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The impact of institutional child abuse on emotion  
regulation difficulties and psychological inflexibility

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Olivia Lackner, BSc.

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## **Zusammenfassung**

### **Institutioneller Kindesmissbrauch und seine Auswirkungen auf die Emotionsregulation und die psychologische Inflexibilität**

Kindesmissbrauch wird als wichtiger Faktor für die Entwicklung einer Vielzahl von psychischen Störungen betrachtet. Institutioneller Kindesmissbrauch weist ein vielfach höheres Risiko bezüglich der Entstehung solcher auf. Bisher wurde dieser Bereich in der Forschung unzureichend thematisiert.

Emotionsregulationsprobleme und psychologische Inflexibilität wurden mehrfach als potenzielle Mediatoren zwischen Kindesmissbrauch und späteren psychischen Störungen in Erwägung gezogen. Die Zielsetzung dieser Studie war die Untersuchung genannter Annahmen in Bezug auf Symptome der Ängstlichkeit, Depression und Somatisierung. Die Daten beziehen sich auf die institutionalisierte Hauptgruppe ( $n = 219$ ) und die im Familienkreis aufgewachsene Kontrollgruppe ( $n = 127$ ). Allen wurde der Childhood Trauma Questionnaire (CTQ), der Acceptance and Action Questionnaire (AAQ-II), die Difficulties in Emotion Regulation Scale (DERS) und das Brief Symptom Inventory 18 (BSI-18) vorgegeben.

Eine zentrale Eigenschaft der Hauptgruppe ist die erhöhte Prävalenz von schweren emotionalen (71%), körperlichen (78%) und sexuellen (47%) Misshandlungserfahrungen, verglichen mit der Kontrollgruppe (10%, 6% und 6 %). Bezüglich schwerer Missbrauchserfahrungen in der Hauptgruppe wurde eine ANOVA durchgeführt. Drei Untergruppen wurden hinsichtlich der Anzahl (eine, zwei oder drei) erlebter Missbrauchsformen differenziert. Die Gruppe mit drei erlebten Missbrauchsformen unterschied sich mit stärkeren Symptomen (Angst, Somatisierung und Summenskala) sowie einer höheren psychologischen Inflexibilität signifikant von der Gruppe mit einer erlebten Missbrauchsform. Bei diesem Gruppenvergleich zeichneten sich auch tendenziell stärker ausgeprägte Emotionsregulationsprobleme in der erstgenannten Gruppe ab. Hinsichtlich der Symptome zeigten sich im Vergleich der Gruppen mit drei und zwei erlebten Missbrauchsformen kongruente Ergebnisse.

Parallele multiple Mediationsanalysen wurden abschließend in der Haupt- und Kontrollgruppe durchgeführt. Emotionsregulation und psychologische Inflexibilität wurden dabei als partielle Mediatoren zwischen Missbrauch und Symptomen (Angst und Somatisierung) aufgezeigt. Eine vollständige Mediation zeigte sich ausschließlich hinsichtlich der Depressionssymptome. Diese Ergebnisse zeigen, dass eine Verbesserung der Emotionsregulation und psychologischen Inflexibilität prophylaktisch oder therapeutisch eingesetzt werden könnte.

## **Abstract**

### **The impact of institutional child abuse on emotion regulation difficulties and psychological inflexibility**

Child abuse has been considered as an important part for the development of various mental disorders. Albeit development of mental disorders are manifold higher with an institutional child abuse history, previous research has not focused on this setting. Problems in emotion regulation and psychological inflexibility were mentioned consistently as possible mediators between experienced abuse and later mental disorder. The aim of this study was to investigate this assumptions in detail for symptoms of anxiety, depression and somatization. Data were generated from the institutionalized main group ( $n = 219$ ) and the at-home control group ( $n = 127$ ). Both groups completed the Childhood Trauma Questionnaire (CTQ), the Acceptance and Action Questionnaire (AAQ-II), the Difficulties in Emotion Regulation Scale (DERS) and the Brief Symptom Inventory 18 (BSI-18). An enormous number of participants in the main group displayed severe experiences of emotional (71%), physical (78%) and sexual abuse (47%) compared to the control group (10%, 6% and 6%). ANOVA was conducted with the main group (single, double and triple type) regarding severe abuse. It showed significantly differences between the triple and single type concerning symptoms and psychological inflexibility and tendencies for emotion regulation. Also the triple and double type groups differed significantly concerning symptoms.

