   0022234
     2.00        7 .   56
     1.00        8 .   0

 Stammbreite:     10.00
 Jedes Blatt:         1 Fälle
```

Figure A59

Boxplot Difficulties in Positive Emotion Regulation (Sumscore DERSP) Imputed data set 4

Figure A60

Stem-Leaf-Diagram Difficulties in Positive Emotion Regulation (Sumscore DERSP) Imputed data set 4

```
SUMDERP Stengel-Blatt-Diagramm

 Häufigkeit   Stem &  Blatt

      .00        1 .
   206.00        1 .
2222222222222222222222222222222222222222222222222222233333333333
    53.00        1 .  44444444455555555
    23.00        1 .  6667777
     9.00        1 .  889
    16.00        2 .  00111
     3.00        2 .  3&
     7.00        2 .  445
    11.00        2 .  677
     6.00        2 .  89
     6.00        3 .  01
     5.00        3 .  23
     3.00        3 .  4
    53.00 Extremwerte (>=35)

 Stammbreite:      10.00
 Jedes Blatt:       3 Fälle
 & denotes fractional leaves.
```

Figure A61

Boxplot Trauma Type Imputed data set 4

Figure A62

Stem-Leaf-Diagram Trauma Type Imputed data set 4
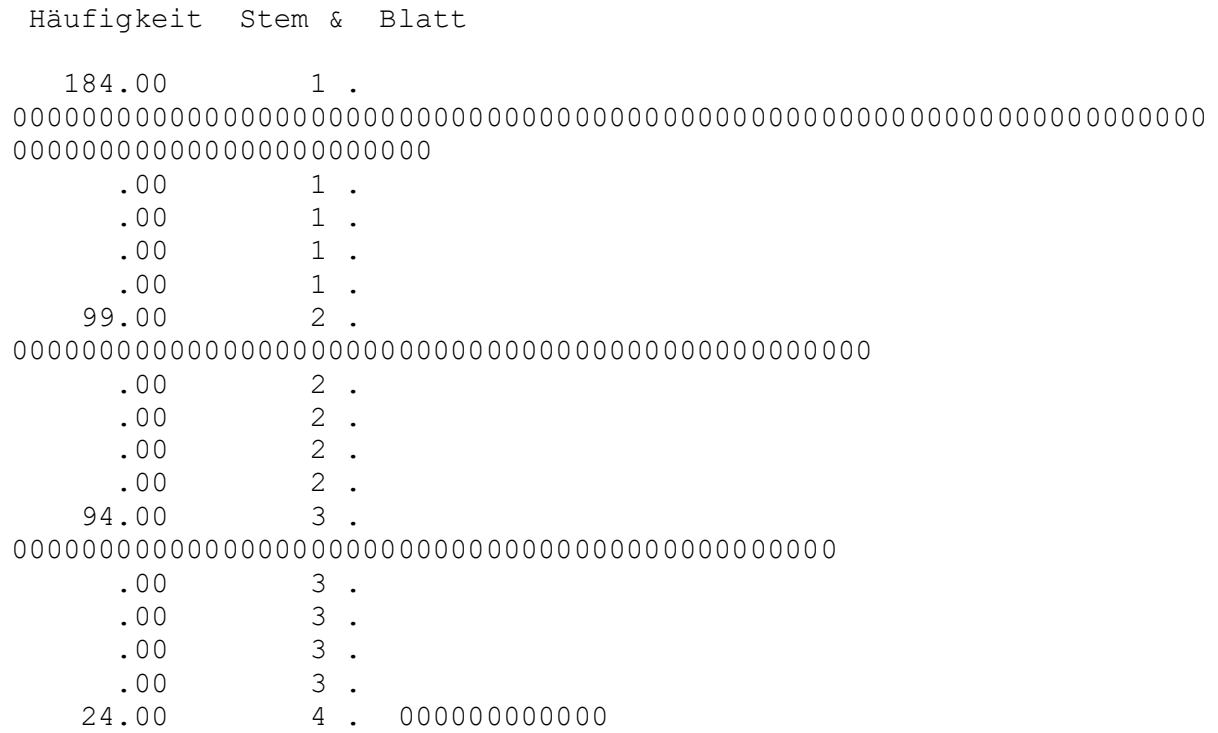
```
Mosttraumatic LEC categorized into LEC-Cluster Stengel-Blatt-
Diagramm

 Häufigkeit  Stem &  Blatt

   184.00       1 .
000000000000000000000000000000000000000000000000000000000000000000000
00000000000000000000000000
       .00       1 .
       .00       1 .
       .00       1 .
       .00       1 .
    99.00        2 .
000000000000000000000000000000000000000000000000000
       .00       2 .
       .00       2 .
       .00       2 .
       .00       2 .
    94.00        3 .
0000000000000000000000000000000000000000000000000
       .00       3 .
       .00       3 .
       .00       3 .
       .00       3 .
    24.00        4 .  000000000000

 Stammbreite:        1
 Jedes Blatt:       2 Fälle
```

Figure A63

Boxplot Exposure Degree Imputed data set 4

Figure A64

Stem-Leaf-Diagram Exposure Degree Imputed data set 4

```
Exposure degree of the mosttraumatic LEC-event Stengel-Blatt-
Diagramm

 Häufigkeit  Stem &  Blatt

   286.00        1 .
0000000000000000000000000000000000000000000000000000000000000000000
000000000000000000000000000
     .00         1 .
     .00         1 .
     .00         1 .
     .00         1 .
    77.00        2 .  00000000000000000000000000
     .00         2 .
     .00         2 .
     .00         2 .
     .00         2 .
    21.00        3 .  0000000
    17.00 Extremwerte (>=4.0)

 Stammbreite:      1.00
 Jedes Blatt:       3 Fälle
```

Figure A65

Boxplot Age at traumatic event Imputed data set 4
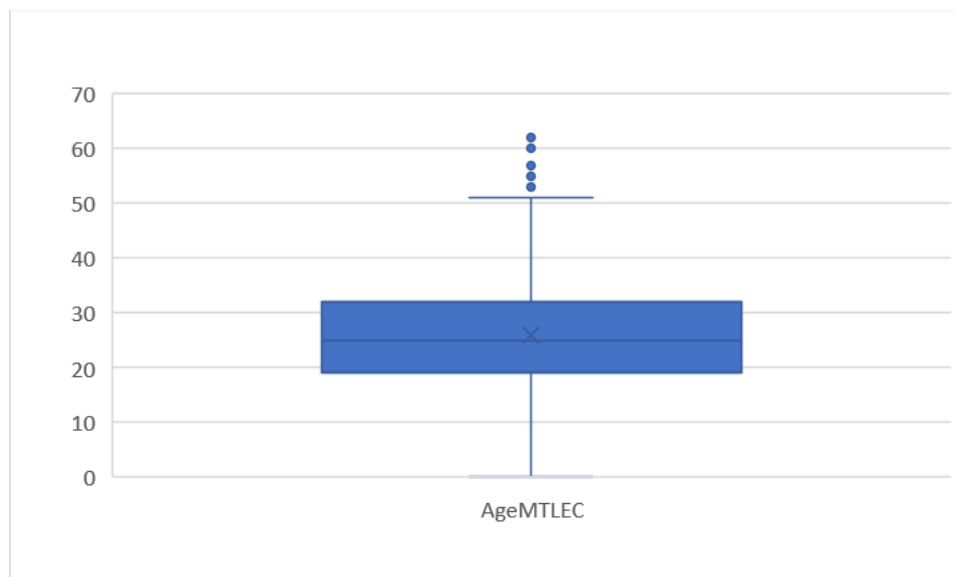
Figure A66

Stem-Leaf-Diagram Age at traumatic event Imputed data set 4

```
AgeMTLEC Stengel-Blatt-Diagramm

 Häufigkeit  Stem &  Blatt

    12.00         0 .  012222344444
    23.00         0 .  66666677777777788999999
    29.00         1 .  00000111112223333333334444444
    50.00         1 .
5555555666666666777777777888888888899999999999999999
    86.00         2 .
000000000000000001111111111111122222222222222222222233333333333333333
334444444444444444
    71.00         2 .
55555555555566666666666666666666677777777777788888888888888999999999
999
    48.00         3 .
00000000000011111111111111122222223333333334444444
    33.00         3 .  555555555566666666667788889999999
    15.00         4 .  000001112233344
    13.00         4 .  5557777888899
     5.00         5 .  00111
    16.00 Extremwerte (>=53)

 Stammbreite:      10.00
 Jedes Blatt:       1 Fälle
```

Figure A67

P-P-Diagram of Normal Distribution of PTSD Symptom Severity (Sumscore PCL) Imputed
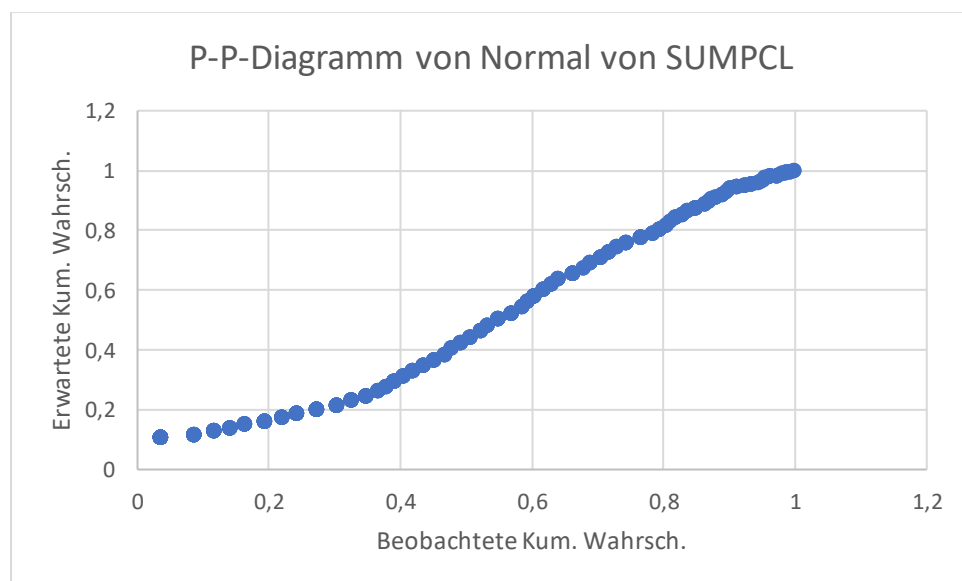
data set 4

Figure A68

P-P-Diagram of Normal Distribution of Difficulties in Emotion Regulation (Sumscore DERS)
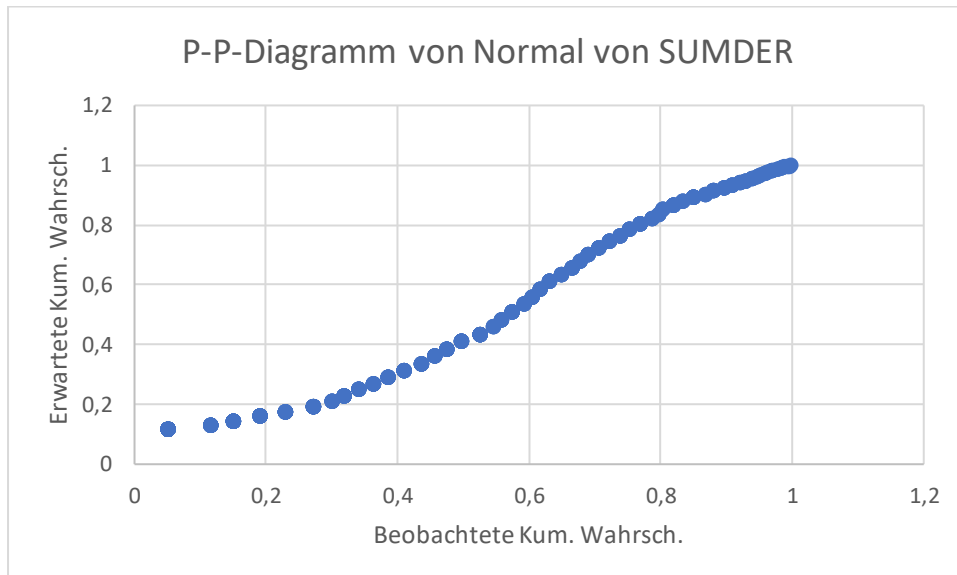
Imputed data set 4

Figure A69

P-P-Diagram of Normal Distribution of Difficulties in Positive Emotion Regulation (Sumscore DERSP) Imputed data set 4
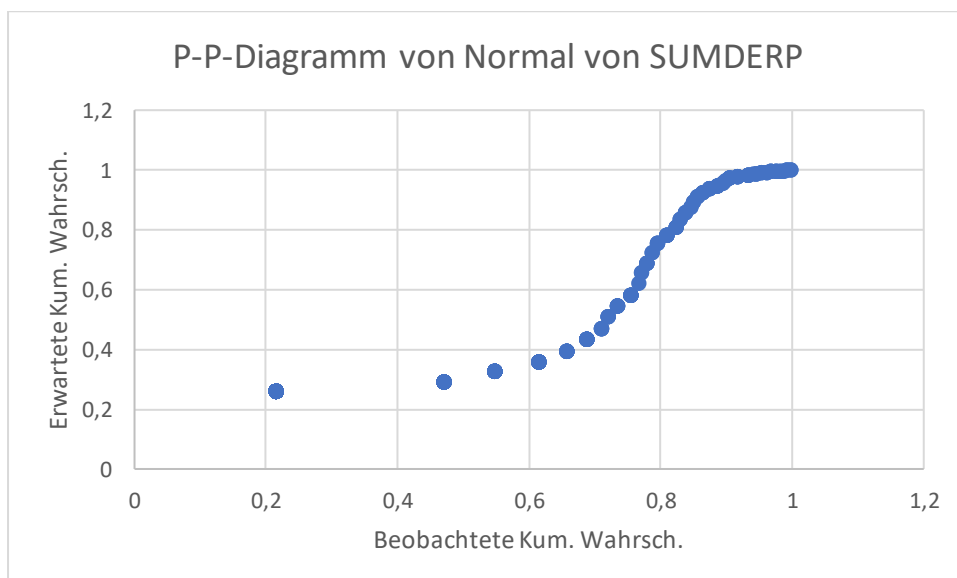
Figure A70

P-P-Diagram of Normal Distribution of Trauma Type Imputed data set 4
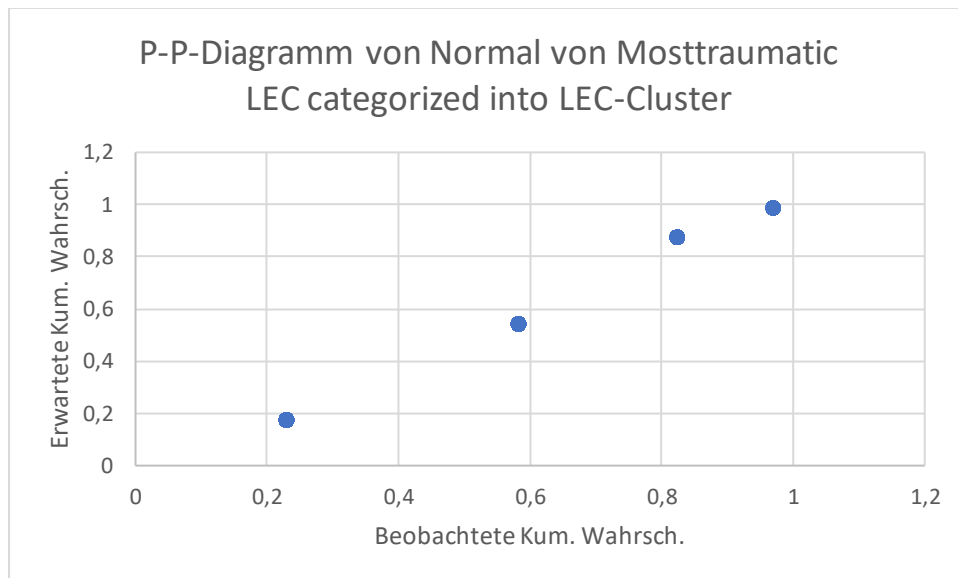
Figure A71

P-P-Diagram of Normal Distribution of Exposure Degree Imputed data set 4
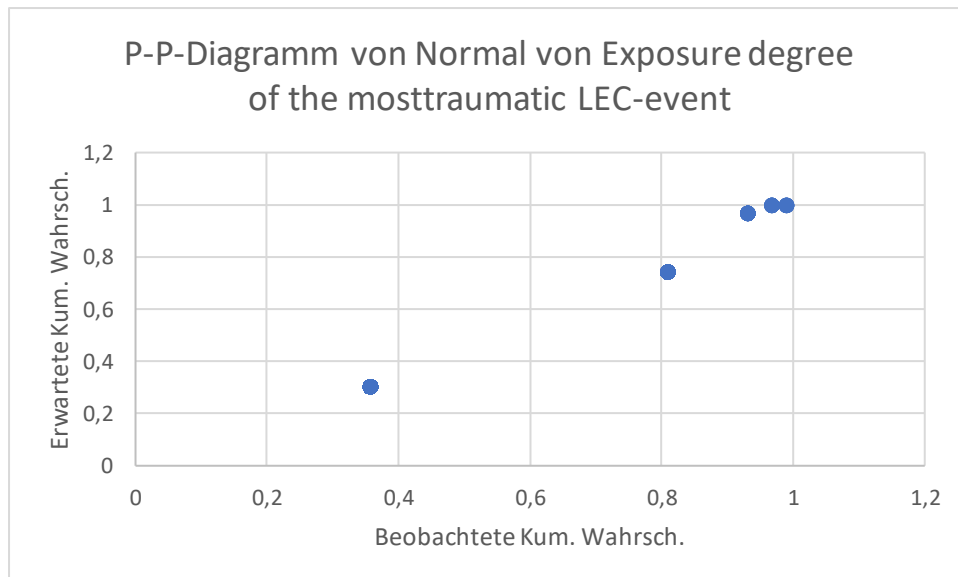
Figure A72

P-P-Diagram of Normal Distribution of Age at traumatic event Imputed data set 4
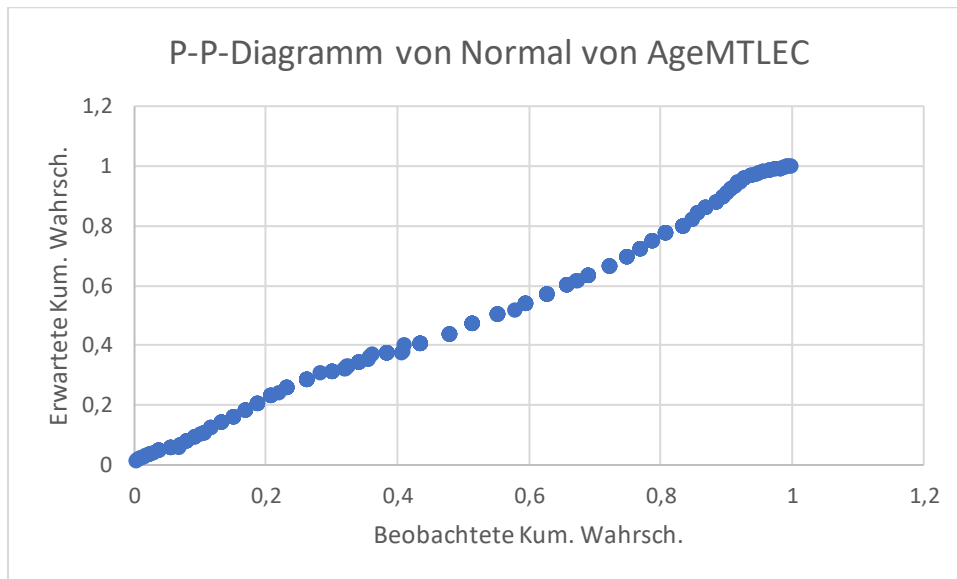
Imputed data set 5

Figure A73

Boxplot PTSD Symptom Severity (Sumscore PCL) Imputed data set 5
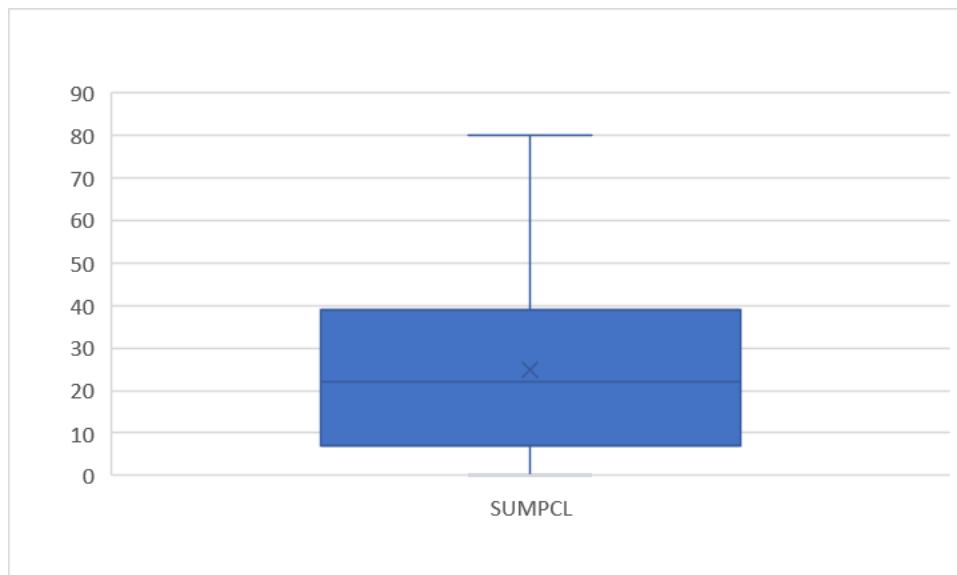
Figure A74

Stem-Leaf-Diagram PTSD Symptom Severity (Sumscore PCL) Imputed data set 5