In both groups parallel multiple mediation analysis were conducted. Partial mediation via emotion regulation difficulties and psychological inflexibility was found in regards to symptoms of anxiety and somatization. Between child abuse and symptoms of depression a full mediation was shown.

These findings support the necessity for interventions based on enhancements of emotion regulation and psychological inflexibility.

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# 1 Introduction

## 1.1 Child abuse

Since the 1980s, the scientific community has addressed a growing interest to the subject child abuse, an interpersonal experience of trauma, which is seen in the evolving literature of this research area (Stoltenborgh, Bakermans-Kranenburg, Alink, & Van Ijzendoorn, 2015). Primarily, maltreatment of children under three years of age, their physical abuse plus physical sequelae induced by a parent or a parent-substitute was brought into focus (Kempe, Silverman, Steele, Droegemueller, & Silver, 1985). Back then, the main attention centred on describing the psychological components of the offender rather than of the maltreated child (Kempe et al., 1985).

The focus of research shifted from generating theoretical frameworks in the 1980s to the implementation of quantitative studies with the aim to support former at the present day (Behl, Conyngham, & May, 2003). Additionally, there is a noticeable widening of child maltreatment literature regarding the concerned age of child maltreatment (e.g., Euser, Alink, Tharner, Van Ijzendoorn, & Bakermans-Kranenburg, 2014; Finkelhor, Turner, Ormrod, Hamby, & Kracke, 2009; Kloppen, Mæhle, Kvello, Haugland, & Breivik, 2015). Established research engages not only with maltreatment of the very young, but extended its attention to adolescence, up to the legal age.

Furthermore, the concept of maltreatment was expanded by five different types of maltreatment: physical, sexual and emotional abuse as well as physical and emotional neglect (Stoltenborgh et al., 2015). The World Health Organisation (WHO) published the *Report of the Consultation on Child Abuse Prevention* (1999), which includes definitions of prior mentioned types of maltreatment: It defines physical harm – potential or actual – inflicted by a caregiver through an interaction or denial of interaction as *physical abuse (PA)*. *Sexual abuse (SA)* is characterized among others by the involvement of a child in a sexual activity for gratification of the other person, which the child is unable to understand and therefore to agree with. The caregiver is supposed to support the child's emotional and social competencies best possible within his or her control. The failure of providing this supportive environment through non-physical acts of rejection and hostility towards the child is classified as *emotional abuse (EA)*. The terms *physical* and *emotional neglect* describe the failure of supporting the child's development as a caregiver best

possible in areas like health, education, emotional development, nutrition, shelter and safety.

Depending on the parameters within surveys, fairly different prevalence rates regarding child maltreatment occur in literature. Firstly, informants reported rates of any type of child abuse are considerably lower than self-reported rates. Secondly, depending on the type of child abuse there are tremendous differences in prevalence rates. Thirdly, there is the necessity to mention that the vast majority of findings in this matter stems from research within Central and Northwest Europe as well as North America. As a consequence, the rates are generalizable to those populations, but with restriction due to social and cultural differences (Stoltenborgh et al., 2015).

In the USA, life-time prevalence rates of 18.6 percent for child maltreatment (including physical and emotional abuse as well as neglect), 9.8 percent for SA of children and 27.3 percent for SA of 14- to 17-year-old adolescents were found (Finkelhor et al., 2009). Similar, but more precisely divided prevalence rates for underaged US-Americans were shown a few years earlier (Edwards, Holden, Felitti, & Anda, 2003): 21.6 percent (SA), 20.6 percent (PA) and with a wide range – due to differentially heeded degrees of maltreatment (from low to severe) – from 4 to 35 percent for EA. A comparative study comprising North and Central European countries displayed prevalence rates for sexual abuse between 6 and 15 percent for girls and 1 to 9 percent for boys, as well as physical abuse rates between 5 and 50 percent for children under the age of 16 (Lampe, 2002).