```
SUMPCL Stengel-Blatt-Diagramm

 Häufigkeit  Stem &  Blatt

    71.00        0 .
000000000000000000000000000011111111111222222222223333333344444444
444
    56.00        0 .
555555555555556666666777777777788888888888889999999999
    33.00        1 .  000000011111111112222233334444444
    30.00        1 .  555566666666777778888888999999
    25.00        2 .  0001111111222222333333444
    30.00        2 .  555555555566666666777788899999
    28.00        3 .  0000011112222233333333333344
    29.00        3 .  55555566666677777888899999999
    23.00        4 .  00000000001111222223334
    22.00        4 .  5555566667778888888999
    12.00        5 .  001122233334
    18.00        5 .  566777777888899999
     5.00        6 .  00112
    10.00        6 .  5666667779
     5.00        7 .  00134
     2.00        7 .  55
     2.00        8 .  00

 Stammbreite:     10.00
 Jedes Blatt:       1 Fälle
```

Figure A75

Boxplot Difficulties in Emotion Regulation Imputed data set 5

Figure A76

*Stem-Leaf-Diagram Difficulties in Emotion Regulation (Sumscore DERS) Imputed data set 5*

```
SUMDER Stengel-Blatt-Diagramm

 Häufigkeit  Stem &  Blatt

    84.00       1 .
6666666666666666666666666666666666666666666677777777778888888888888888
899999999999999
    56.00       2 .
00000000000000001111111111111111112222233333333334444444
    46.00       2 .   555555555556666666677777777778888888888999999
    40.00       3 .   00000000011111111122222222222222333344444
    31.00       3 .   555555555566666777788888999999
    29.00       4 .   00000001111112223333333444444
    32.00       4 .   55555555666666777788888888899999
    28.00       5 .   000111222222222233344444444444
    25.00       5 .   5555666666677777888889999
    12.00       6 .   000011112334
     8.00       6 .   55567777
     7.00       7 .   0022234
     2.00       7 .   56
     1.00       8 .   0

 Stammbreite:      10.00
 Jedes Blatt:       1 Fälle
```

Figure A77

Boxplot Difficulties in Positive Emotion Regulation Imputed data set 5

Figure A78

Stem-Leaf-Diagram Difficulties in Positive Emotion Regulation (Sumscore DERSP) Imputed data set 5

```
SUMDERP Stengel-Blatt-Diagramm

 Häufigkeit   Stem &   Blatt

      .00         1 .
   206.00         1 .
2222222222222222222222222222222222222222222222222222222222233333333333
    53.00         1 .  44444444455555555
    23.00         1 .  6667777
     9.00         1 .  889
    16.00         2 .  00111
     3.00         2 .  3&
     7.00         2 .  445
    11.00         2 .  6677
     5.00         2 .  8&
     7.00         3 .  001
     5.00         3 .  23
     5.00         3 .  44
    51.00 Extremwerte (>=35)

 Stammbreite:     10.00
 Jedes Blatt:       3 Fälle
 & denotes fractional leaves.
```

Figure A79

Boxplot Trauma Type Imputed data set 5

Figure A80

Stem-Leaf-Diagram Trauma Type Imputed data set 5

```
Mosttraumatic LEC categorized into LEC-Cluster Stengel-Blatt-
Diagramm

 Häufigkeit   Stem &  Blatt

   184.00         1 .
0000000000000000000000000000000000000000000000000000000000000000000
000000000000000000000000
       .00         1 .
       .00         1 .
       .00         1 .
       .00         1 .
    99.00          2 .
0000000000000000000000000000000000000000000000000
       .00         2 .
       .00         2 .
       .00         2 .
       .00         2 .
    94.00          3 .
000000000000000000000000000000000000000000000000
       .00         3 .
       .00         3 .
       .00         3 .
       .00         3 .
    24.00          4 .  000000000000

 Stammbreite:          1
 Jedes Blatt:       2 Fälle
```

Figure A81

Boxplot Exposure Degree Imputed data set 5

Exposure degree of the mosttraumatic LEC-event

Figure A82

Stem-Leaf-Diagram Exposure Degree Imputed data set 5

```
Exposure degree of the mosttraumatic LEC-event Stengel-Blatt-
Diagramm

 Häufigkeit  Stem &  Blatt

   285.00         1 .
0000000000000000000000000000000000000000000000000000000000000
00000000000000000000000000
      .00         1 .
      .00         1 .
      .00         1 .
      .00         1 .
    78.00         2 .  00000000000000000000000000
      .00         2 .
      .00         2 .
      .00         2 .
      .00         2 .
    22.00         3 .  0000000
    16.00 Extremwerte (>=4.0)

 Stammbreite:      1.00
 Jedes Blatt:       3 Fälle
```

Figure A83

Boxplot Age at traumatic event Imputed data set 5

Figure A84

Stem-Leaf-Diagram Age at traumatic event Imputed data set 5

```
AgeMTLEC Stengel-Blatt-Diagramm

 Häufigkeit  Stem &  Blatt

    10.00        0 .  0122224444
    23.00        0 .  56666667777777788999999
    29.00        1 .  00000111112223333333334444444
    54.00        1 .
5555555556666666777777777788888888889999999999999999
    84.00        2 .
00000000000000011111111111122222222222222222222233333333333333333333
444444444444444
    69.00        2 .
555555555556666666666666666666677777777777778888888888888999999999
9
    51.00        3 .
00000000000011111111111111112222222333333333334444444
    33.00        3 .  5555555555666666666677788889999999
    17.00        4 .  00000011122333344
    12.00        4 .  557777888899
     5.00        5 .  00111
    14.00 Extremwerte (>=53)

 Stammbreite:     10.00
 Jedes Blatt:      1 Fälle
```

Figure A85

P-P-Diagram of Normal Distribution of PTSD Symptom Severity (Sumscore PCL) Imputed

data set 5

Figure A86

P-P-Diagram of Normal Distribution of Difficulties in Emotion Regulation (Sumscore DERS)
Imputed data set 5

P-P-Diagramm von Normal von SUMDER
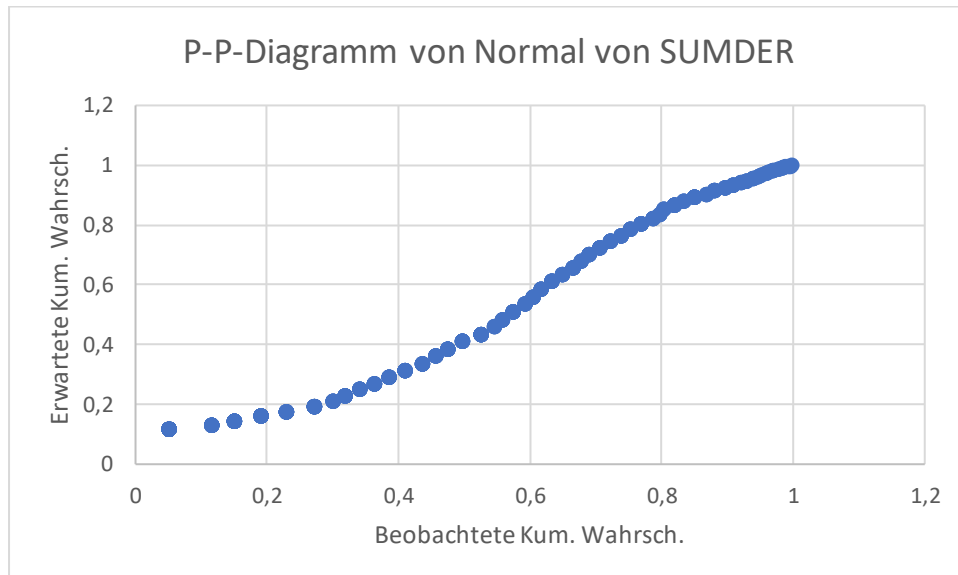
Figure A87

P-P-Diagram of Normal Distribution of Difficulties in Positive Emotion Regulation (Sumscore
DERSP) Imputed data set 5

P-P-Diagramm von Normal von SUMDERP
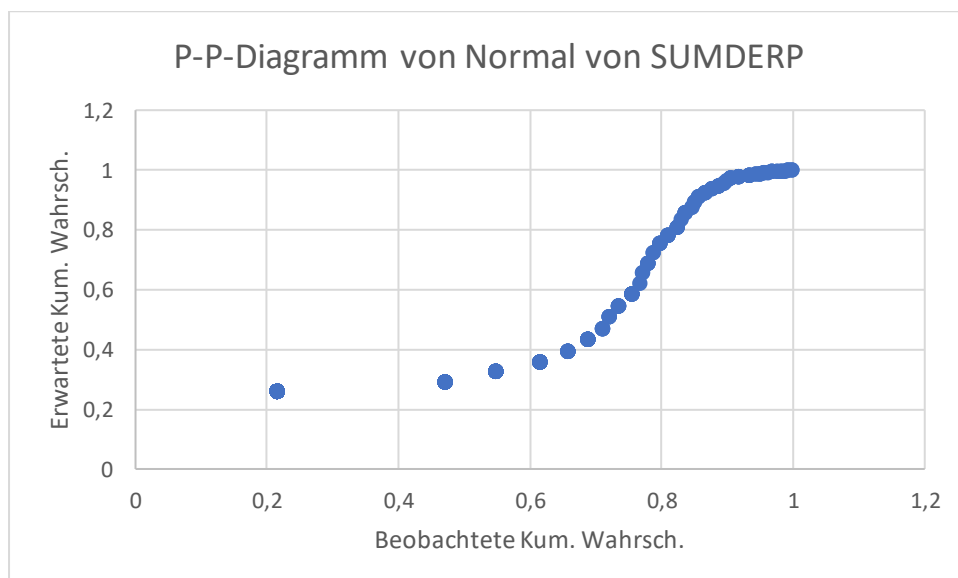
Figure A88

P-P-Diagram of Normal Distribution of Trauma Type Imputed data set 5
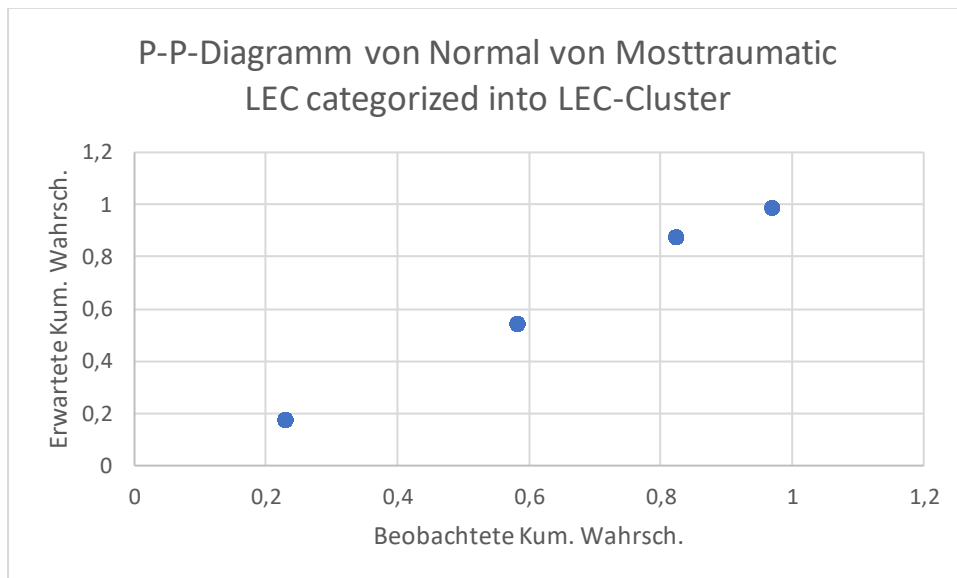
Figure A89

P-P-Diagram of Normal Distribution of Exposure Degree Imputed data set 5
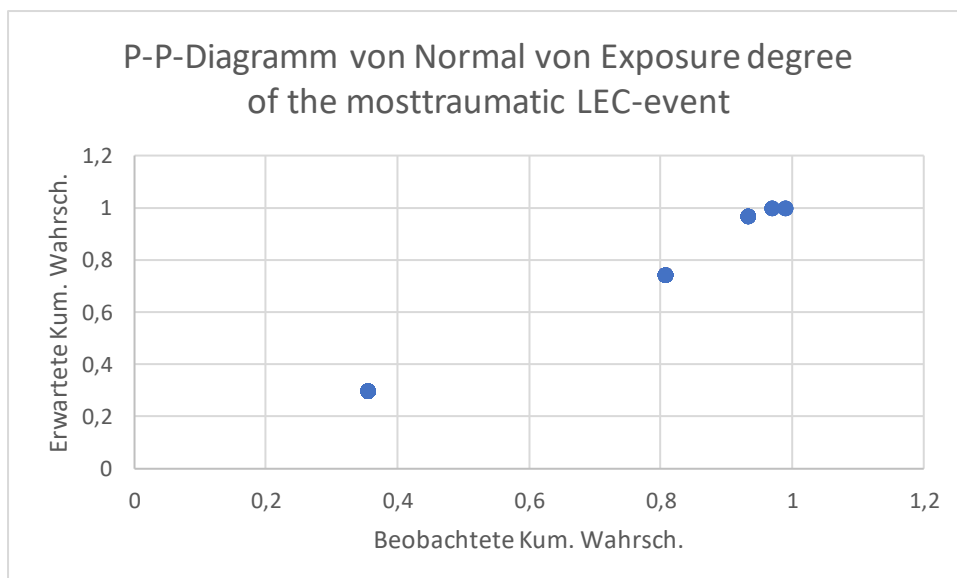
Figure A90

P-P-Diagram of Normal Distribution of Age at traumatic event Imputed data set 5
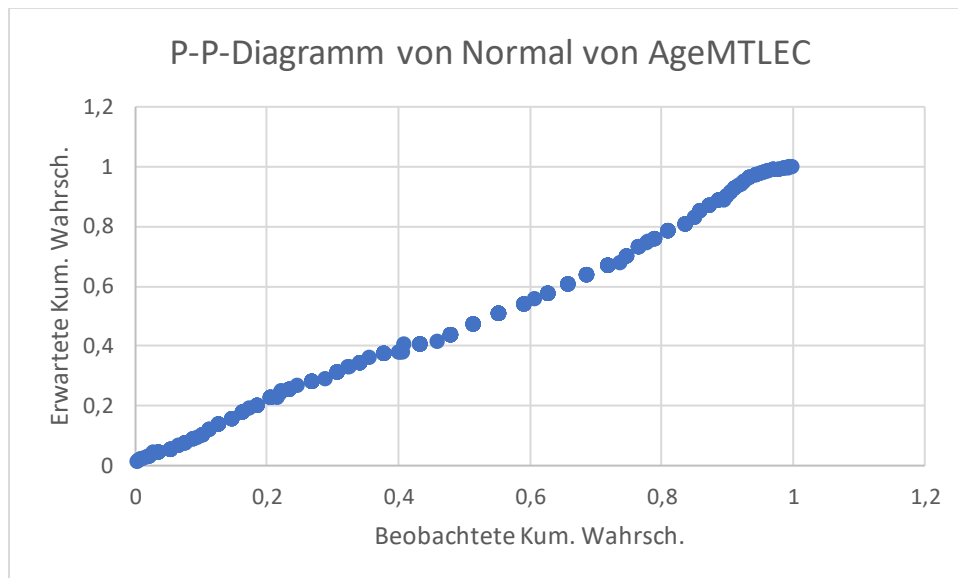
Appendix B

Residual Plots and QQ-Plots

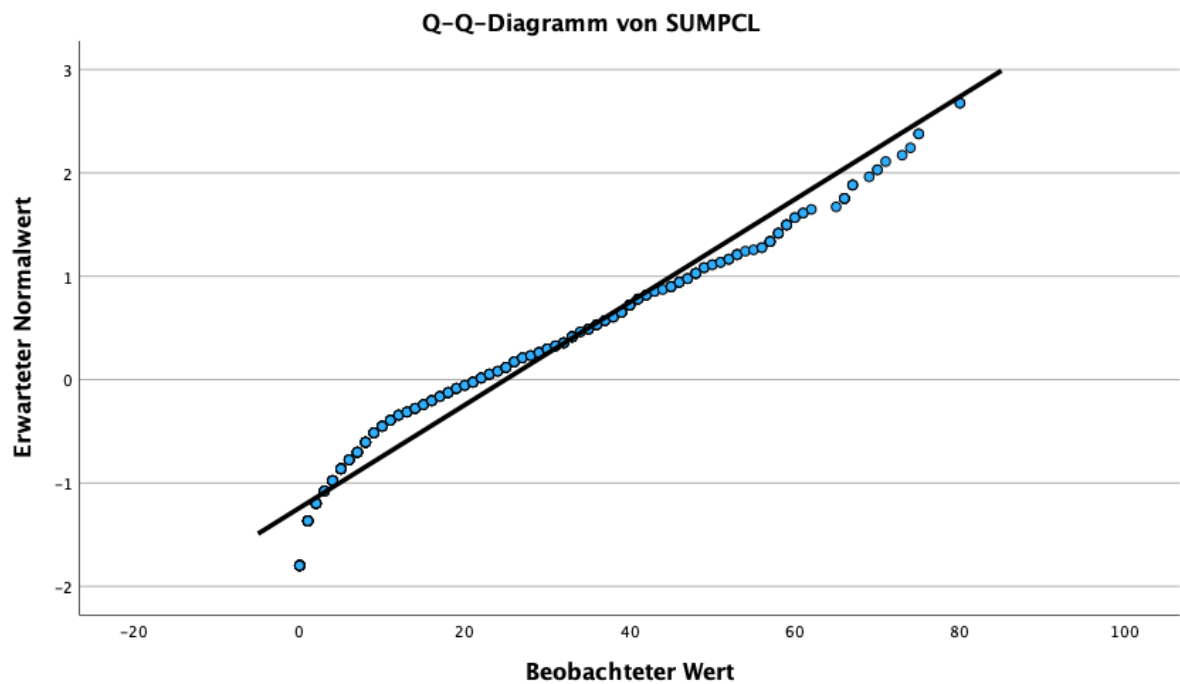***Imputed data set 1***

Figure B1
Residual Plot Imputed data set 1
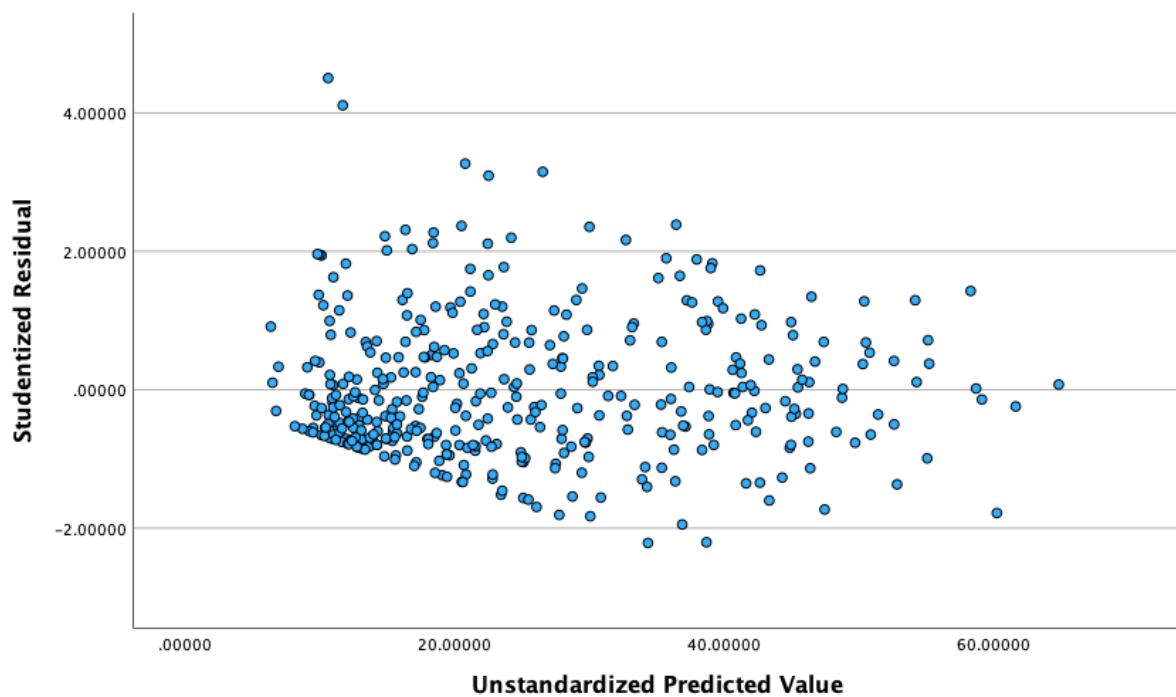
Figure B2
QQ-Plot Trauma Type Imputed data set 1

Q–Q–Diagramm von Mosttraumatic LEC categorized into LEC–Cluster
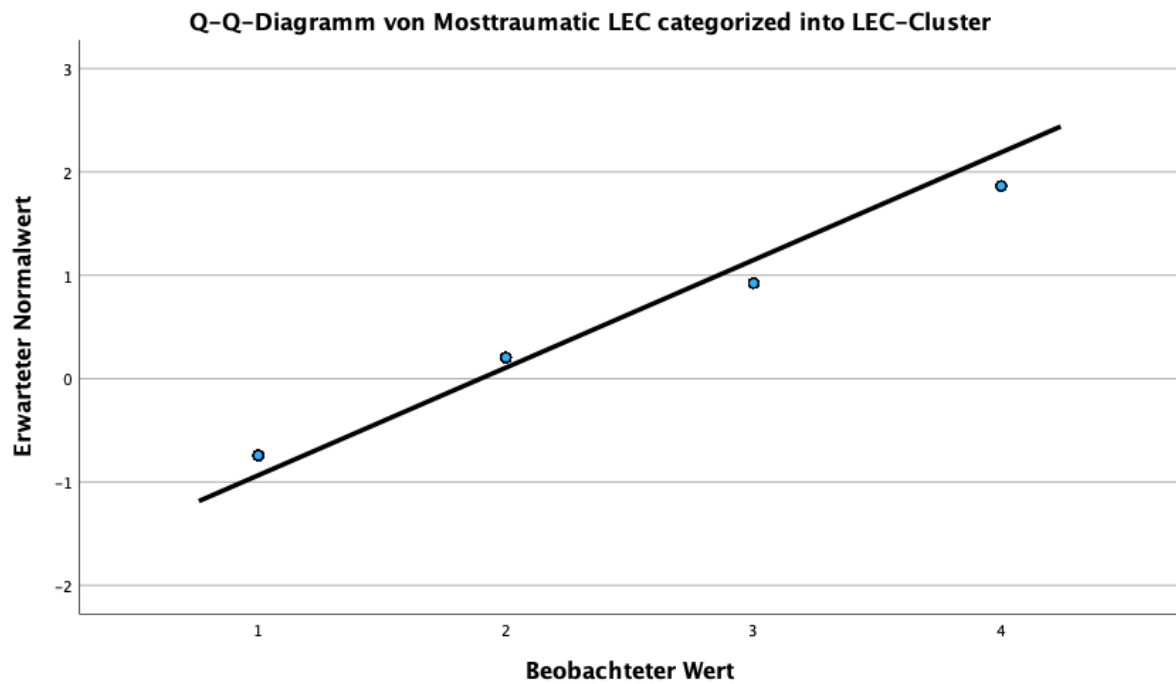
Figure B3
QQ-Plot Exposure Degree Imputed data set 1

Q–Q–Diagramm von Exposure degree of the mosttraumatic LEC–event
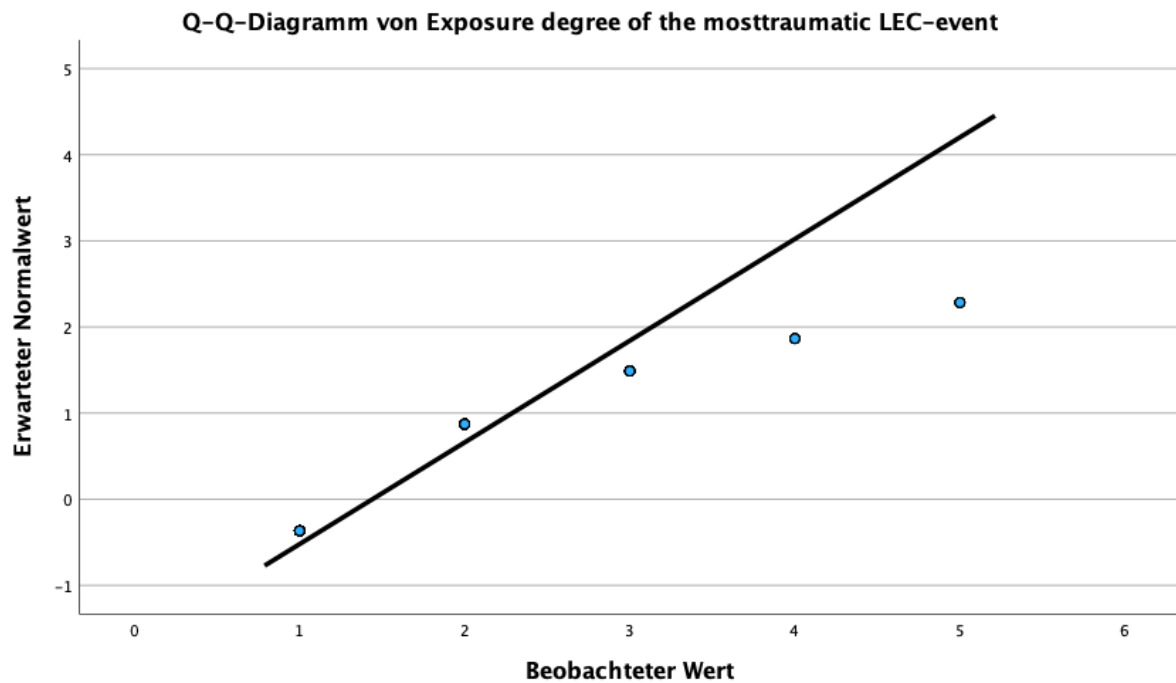
Figure B4
QQ-Plot Age at traumatic event Imputed data set 1
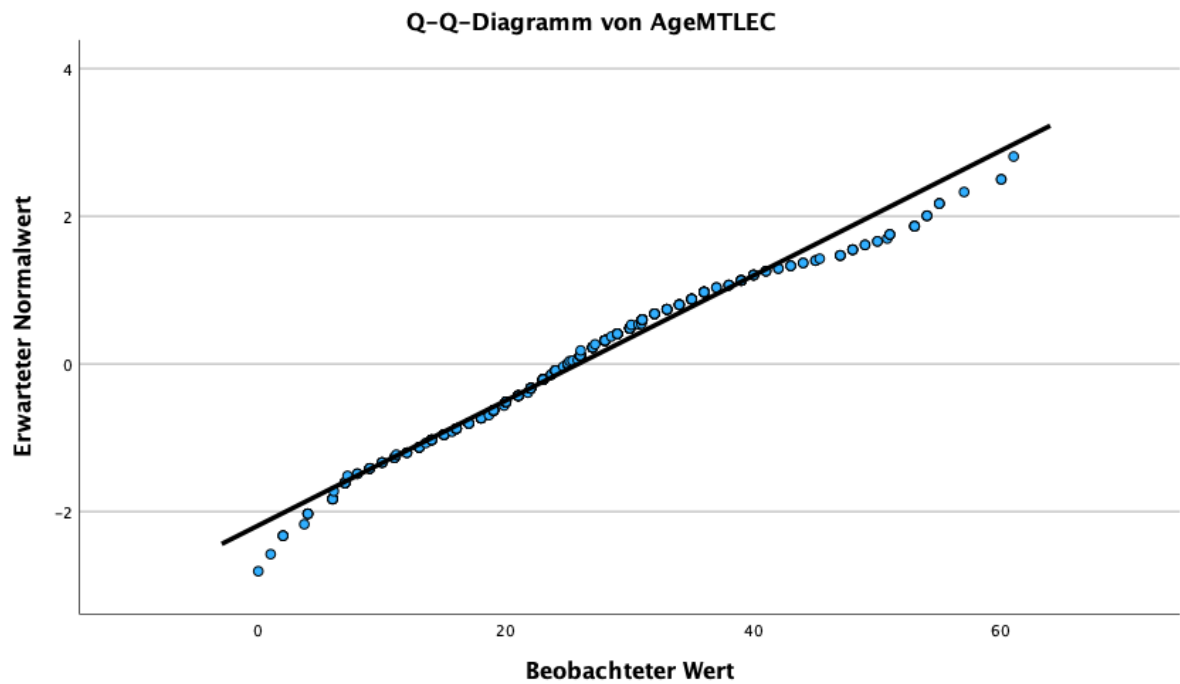
Figure B5
QQ-Plot PTSD Symptom Severity (Sumscore PCL) Imputed data set 1
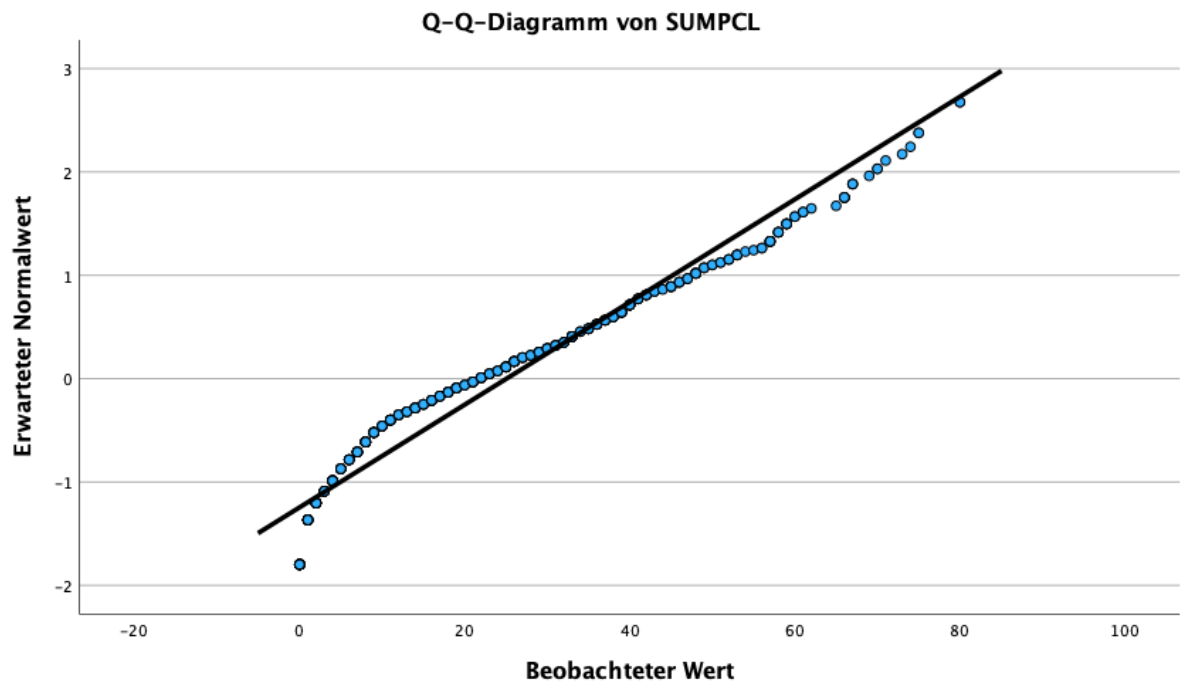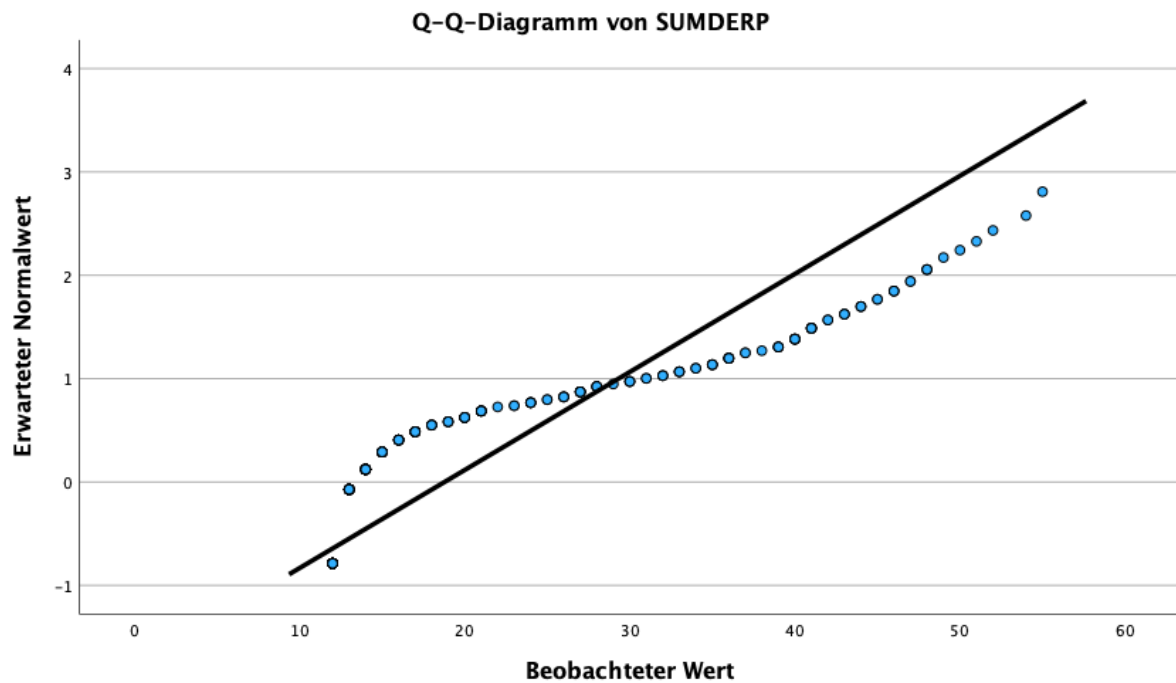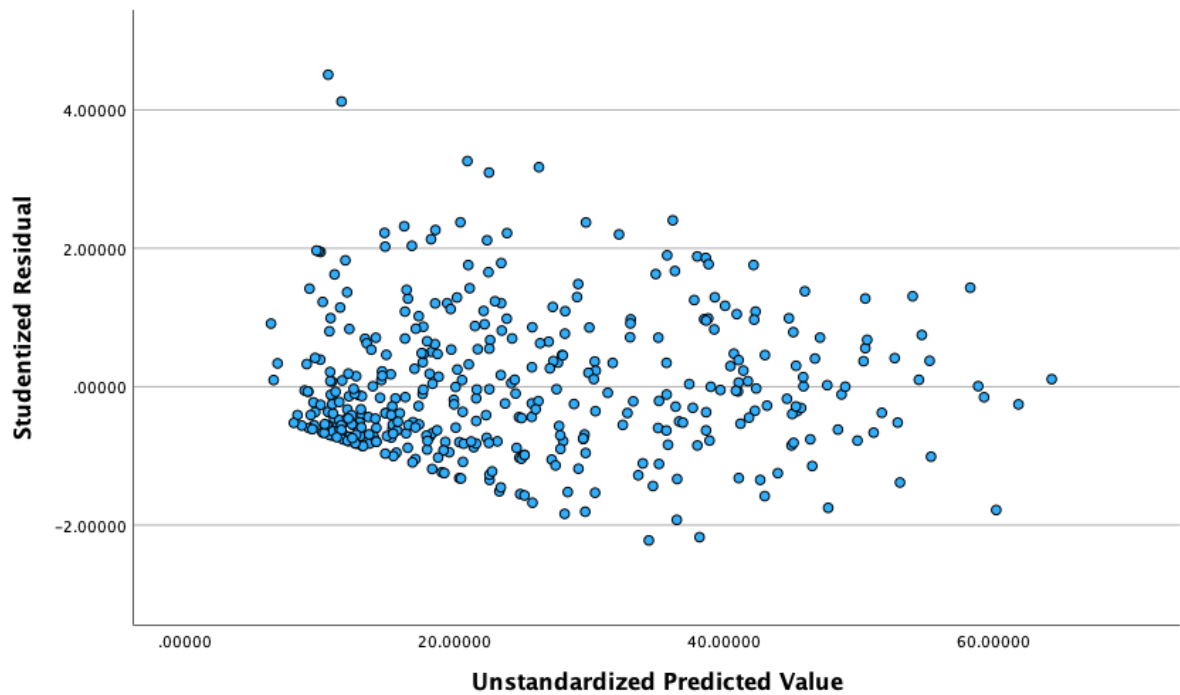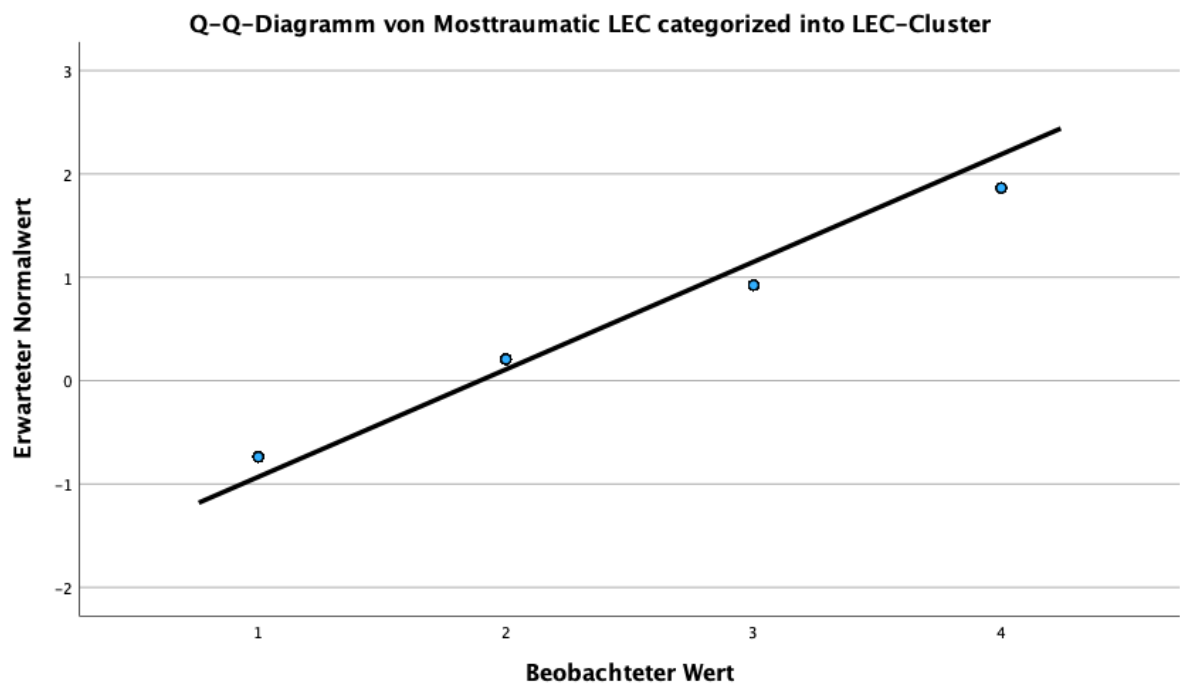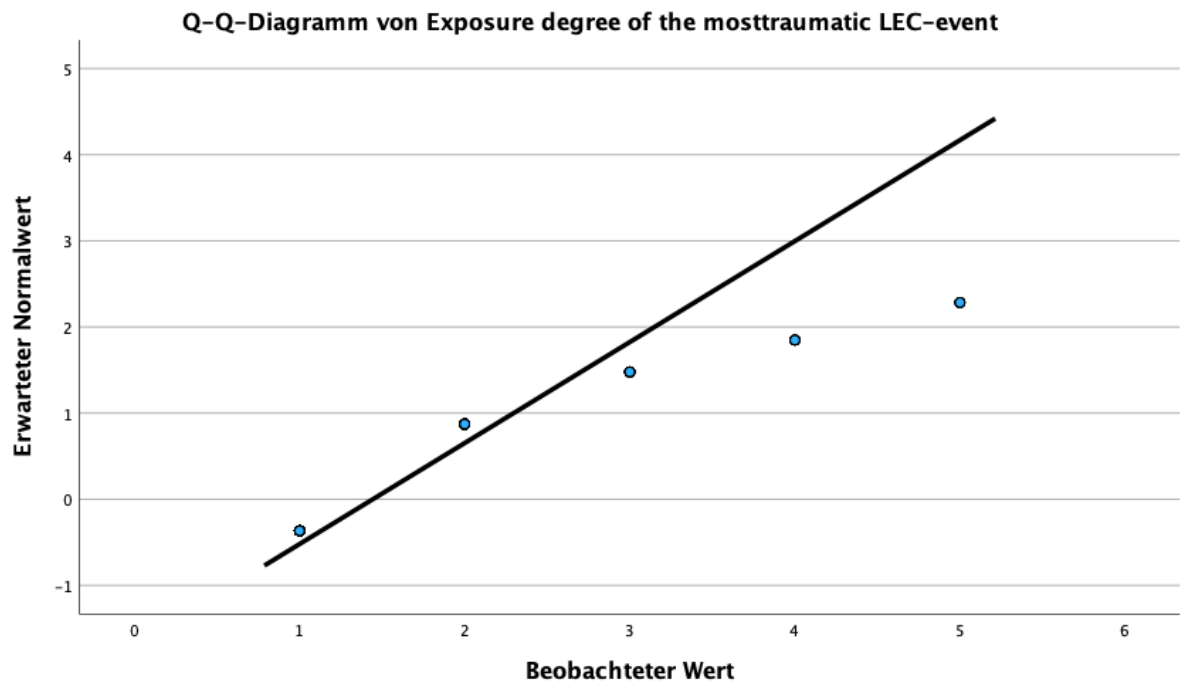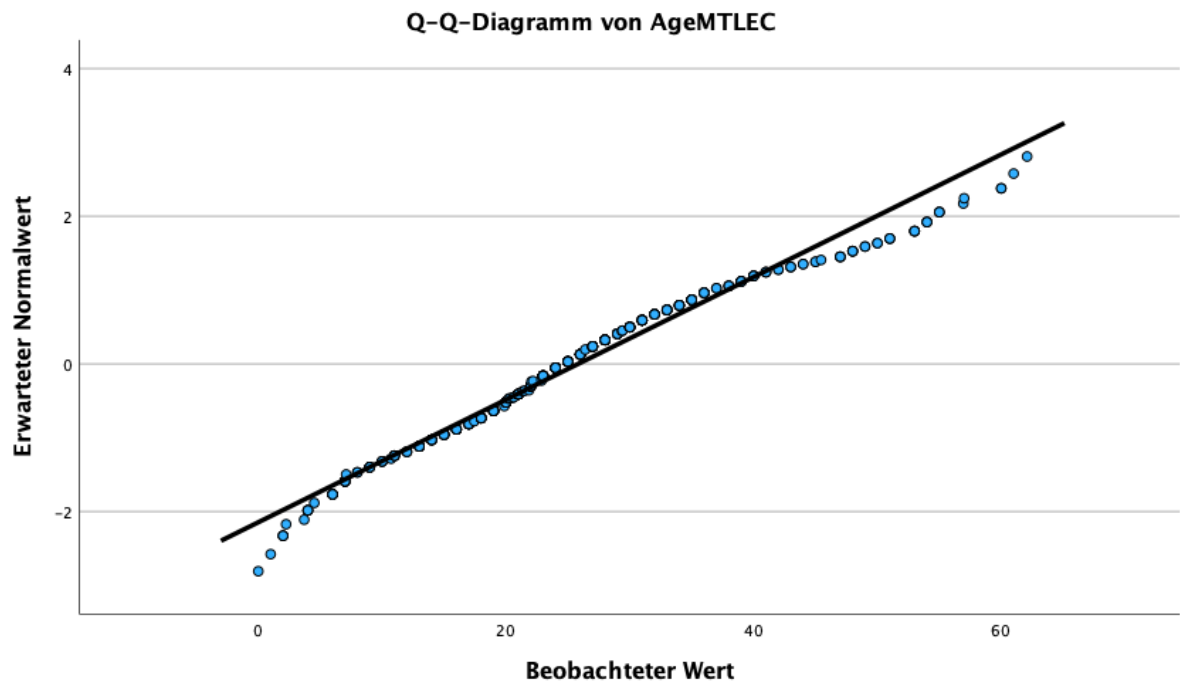
Figure B6
QQ-Plot Difficulties in Emotion Regulation (Sumscore DERS) Imputed data set 1