Gilbert et al. (2009) were able to gather resembling prevalence rates in a meta-analysis for high-income countries of North America and Europe: 15 to 30 percent of girls and 5 to 15 percent of boys were sexually abused. 5 to 35 percent of children showed severe physical abuse and 4 to 9 percent severe emotional abuse experiences. Another meta-analysis from 2015 (Stoltenborgh et al.) elaborated and combined prevalence rates of self-reported studies with the focus on Europe and North America and loomed following results for children aged 17 or younger: almost 8 percent for sexual abuse among boys, 18 percent for sexual abuse among girls, almost 23 percent for physical abuse and 36 percent for emotional abuse. The only current and representative study for the German population – and generalizable for Austrian population most reasonable, because of historical and cultural similarities – varies in its prevalence rates due to different classifications of severity of



maltreatment from low to severe as follows (Häuser, Schmutzer, Brähler, & Glaesmer, 2011): 1.6 up to 15 percent for emotional abuse, 2.7 up to 12 percent for physical abuse and 1.9 up to 12 percent for sexual abuse.

As seen above, it is not only possible to differentiate maltreatment by degree (mild to severe) but also by frequency (once to long-time). Furthermore, it is important to consider that an individual might have experienced more than one type of maltreatment during childhood, resulting in a so called co-occurrence, as first mentioned by Walker et al. (1999). 17 years later, the possibility of experiencing multiple abuses during childhood is still underrepresented in literature (Stoltenborgh et al., 2015) and only recently begins to draw attention. One representative study conducted in the general population of Germany displayed that 32 percent experienced no type of maltreatment, 28 percent experienced one type, 24 percent two types and 16 percent three or more types (Häuser et al., 2011). These rates dropped sharply, when analysed for severe forms of abuse. Under this condition 86 percent experienced none, 9 percent experienced one, 3 percent experienced two and only 2 percent experienced three or more types of maltreatment.

### **1.1.1 Child abuse sequelae**

The impact of child abuse on neurobiological, (psycho)social, educational, physical and psychological health has been subject to recent scientific studies. Major results are listed as follows: Childhood abuse leads to alterations in the anatomy of the brain and its development and functioning (e.g., Tarullo & Gunnar, 2006; Teicher et al., 2003; Twardosz & Lutzker, 2010). Its experiences affect interpersonal relationships (Spröber et al., 2014; Wolfe, Jaffe, Jettè, & Poisson, 2003), lead to an insecure attachment style (Carr et al., 2010) as well as behavioural problems and learning difficulties (Hobbs, Hobbs, & Wynne, 1999). Moreover it is connected with lower educational achievements (Gilbert et al., 2009; Romano, Babchishin, Marquis, & Fréchette, 2015), higher health care use and costs (Arnow, 2004; Gilbert et al., 2009), prostitution (Gilbert et al., 2009), and a lower general adult health (Gilbert et al., 2009; Min, Minnes, Kim, & Singer, 2013).

Regarding mental health and mental health disorders, it was possible to show a link between abuse and the following: self-injurious behaviour and increased risk of suicide attempts (Arnow, 2004; Gilbert et al., 2009), psychiatric diagnoses like post-traumatic stress disorder (PTSD; Subic-Wrana et al., 2011), personality

disorder (Fitzpatrick et al., 2010), substance abuse and dependence of alcohol and illicit drugs (Arnow, 2004; Fitzpatrick et al., 2010), depression (Subic-Wrana et al., 2011), anxiety disorders (Sugaya et al., 2012), and somatization disorder (Spitzer, Barnow, Gau, Freyberger, & Grabe, 2008).