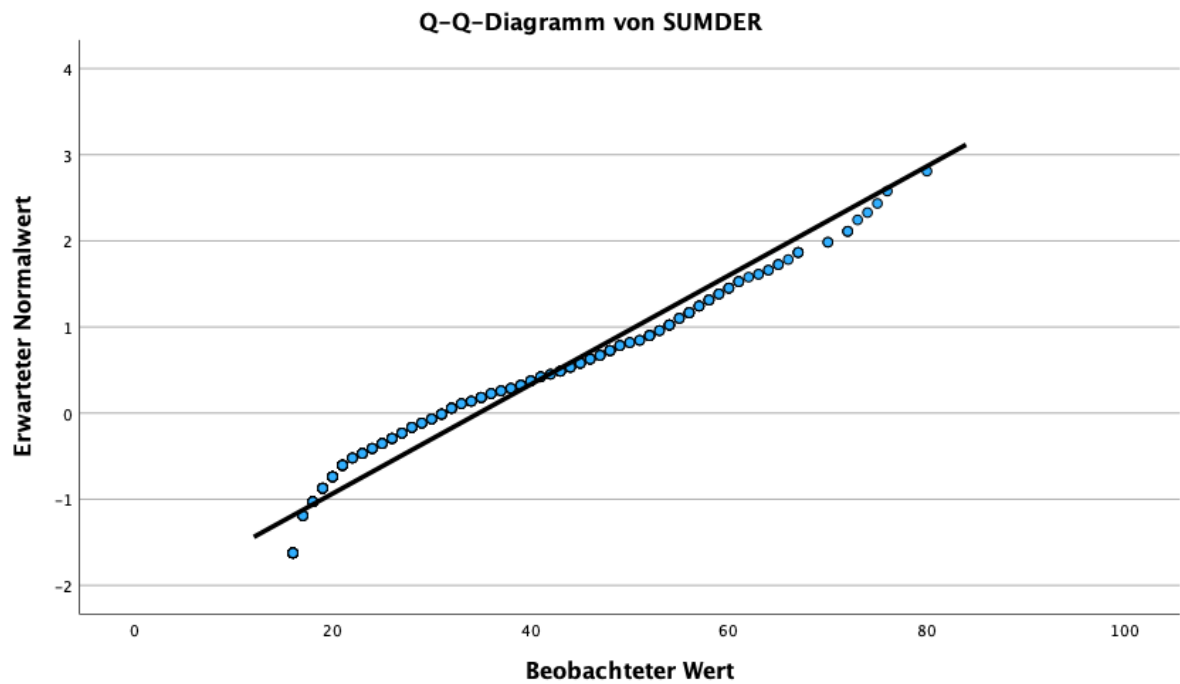
Figure B7
QQ-Plot Difficulties in Positive Emotion Regulation (Sumscore DERSP) Imputed data set 1
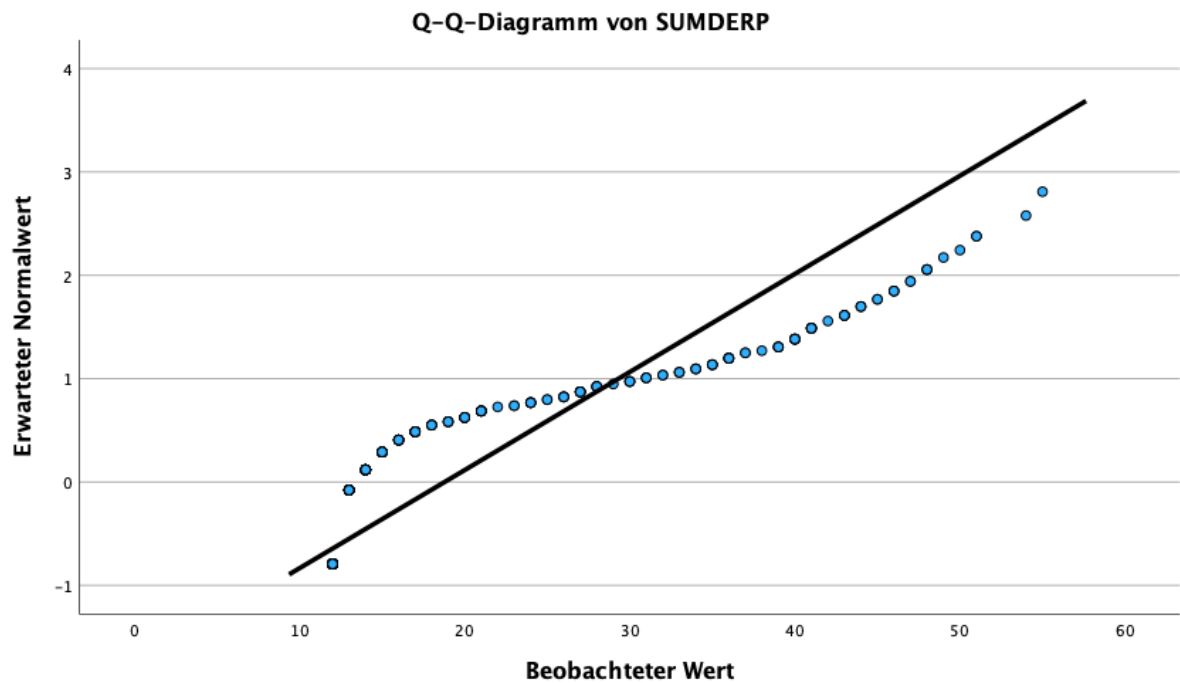
Imputed data set 2

Figure B8
Residual Plot Imputed data set 2
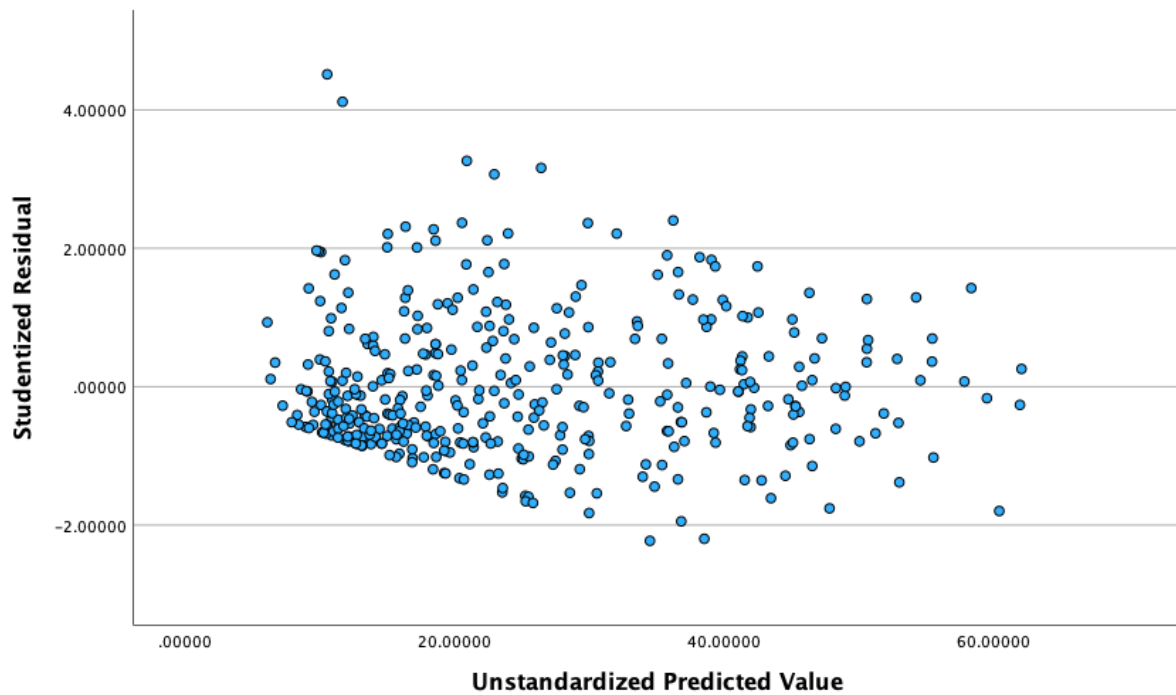
Figure B9
QQ-Plot Trauma Type Imputed data set 2
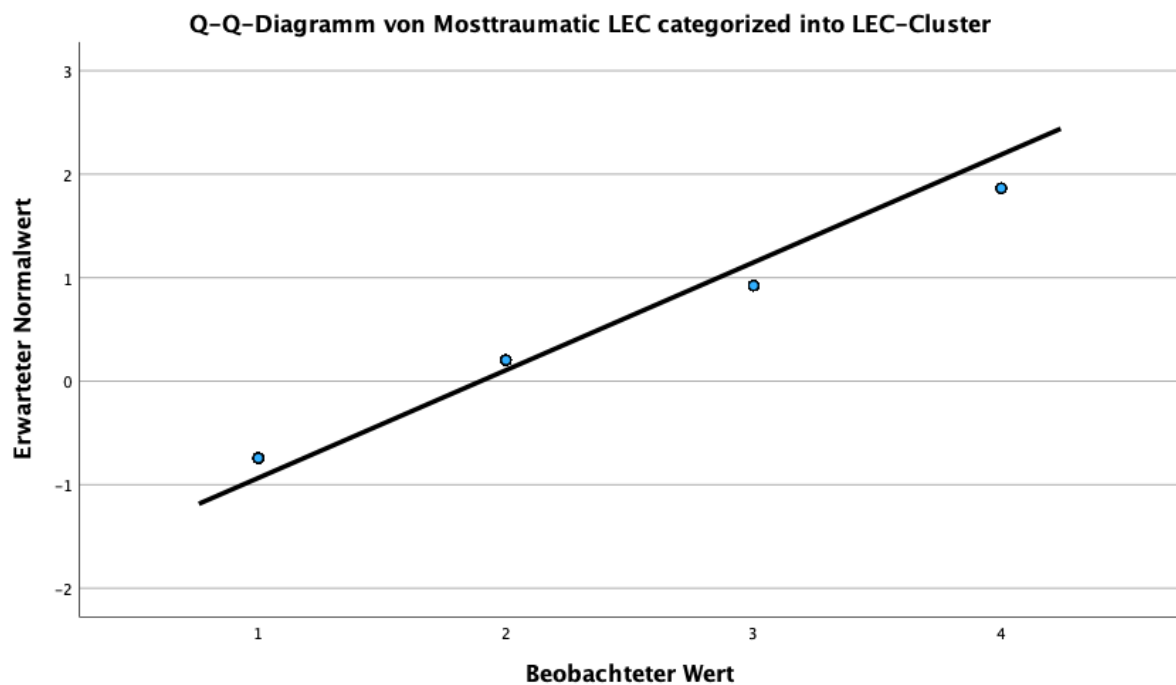
Figure B10
QQ-Plot Exposure Degree Imputed data set 2
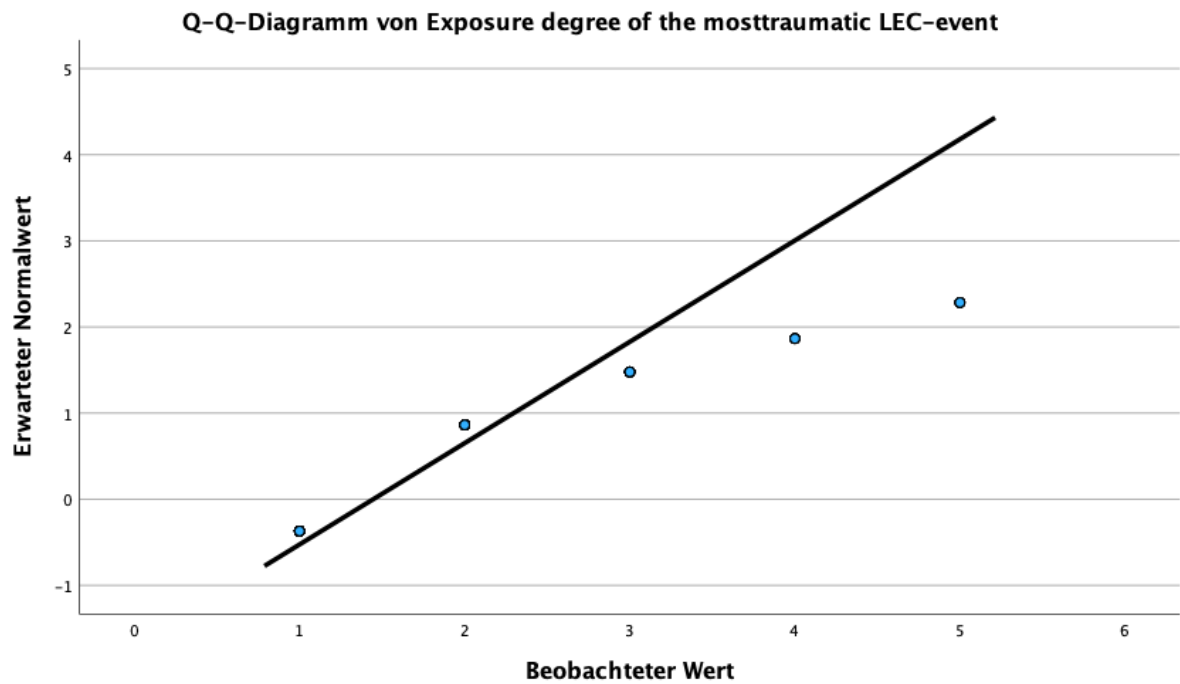
Figure B11
QQ-Plot Age at traumatic event Imputed data set 2
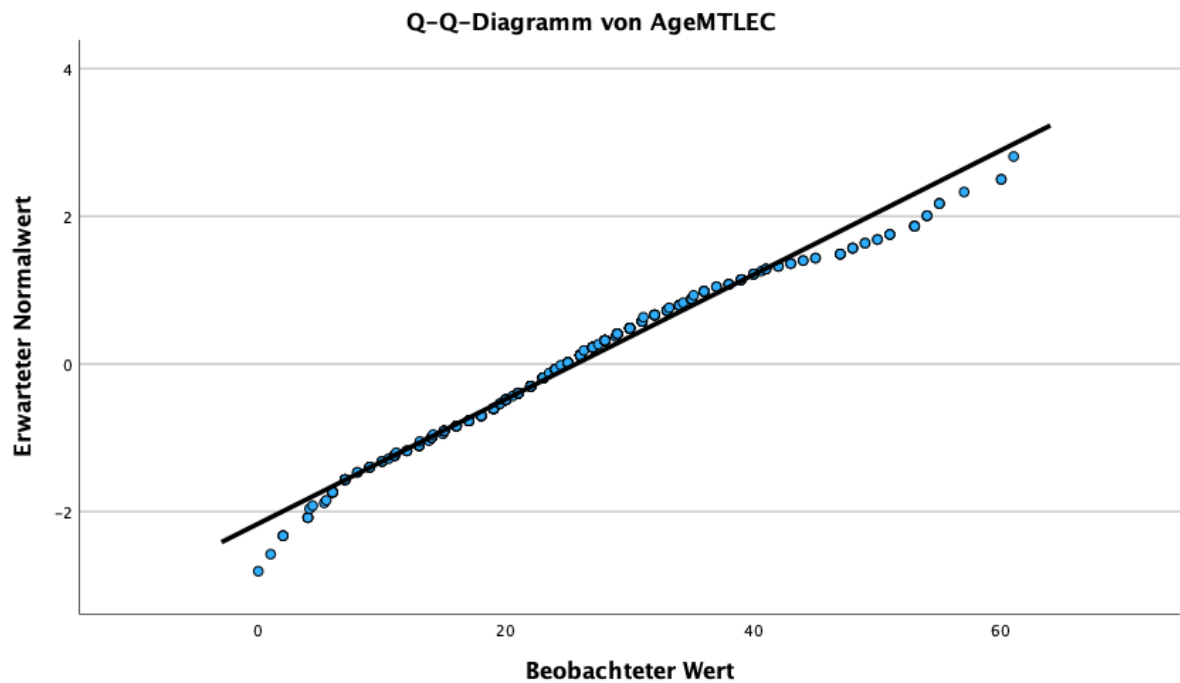
Figure B12
QQ-Plot PTSD Symptom Severity (Sumscore PCL) Imputed data set 2
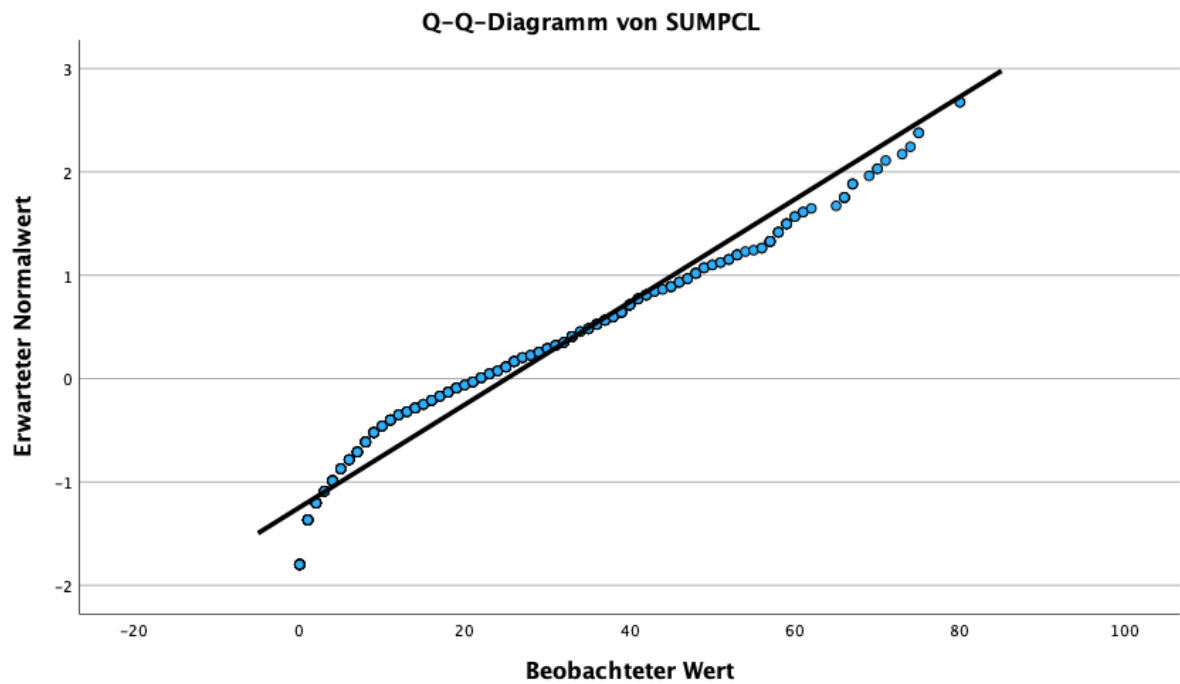
Figure B13
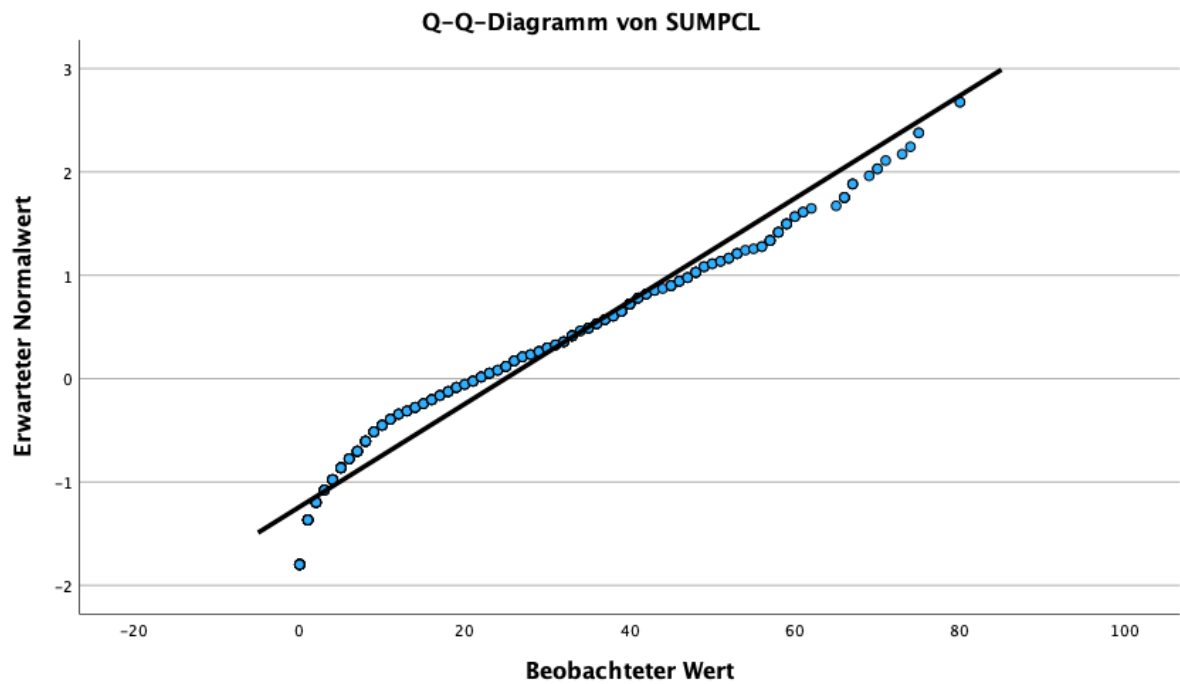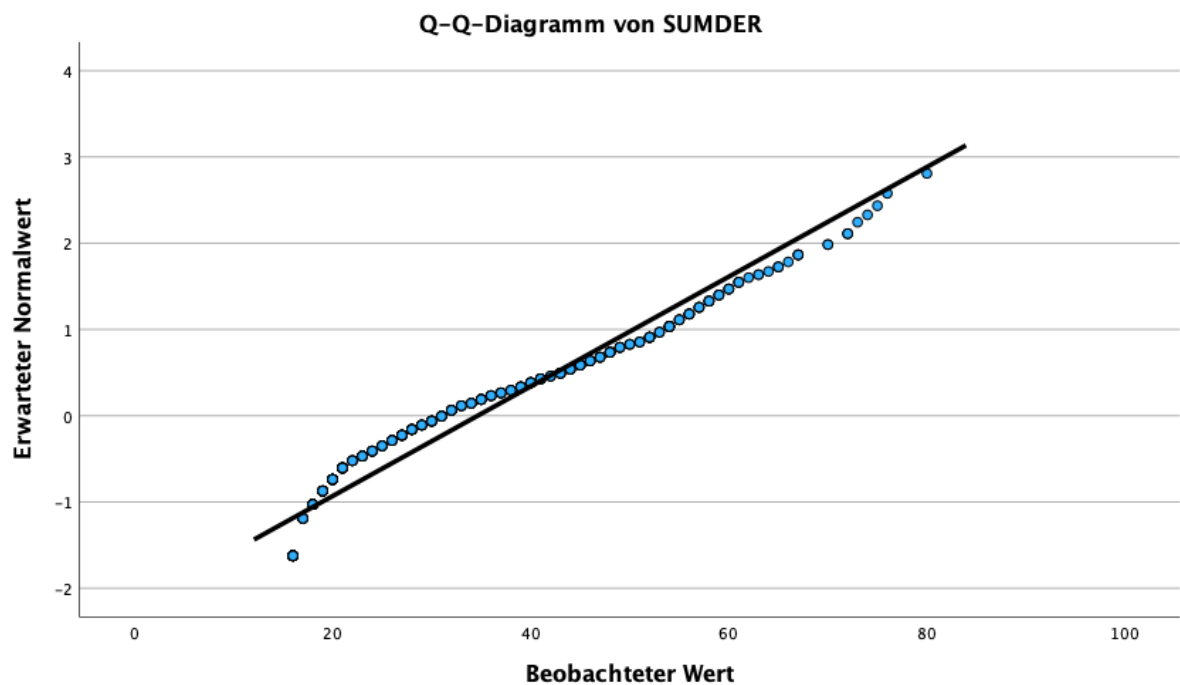*QQ-Plot Difficulties in Emotion Regulation (Sumscore DERS) Imputed data set 2*
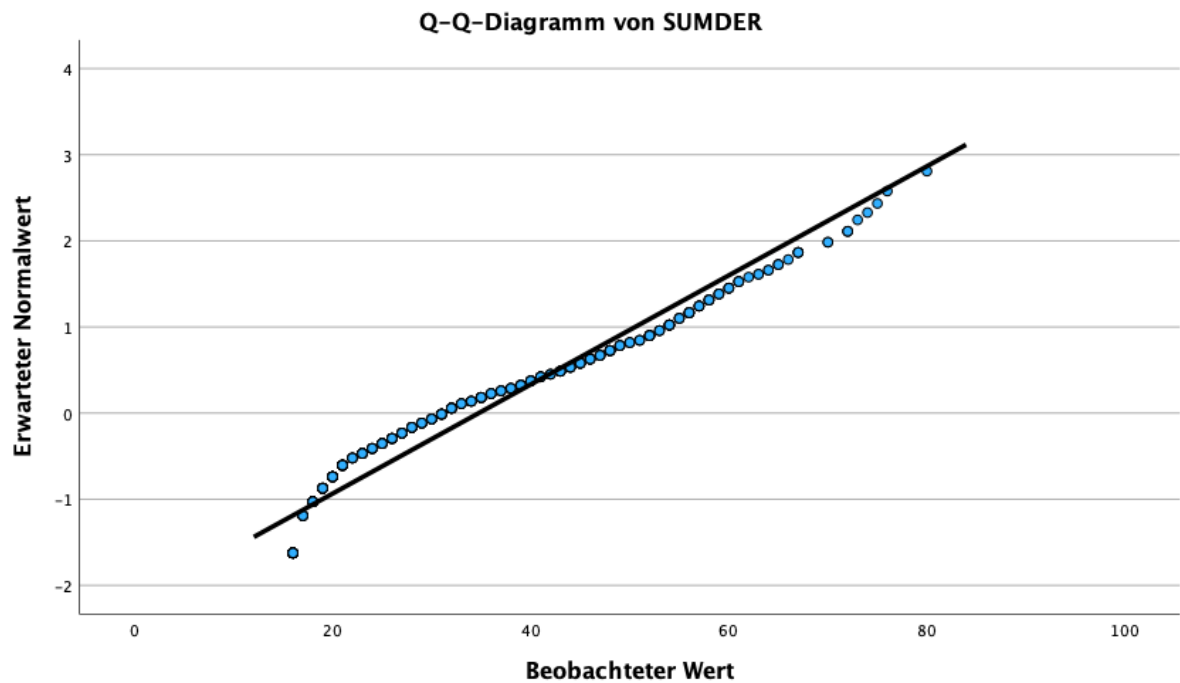
Figure B14
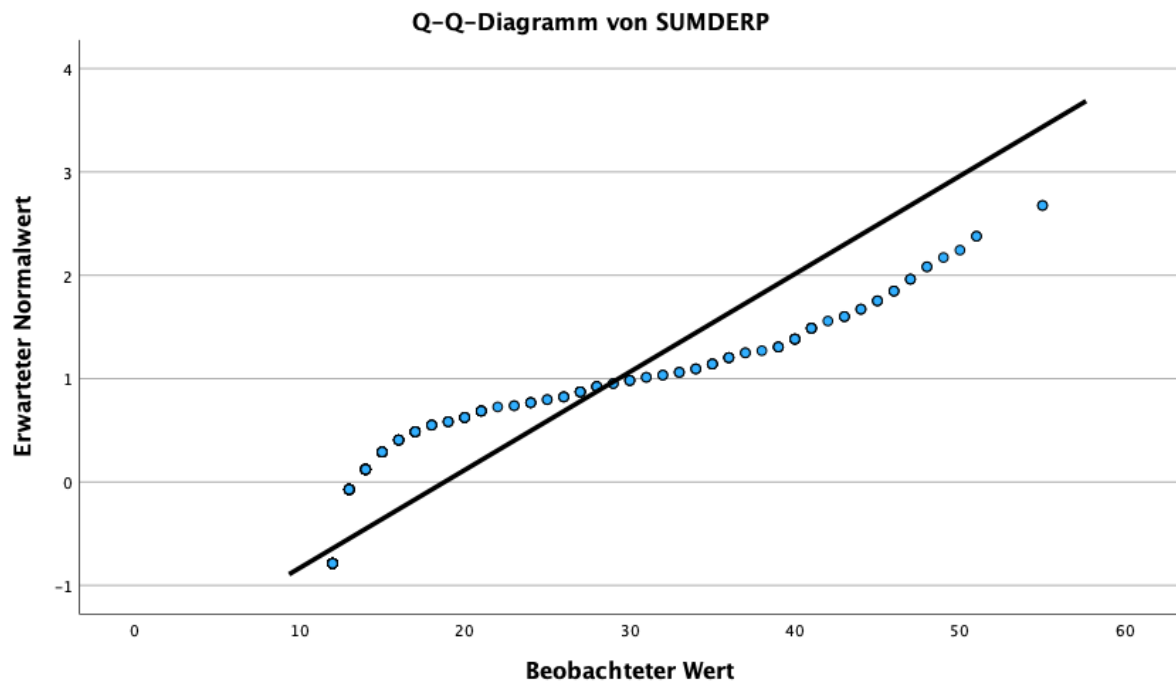*QQ-Plot Difficulties in Positive Emotion Regulation (Sumscore DERSP) Imputed data set 2*
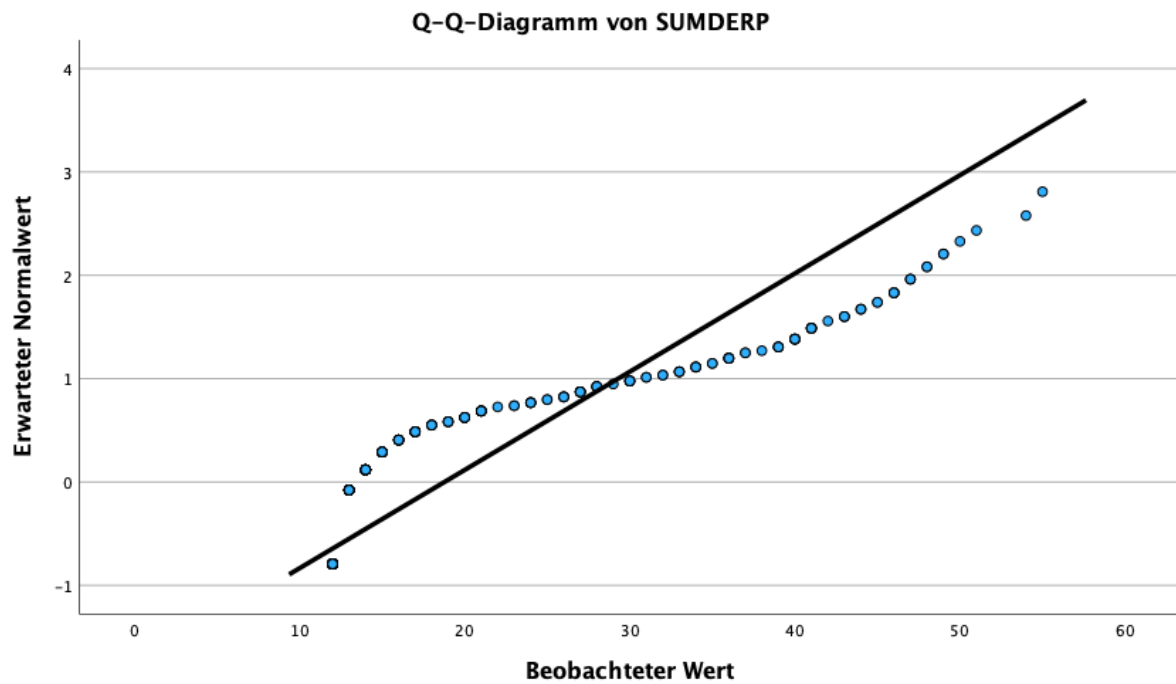
Imputed data set 3

Figure B15
Residual Plot Imputed data set 3
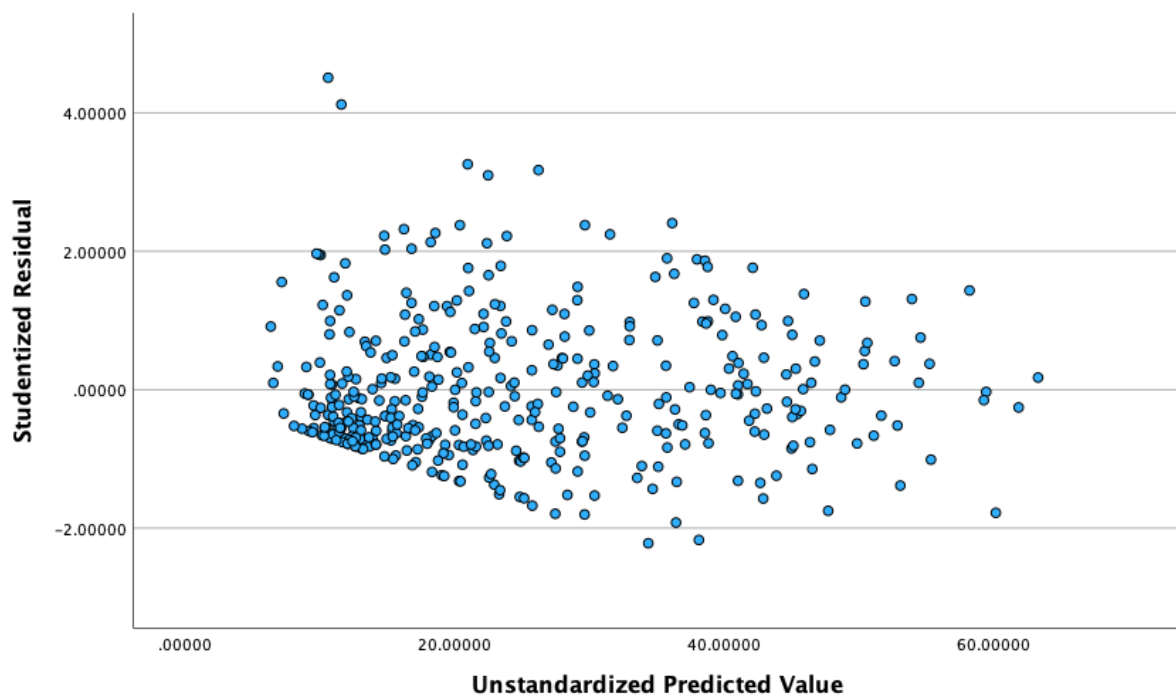
Figure B16
QQ-Plot Trauma Type Imputed data set 3

Q-Q-Diagramm von Mosttraumatic LEC categorized into LEC-Cluster
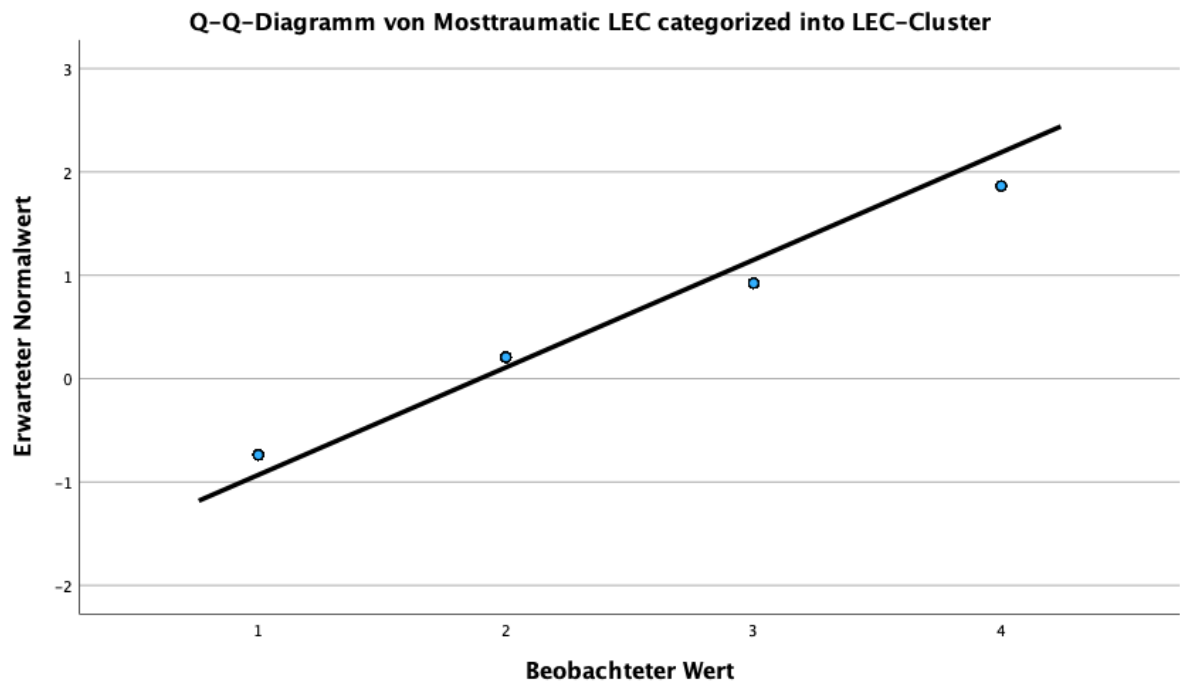
Figure B17
QQ-Plot Exposure Degree Imputed data set 3

Q-Q-Diagramm von Exposure degree of the mosttraumatic LEC-event
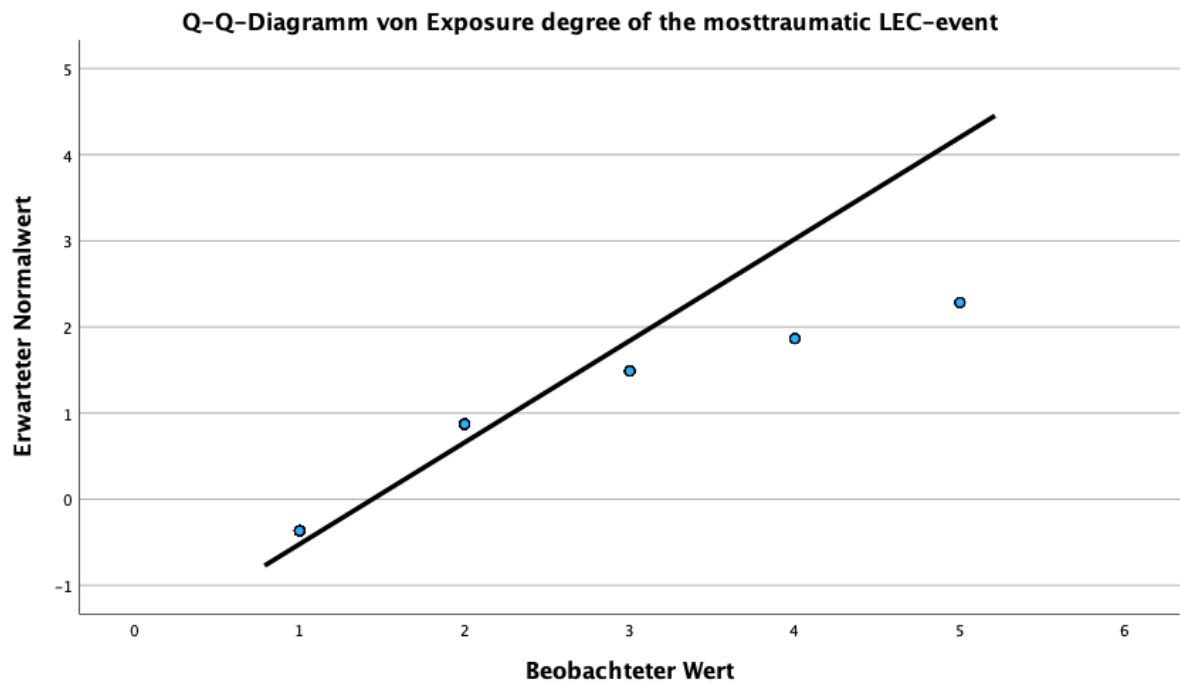
Figure B18
QQ-Plot Age at traumatic event Imputed data set 3

Q-Q-Diagramm von AgeMTLEC
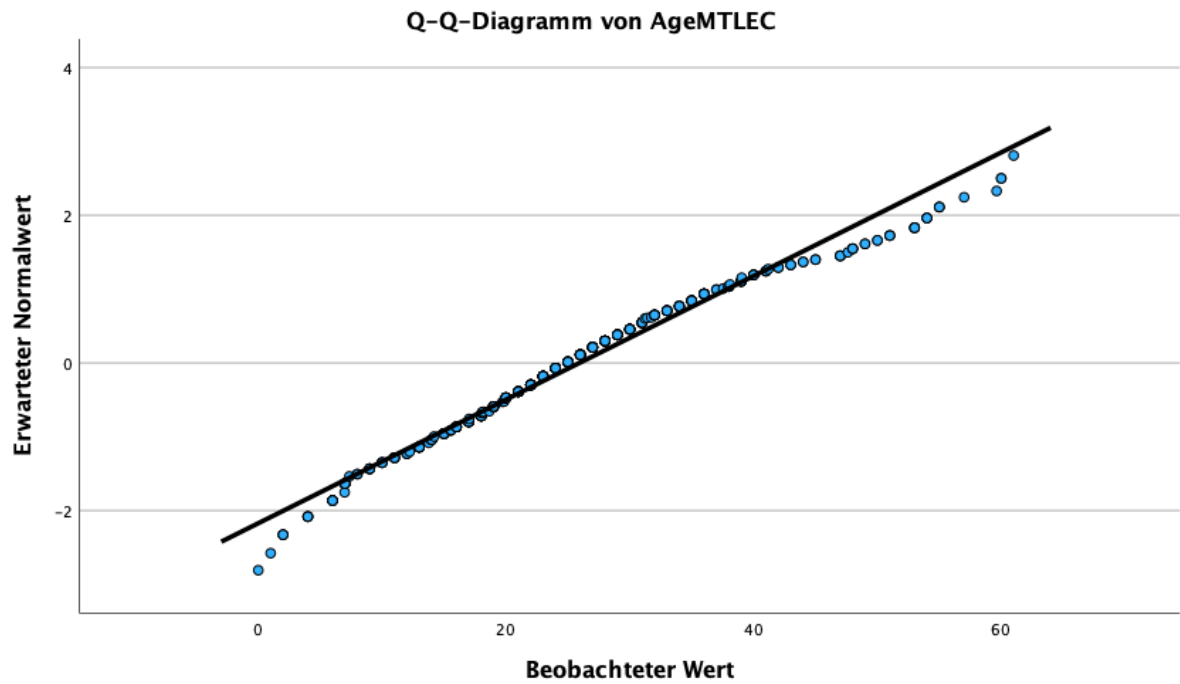
Figure B19
QQ-Plot PTSD Symptom Severity (Sumscore PCL) Imputed data set 3

Q-Q-Diagramm von SUMPCL

Figure B20
QQ-Plot Difficulties in Emotion Regulation (Sumscore DERS) Imputed data set 3
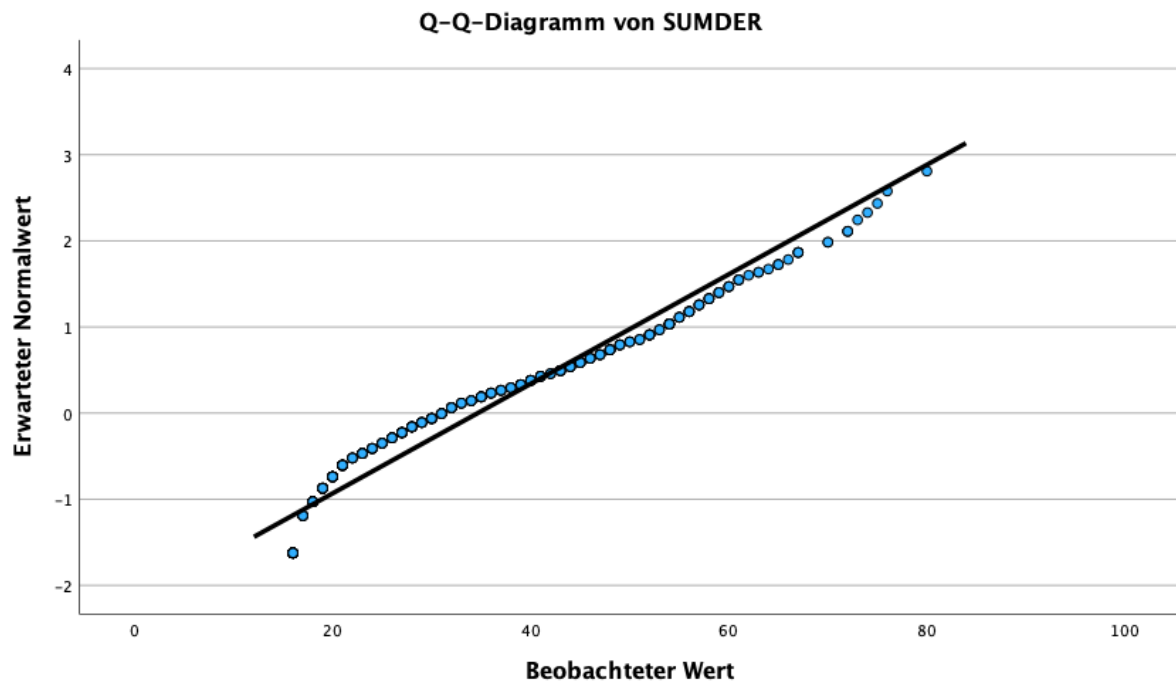
Figure B21