### **1.1.2 Child abuse and specific mental disorders**

The WHO implemented the World Mental Health Surveys in the years from 2002 to 2004 to gather data on health systems and the health of adult populations in participating countries all over the world (World Health Organization, 2016). Since then, the data has been used by multiple collaborators in publications. They displayed that the estimated prevalence rates of depression and anxiety have been the highest (with few exceptions of substance-related disorders) among mental health disorders in adult populations around the globe (Kessler et al., 2009). In Germany, the lifetime prevalence has been estimated at 14.6 percent for any anxiety disorder and 9.9 percent for any mood disorder whereas the 12-month prevalence has been estimated at 8.3 percent for any anxiety disorder and 3.3 percent for any mood disorder.

As mentioned above, there are findings which indicate that child abuse contributes to the development of disorders. Concerning this matter, Hovens et al. (2010) carried out a longitudinal study over eight years in the Netherlands and initially distinguished between different childhood adversities and their effects in adults. In the process they were able to reveal relevant differences between the impacts of these adversities. Divorce of parents and early parental loss did not show associations with anxiety or depression. On the contrary, emotional, physical and sexual abuse as well as emotional neglect were related to anxiety, depression and the combination of those two psychopathologies.

Laying the focus on child abuse before the age of 16, a meta-analysis of 19 studies which includes almost 116.000 participants, has compared the combined Odds Ratios (cOR; here Odds Ratio describes the odds between the presence of a negative experience and the following increased presence of an adverse outcome. The OR of 1 equals no difference between the groups) between groups who had experienced physical or sexual abuse and a control group without experiences of abuse (Lindert et al., 2014). Compared to the control group children with experiences of SA have got a twofold risk (cOR of 2.04), and with experiences of

PA a 1.5-fold risk (cOR of 1.49) to develop a depression later in life. Even stronger effects for the development of anxiety have been found: a 2.5-fold risk for children who experienced SA (cOR of 2.52) and a more than 1.5-fold risk for children who experienced PA (cOR of 1.70). These summarized results are conform to the data gathered within an U.S. adult population sample, which showed a lifetime prevalence of 47 percent for any mood disorder and 53 percent for any anxiety disorder, both with twofold risk compared to adults without experiences of physical abuse (Sugaya et al., 2012). Contrary to those retrospective-designed surveys, a prospective-design study – lasting 43 years – regarding sexual abuse during childhood with a matched comparison group without sexual abuse during childhood has been implemented in Australia (Cutajar et al., 2010). Thereby it was possible to overcome the natural validity restrictions of former, demonstrating a twofold risk of affective disorders and 2.5-fold risk of anxiety disorders in adulthood for sexual abused children likewise.

One of the most recent studies, which was conducted in Germany, chose a different approach of observation by taking chronically depressed patients, diagnosed by the German version of the Structured Clinical Interview for DSM-IV (SCID I and SCID II; Wittchen, Wunderlich, Gruschwitz, & Zaudig, 1997), into account as sample (Negele, Kaufhold, Kallenbach, & Leuzinger-Bohleber, 2015). First of all, within this population the correlations between depression and the five types of maltreatment have shown the strongest connection with emotional abuse, followed closely by sexual abuse and physical abuse, resting upon the operationalization of co-occurrence of different types of maltreatment by Walker et al. (1999). Secondly, they selected groups, which differed by the reported number of experienced types of abuse. Additionally they slightly modified their approach by taking off the main focus of sexual abuse and by making the types of abuse weighted equally. Thereby it was achievable to compare groups of individuals, categorized into experiences of no, single, double or multiple traumas, enabling so-called dose-response relationships calculations. Findings revealed significantly higher values of self-reported depression for the multiple trauma group compared to all other groups. As a matter of fact higher values indicate a higher symptom severity. In a final step, they assumed that multiplicity (multiple traumas experienced) increases the risk for symptom severity. A multiple regression analysis confirmed this assumption.

Although few existing studies indicate a close relationship between child abuse and adult somatization (Spitzer et al., 2008), somatization disorders are scarcely investigated in the context of child abuse. In the Diagnostic and Statistical Manual of Mental Disorders (DSM), somatoform disorders, including somatization disorders and others, are defined by somatic symptoms which are not caused by physiological, but (primarily) psychological factors. It includes somatic complaints as for instance back pain, headache and dizziness, once medical causes are excluded (4th ed., text rev.; DSM-IV-TR; American Psychiatric Association, 2000).

Another study, which was conducted in Germany and took anxiety disorders, depression and somatoform disorders into consideration, showed strongest correlations between emotional abuse and depression as well as physical abuse and somatoform disorders (Subic-Wrana et al., 2011). Within a sample of 205 female participants who were visiting a primary care practice, symptoms of anxiety, depression and somatization have been observed using a self-reporting symptom checklist (Spertus, Yehuda, Wong, Halligan, & Seremetis, 2003). Results indicated a predictive function of childhood emotional abuse combined with neglect on increased symptoms of anxiety, depression and somatization.

One of the very few existing studies that investigated abuse in Western Europe was recently realised in the general population of Portugal (Dias, Sales, Hessen, & Kleber, 2015). Researchers used a broader based self-reporting measure for psychological symptoms, including anxiety, depression and somatization among others, thereby previous results could be reinforced. Results confirmed that emotional abuse predicted symptoms of anxiety, depression and somatization and, furthermore, sexual abuse predicted symptoms of anxiety and depression. In contrast to the latter result, Spitzer et al. (2008) came to a different conclusion by connecting sexual abuse during childhood to patients with somatization disorders rather than to patients with depressive disorders. They were able to witness an eightfold risk. Including severity as a criterion into the investigation, a comparison between patients with somatization disorder and patients with dystonia (a neurological disorder) revealed more severe forms of emotional and physical abuse in the somatization disorder group (Brown, Schrag, & Trimble, 2005).

## **1.2 Institutionalized child abuse**

Goffman (1987) shaped the terms total institution and institutional abuse. Total institution is defined as an environment without separation of sleeping, working, and recreational places, for equivalent individuals grouped together, for a considerable time and formal regulated conduct of life. As a consequence, the executive institution and its single authorities which function as caregivers in children's homes, are controlling most aspects of a child's life, leading to a hierarchic structure of power and dependence. Institutional abuse refers to the exploitation of this power by the adult caregiver, risking the child's development, health and well-being. Nowadays, the investigation of institutional abuse broadened, as abuse of this kind may take place in different institutional and social environments, and, therefore, does not fulfil the previously mentioned criteria (Wolfe et al., 2003).

Various reasons – such as abuse and neglect of the child, abandonment by parent(s), illness of parent(s), and others – may lead to a child's allocation to foster or residential care as their main place of residence which made it relevant to inspect those different environments regarding child maltreatment as well (Hobbs et al., 1999). One of the first successful attempts in realising such a study was supported by the Indiana Department of Public Welfare, USA, which collected and allocated detailed information about reported neglect as well as physical and sexual abuse (Spencer & Knudsen, 1992). This led to the first conclusion that a higher physical as well as sexual abuse rate in children living in full-time care in relation to children living at home exists. In the United Kingdom, it was possible to exhibit a massive discrepancy between assessed child abuse rates and actually reported child abuse rates in foster and residential care by paediatricians (Hobbs et al., 1999). The rates and the discrepancy were higher for children living out-of-home compared to children living at home. The likelihood for physical and sexual abuse of children in out-of-home care was 6-8 times higher compared to children growing up at home. In the more recent past, these observations got substantiated regarding 12- to 17-year-old adolescents in out-of-home-care with a nearly threefold elevated risk of physical abuse compared to adolescents in the equally aged general population (Euser et al., 2014). In the German-speaking part of Europe, most recent research was grounded on information given by former institutionalized children (Lueger-Schuster et al., 2014; Spröber et al., 2014). It evinced that during the 1950s up to

the 1980s sexual, physical and emotional child abuse in nationally and religiously managed out-of-home-care institutions existed already.