QQ-Plot Difficulties in Positive Emotion Regulation (Sumscore DERSP) Imputed data set 3

Imputed data set 4

Figure B22
Residual Plot Imputed data set 4

Figure B23
QQ-Plot Trauma Type Imputed data set 4

Figure B24
QQ-Plot Exposure Degree Imputed data set 4

Q–Q-Diagramm von Exposure degree of the mosttraumatic LEC–event

Figure B25
QQ-Plot Age at traumatic event Imputed data set 4

Q–Q-Diagramm von AgeMTLEC

Figure B26

QQ-Plot PTSD Symptom Severity (Sumscore PCL) Imputed data set 4

Figure B27

QQ-Plot Difficulties in Emotion Regulation (Sumscore DERS) Imputed data set 4
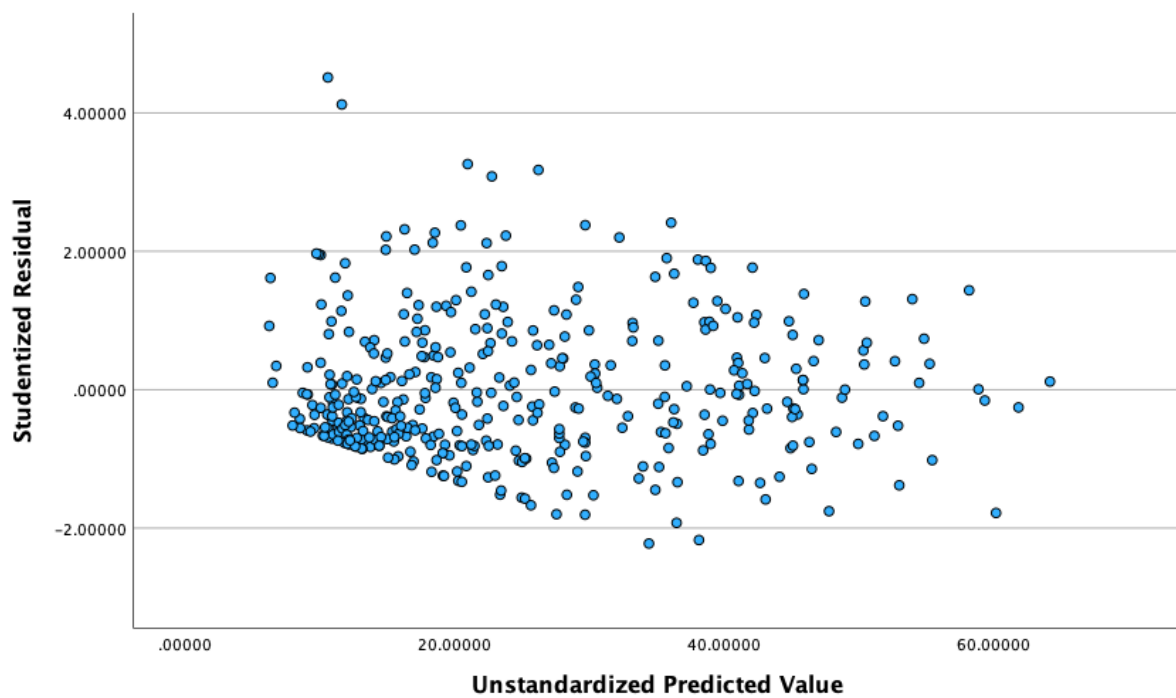
Figure B28
QQ-Plot Difficulties in Positive Emotion Regulation (Sumscore DERSP) Imputed data set 4
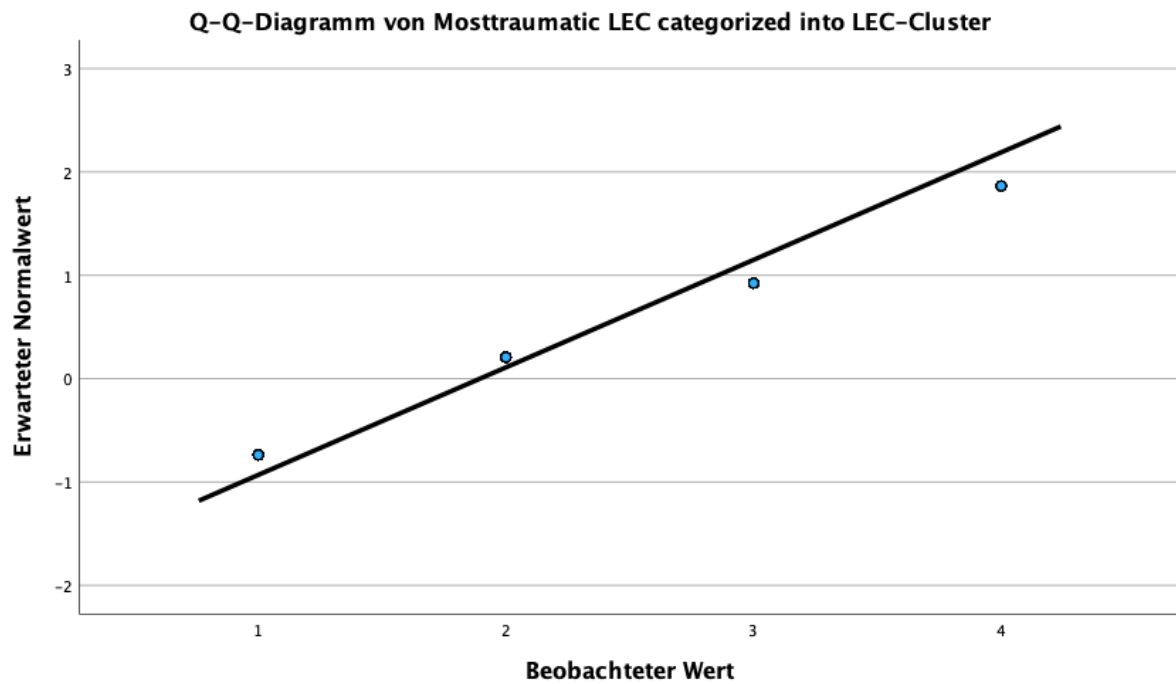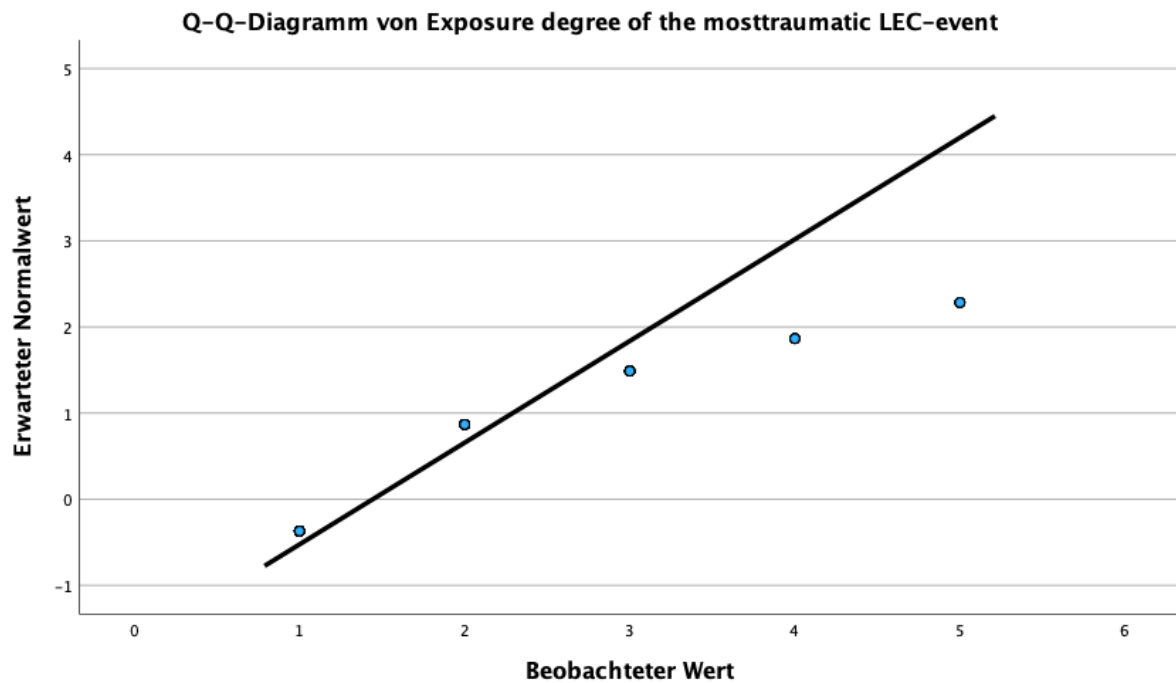

Q-Q-Diagramm von SUMDERP

Imputed data set 5

Figure B29
Residual Plot Imputed data set 5
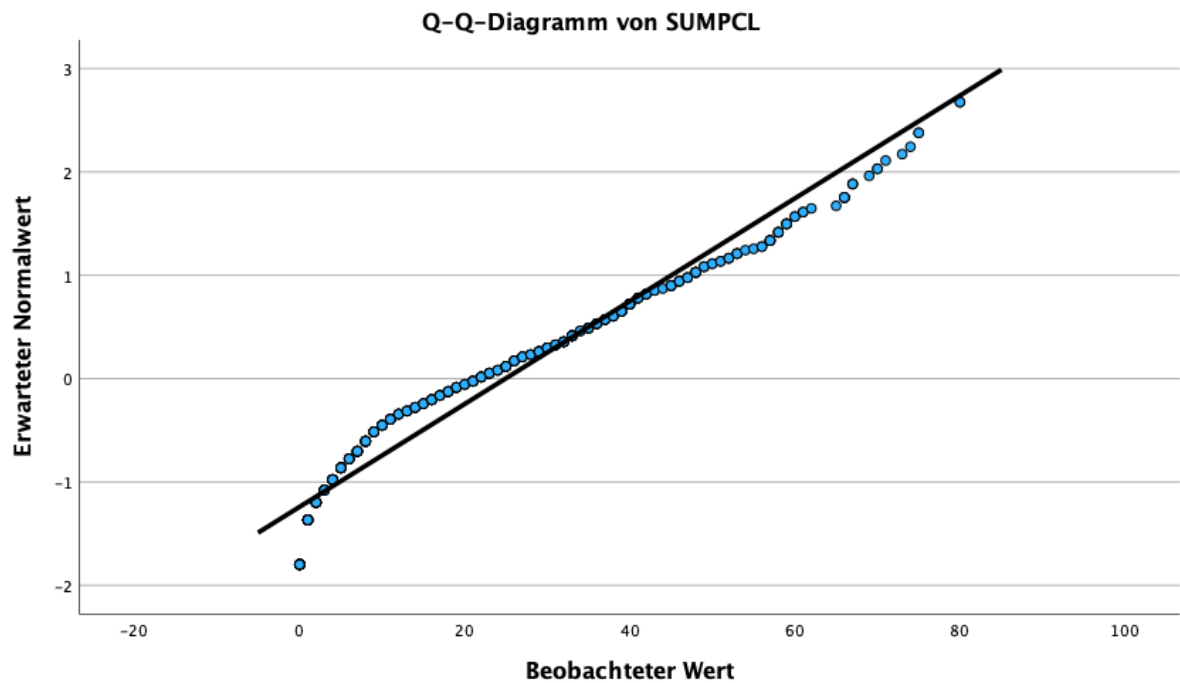
Figure B30
QQ-Plot Trauma Type Imputed data set 5

Q–Q–Diagramm von Mosttraumatic LEC categorized into LEC–Cluster

Figure B31
QQ-Plot Exposure Degree Imputed data set 5

Q–Q–Diagramm von Exposure degree of the mosttraumatic LEC–event

Figure B32
QQ-Plot Age at traumatic event Imputed data set 5

Q–Q–Diagramm von AgeMTLEC
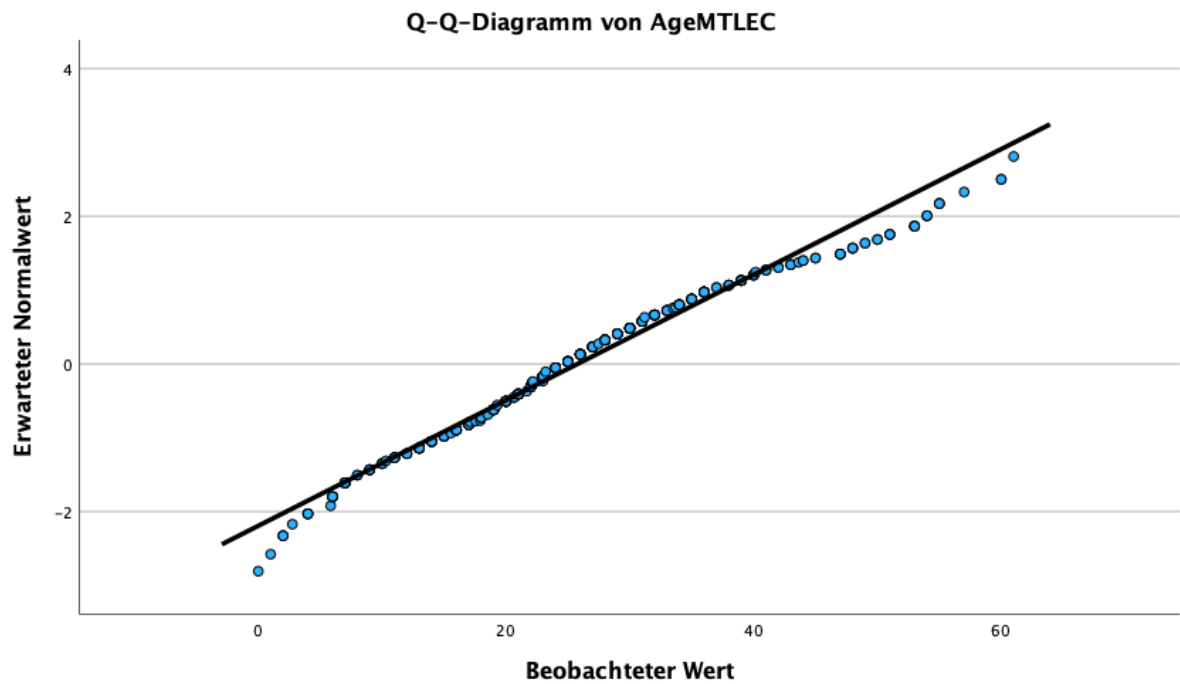
Figure B33
QQ-Plot PTSD Symptom Severity (Sumscore PCL) Imputed data set 5
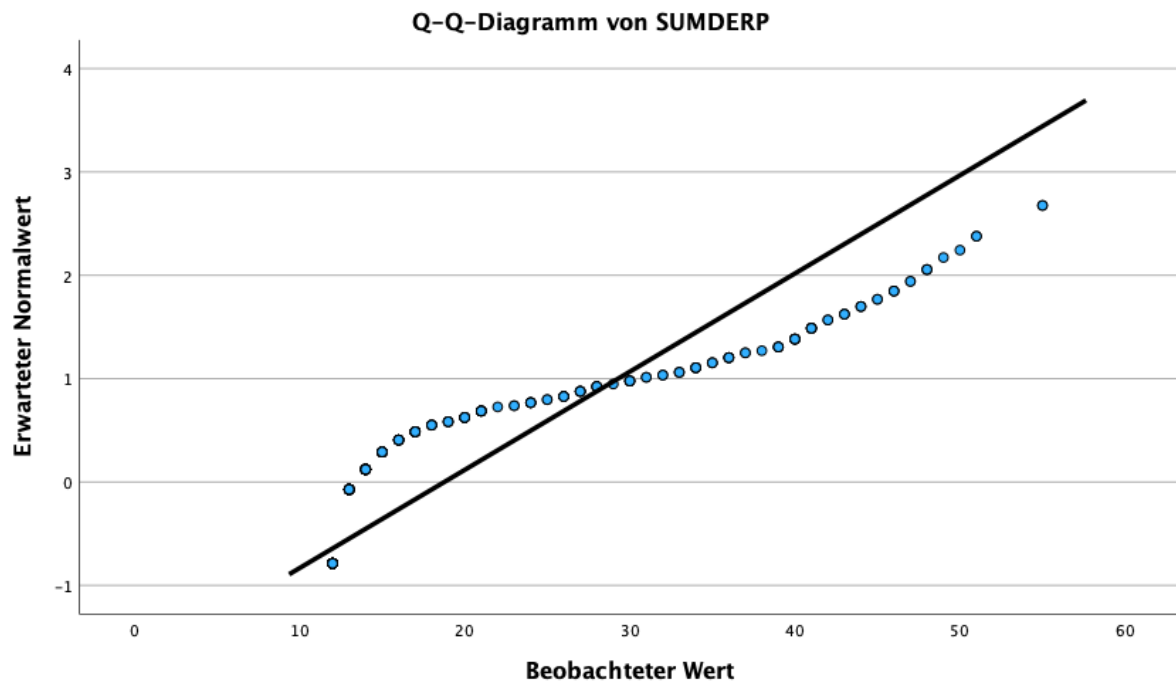

Q–Q–Diagramm von SUMPCL

Figure B34
QQ-Plot Difficulties in Emotion Regulation (Sumscore DERS) Imputed data set 5
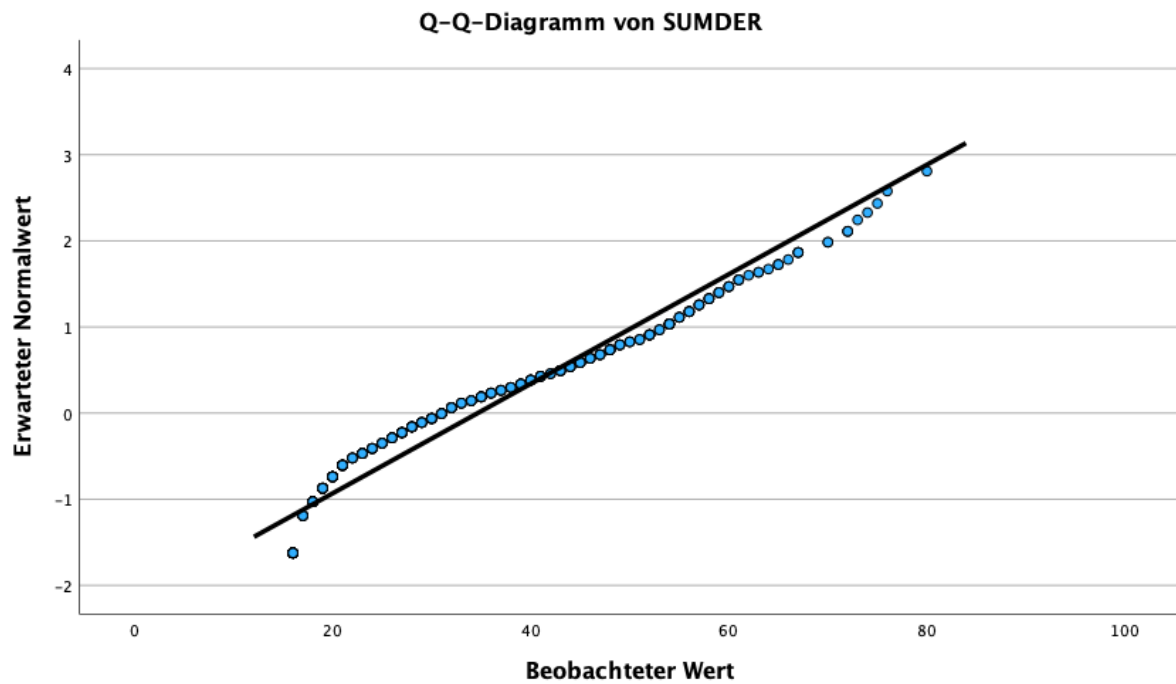
Figure B35
QQ-Plot Difficulties in Positive Emotion Regulation (Sumscore DERSP) Imputed data set 5

Appendix C

Table C1

Unclear/modified cases

Cases	ExDegree changed to …	TType changed to …	Year_Trauma Event changed to …
4 (robbery and attempted rape vs. 3)	1		
15 (SID of daughter indicated as 17, but maybe more 15?)	Left at 17/1		
25 (Suicide of friend categorized as 17, but maybe more 14?)		3	