Similar to the children of the general population, institutionalized children might experience multiple types of maltreatment during their childhood. Hobbs et al. (1999) showed that some children experienced physical as well as sexual abuse in an institutional setting already. Spröber et al. (2014) compared child sexual abuse in religiously managed institutions in Germany, their findings demonstrate that adult survivors of abuse frequently experienced two or three types of abuse during their childhood – sexual abuse in combination with physical and/or emotional abuse.

### **1.2.1 Institutionalized child abuse and specific mental disorders**

Considering that institutional child abuse is an even younger research field than child abuse in general, it is not surprising to see lower numbers of publications investigating the consequences of institutional child abuse. One similarity has to be pointed out in the beginning: the prevalence rates of psychological disorders for institutional child abuse (IA) seem to be at least equally high as for child abuse in general stated above. This was ascertained by comparing IA in an Irish sample with samples of the general population of Europe, the USA and the UK. The risk of developing any anxiety disorder increases more than twofold and for any mood disorder more than 2.5-fold in comparison to the general adult population of Europe, respectively (Carr et al., 2010), as illustrated in Table 1 in prevalence rates.

One of the few existing studies examining institutional physical and/or sexual abuse concentrated on 76 male survivors (Wolfe, Francis, & Straatman, 2006). It was shown that 42% of them met criteria for psychiatric disorders of mood and/or anxiety disorders. Spröber et al. (2014) were able to contribute to these findings by identifying the most frequent mental health disorders in adult survivors of institutional emotional, physical and/or sexual child abuse: depression, PTSD and anxiety disorder. In the case of measuring self-reported psychological symptoms in combination with institutionalized child abuse in a large Austrian sample, embracing 448 men and women, at least one psychopathological symptom of nine, including anxiety, depression and somatization, was found significantly in 85% of the adult survivors (Lueger-Schuster et al., 2014).

Table 1. Prevalence rates of specific mental disorders compared in several populations

	Germany General population <sup>1,3</sup>	Europe* General population <sup>2,3</sup>	Ireland Abused in institution <sup>2</sup>
Any lifetime anxiety disorder	14.6	13.6	34.4
Any current anxiety disorder	8.3	16.0	44.9
Any lifetime mood disorder	9.9	14.0	36.0
Any current mood disorder	3.3	4.2	26.7
Any somatoform disorder	n/a	n/a	n/a

*Note.* \* Following six countries have been defined as Europe in the conducted study: Belgium, France, Germany, Italy, the Netherlands and Spain. <sup>1</sup> rates taken from Kessler et al., 2009. <sup>2</sup> rates taken from Carr et al., 2010. <sup>3</sup> institutionalized child abuse not experienced. n/a = not available.

### 1.3 Emotion and emotion regulation

Emotions belong to the family of affective processes. They are defined by three characteristics, therefore making it possible to distinguish them from other affective processes like general stress reactions, mood and other motivational impulses like thirst or pain (Gross & Thompson, 2007; Mauss, Levenson, McCarter, Wilhelm, & Gross, 2005).

First, they originate when an individual enters a situation, which is perceived as relevant for her or his own goals. If the sense of the situation changes, the emotion does as well. Second, emotions are multidimensional, whole-body phenomena, referring to changes in subjective experiences and behaviour, and physiology (e.g., joy can evoke changes in facial expression while also increasing the heart rate). Third, the multidimensional changes are not rigid and obligatory – they manifest in different ways. They are able to interrupt a current activity and have the character of a “call to action”. Nevertheless, emotions are malleable by the individual, which enables emotion regulation.

*Emotion regulation (ER)* is a complex phenomenon, composed of related processes, which has been interpreted differently concerning its structure by researchers over the last two decades (Thompson, Lewis, & Calkins, 2008). One definition, which has been generally accepted in the scientific community, has been stated by Thompson (1994, pp. 27-28):

*„Emotion regulation consists of the extrinsic and intrinsic processes responsible for monitoring, evaluating, and modifying emotional reactions, especially their intensive and temporal features, to accomplish one's goals.”*

Gross and Thompson (2007) have defined the assumptions of parameters of emotion regulation:

1. People are able to regulate emotions, negative and positive ones equally, by de- and increasing them. Albeit a regulation of negative emotions happens more frequently.
2. The distinctions of ER are not limited categorially. Rather regulation is reflected as a continuum from conscious, effortful and controlled to unconscious, effortless and automatic. Instancing the hiding of anger because of a malice of a co-worker.
3. There must not to be a generalized a-priori assumption of the quality (good or bad) of a particular type of emotion regulation, as the context of the ER is essential to consider. As model-example the following: On the one hand a medical practitioner may improve performance by stifling emotions as he is able to work effectively in an exceptional situation. On the other hand he or she may diminish performance by stifling emotions in a situation where empathy is needed.