35 (Suicide indicated as 14/1 -> either it was only an attempt, or they witnessed it (2))	Left at 1		
41			1991
56 (Murder of father, indicated as 14/1, maybe rather 2 or 3?)	Left at 1		
58 (same case as 15)	Left 17/1		
88 (6 indicated as mosttraumatic, but at the same time LEC8 is rated with 1 and fits verbal description better)	1	Doesn't change TType, so no changes between LEC6 and 8	
90 (Spouse military deployment as 1?)	Left at 1		
101 (Superstorm Sandy . Oct 29, 2012, LEC1-1 but mosttraumatic = LEC17-1??)	Left at 1	Changed to 1	
109 (Death of mother (14) rated with 1)	Left at 1		
186 (Uncle dying but rated with 1)	Left at 1		
195			2010
216 (Description is "fighting" but 9 is indicated with 4)	Left at 4		
272 (Death of nephew (15) rated with 1)	Left at 1		
274 (Suicide (14) rated with 1)	Left at 1		
290	1		
293 (Death of father (15) rated with 1)	Left at 1		

300 ("Feeling irritated/Cut off from others 01/15/2018" indicated as 14/rated as 3 – maybe feeling irritated as a reaction to the death of a dear one?)	Left at 3	
350 (Death of husband (16) rated with 1)	Left at 1	
380		1991
389 (Suicide (14) rated as 1)	Left at 1	

Appendix D

Abstract in English

Difficulties in positive and negative emotion regulation have been shown to influence PTSD symptom severity. Symptom severity is equally dependent on certain characteristics of the traumatic event. In this observational cross-section-study the influence of trauma type, level of exposure and age at traumatic event on PTSD symptom severity is investigated. It was also tested whether these effects are mediated by difficulties in negative emotion regulation and/or difficulties in positive emotion regulation. This study is a secondary data analysis. A sample of 401 North American adults that were recruited via Amazon's Mechanical Turk answered the Life Events Checklist, the PTSD Checklist for DSM-5, the Difficulties in Emotion Regulation Scale as well as the Difficulties in Positive Emotion Regulation Scale. Relative to accidental/injury trauma, difficulties in emotion regulation significantly mediate the effect of victimization trauma on PTSD symptom severity. Difficulties in positive emotion regulation significantly mediate the effect of predominant death threat trauma on PTSD symptom severity relative to accidental/injury trauma. Trauma exposure on the job as well as undefined trauma exposure caused heightened PTSD symptom severity, which is significantly mediated by difficulties in positive and negative emotion regulation relative to direct exposure. Difficulties in negative and positive emotion regulation act as a mediator between age at traumatic event and PTSD symptom severity. Limitations of the study are disclosed. The obtained results imply a a need for more accurate measures of level of exposure and a revision of the DERS and DERSP. With these and more diverse samples, more accurate answers to this study's questions could be possible. The study provides more evidence to the connection of trauma characteristics, Difficulties in emotion regulation and PTSD symptoms and can help to further adapt interventions to individual needs.

Keywords: PTSD, symptom severity, trauma type, level of exposure, difficulties in emotion regulation, difficulties in positive emotion regulation, age at traumatic event

Abstract in German

Schwierigkeiten bei der Regulierung positiver und negativer Emotionen beeinflussen den Schweregrad der PTBS-Symptome. Die Symptomschwere hängt auch von bestimmten Merkmalen des traumatischen Ereignisses ab. In dieser Querschnittsstudie wird der Einfluss des Traumatyps, des Ausmaßes der Traumaexposition und des Alters zum Zeitpunkt des traumatischen Ereignisses auf die PTBS-Symptomschwere untersucht. Es wurde ebenfalls getestet, ob diese Effekte durch Schwierigkeiten bei negativen Emotionen und/oder Schwierigkeiten bei positiven Emotionen mediiert werden. Bei dieser Studie handelt es sich