Therefore the notion of an adaptive emotion regulation with functional processes and a broad range of strategies to use if needed – which develop and maintain a healthy personality – is fundamental (Thompson & Calkins, 1996). Especially during infancy and adolescence the development of ER is shaped by temperamental, neurobiological, conceptual and social impacts and is going to be the foundation of individual differences in ER in adulthood (Gross & Thompson, 2007). Impaired development of adaptive emotion regulation leads to varyingly strong emotion dysregulation. In the past research has been dichotomous, on the one hand focusing on the exploration of specific strategies (Gross, 1998), on the other hand focusing on the process of emotion regulation (Thompson, 1994). Both pathways have shown that mental disorders (as well as their non-pathological forms called distresses) and experiences of child abuse have substantial connections with emotion dysregulation.



### **1.3.1 Emotion regulation, abuse and specific mental disorders**

A thorough overview is provided by Berking and Wupperman (2012) who have summarized the past results concerning emotion regulation and mental health, including a variety of anxiety disorders, depression and somatization. Aiming to assess essential skills influencing depressive symptoms a study in Germany has been realised (Fehlinger, Stumpenhorst, Stenzel, & Rief, 2013). The sample consisted of 124 inpatients diagnosed predominantly with affective disorders as well as anxiety and somatoform disorders. They investigated a possible correlation between depressive symptoms and emotion dysregulation by collecting and comparing data gathered pre- and post-treatment. Results indicated the capability of emotion regulation to predict relevant improvements of depressive symptomatology. Another study realized in Germany, comparing among others women with major depressive disorder (MDD) and healthy women, reported increased difficulties in emotion regulation in former with large effect sizes (Brockmeyer et al., 2012). Looking at the necessary abilities for a successful emotion regulation separately, two of them have been worst affected: accessing ER strategies and engaging in goal directed behaviour.

In a study with a similar design it was possible to highlight the presence of greater difficulties in describing and understanding emotional experiences as well as fewer existing abilities of improving negative feelings in individuals with generalized anxiety disorders, compared to healthy controls (Mennin, Heimberg, Turk, & Fresco, 2005). By gathering data in a general population sample with a self-reporting emotion regulation checklist an association between chronic worry as well as generalized anxiety disorders (GAD) with emotion dysregulation in general became apparent (Salters-Pedneault, Roemer, Tull, Rucker, & Mennin, 2006). In detail the two comprised abilities mentioned above have again been aggravated the most: to access ER-strategies and to engage in goal-directed behaviour. Furthermore, a significant difference between groups with and without GAD referring to emotion dysregulation was found, pointing out more difficulties with emotion regulation in former.

Tull, Stipelman, Salters-Pedneault, and Gratz (2009) generated a proxy risk factor model, including emotion dysregulation, for developing GAD. A proxy risk factor model is similar to a mediation model, however the assumption of a temporal causal relationship is not verifiable. They showed that a prediction of GAD was

possible with emotional dysregulation, and proposed the exploration of a causal relationship between these factors.