um eine Sekundärdatenanalyse. Eine Stichprobe von 401 nordamerikanischen Erwachsenen, die über Amazons Mechanical Turk rekrutiert wurden, beantwortete die Life Events Checklist, die PTSD-Checkliste für DSM-5, die Difficulties in Emotion Regulation Scale sowie die Difficulties in Positive Emotion Regulation Scale. Relativ zum Unfall-/Verletzungstrauma wird der Effekt von Viktimisierungstrauma auf die Schwere der PTBS-Symptome signifikant durch Schwierigkeiten bei der Emotionsregulation mediiert. Schwierigkeiten bei der positiven Emotionsregulation mediieren signifikant den Effekt von Todesgefahrtrauma auf die Schwere der PTBS-Symptome relativ zu Unfall-/Verletzungstrauma. Traumaexposition am Arbeitsplatz sowie undefinierte Traumaexposition verursachen eine erhöhte PTBS-Symptomschwere, die signifikant durch Schwierigkeiten bei der positiven und negativen Emotionsregulation im Vergleich zur direkten Exposition mediiert wird. Schwierigkeiten bei der Regulation negativer und positiver Emotionen wirken als Mediator zwischen dem Alter beim traumatischen Ereignis und dem Schweregrad der PTBS-Symptome. Limitationen der Studie werden aufgezeigt. Die Ergebnisse legen nahe, dass die Instrumente zur Erhebung von Expositionsgrad sowie der DERS und DERSP im Hinblick auf genauere Erhebung überarbeitet werden sollten. Mit angepassten Instrumenten und diverseren Samples könnten die Forschungsfragen dieser Studie umfassender im Rahmen nachfolgender Forschung beatwortet werden. Die Studie liefert neue Evidenz zum Zusammenhang der genannten Konstrukte und kann zu einer gesteigerten Anpassung von Behandlungsmethoden an individuelle Bedürfnisse beitragen.

Keywords: PTBS, Symptomstärke, Traumatyp, Expositionsgrad, Schwierigkeiten in Emotionsregulation, Schwierigkeiten in positiver Emotionsregulation, Alter zum Traumazeitpunkt