Another study examined successfully a correlation between emotion regulation and somatoform disorders in a sample of undergraduate students who had experienced at least one natural or manmade traumatic event (Lilly & Valdez, 2012). Comparing samples of undergraduate students and survivors of interpersonal trauma, survivors had experienced significant more traumatizing events. However, across the samples the correlation between emotion dysregulation and symptoms of depression as well as somatization was shown with medium strength or more (Lilly & Lim, 2012). Furthermore, in both groups higher emotion dysregulation predicted higher symptoms of depression and somatization. In another interpersonal trauma exposed sample associations have been present between each of the following: trauma exposure, difficulties in emotion regulation, somatic symptoms and depressive symptoms. Subsequently increased difficulties in emotion regulation – including the above mentioned goals and strategy processes – have been apparent in the group with psychopathologies (including PTSD, depressive symptoms, somatic symptoms, and alcohol abuse) compared to the distressed group (Lilly & London, 2015).

Using explicitly statistical methods allowing causal interpretations, there appeared a fitting model, including emotion regulation as mediator between traumatic experiences of different kinds and psychopathologies. This assertion was substantiated by multiple research groups recently. In female adolescent US-Americans, it was possible to show the mediation of general difficulties in emotion regulation between all types of child abuse summarized (including witnessing domestic violence) and psychopathologies like anxiety, depression and PTSD (Sundermann & DePrince, 2015). A pathway analysis, generated with a sample of undergraduates in the US, highlighted emotion dysregulation as mediator between high betrayal trauma – defined as traumatic event caused by someone the victim has a close relationship to (e.g., parent or partner) – and symptoms of anxiety, depression and others (Goldsmith, Chesney, Heath, & Barlow, 2013).

Recently mediation analysis successfully showed emotion dysregulation as a mediator in an adult sample likewise (Abravanel & Sinha, 2015). They focused on cumulative adversities, containing a summary of repeated exposure to negative life events, as an independent variable, and symptoms of depression as a dependent

variable. It should be noted that only the processes referring to goals-directed behaviour and access to ER-strategy were significantly relevant.

Only three studies differentiated between the types of abuse mentioned earlier, with emotion dysregulation as a mediation variable and psychopathologies as an outcome variable. First, in a female sample of students, physical abuse and emotional abuse respectively have been found to predict posttraumatic symptomatology, partially mediated by general emotion dysregulation (Burns, Jackson, & Harding, 2010). Second, referring to emotional abuse exclusively, the same mediation via difficulties in emotion regulation was found for the variance of borderline symptomatology within a German adult sample (Carvalho Fernando et al., 2014). Final, the mediating role of ER has been considered with GAD defined as an outcome variable (Soenke, Hahn, Tull, & Gratz, 2010). This assumption was tested within a large sample of US-students, mainly female. Emotional, physical and sexual abuse was examined, as well as the key processes of adaptive emotion regulation. Thereby, with emotional abuse exclusively a full mediation – including processes of goal-directed behaviour and access to ER-strategy – could be successfully shown. The other processes of emotion regulation mediated the results partially.

#### **1.4 Psychological inflexibility**

The last construct thematized in this study is called psychological inflexibility (PSY-INF), with its adaptive counterpart psychological flexibility. Psychological inflexibility has been composed by two different parts (Hayes, Wilson, Gifford, Follette, & Strosahl, 1996): First, the unwillingness of a person to stay in contact with her or his undesirable private experiences through bodily sensations, emotions, thoughts, memories, images, and behavioural predispositions. Second, the maladaptive actions taken to modify this adverse experiences or the situations causing them. This refers to a broad process including constituents like acceptance, cognitive defusion, experiential avoidance, and mindfulness, functioning as response (Hayes, Luoma, Bond, Masuda, & Lillis, 2006). Furthermore it relates to specific forms of emotion regulation as well as coping, however it is not explained by these single constructs such as thought suppression and self-deception (Hayes et al., 2004). It is ascertainable with a revised, shortened questionnaire developed to measure the ability of an individual to engage in this process better or worse –

the Acceptance and Action Questionnaire (latest version: AAQ-II; Bond et al., 2011). Palm and Follette (2011) brought in a very comprehensible example: An individual with social anxieties may feel uncomfortable at a celebration, thinking that nobody wants to chat with her or him. Therefore the individual may seek immediate relief of this unpleasant experience by choosing solutions like drinking alcohol or leaving the room.

#### **1.4.1 Psychological inflexibility, abuse and specific mental disorders**

In general, psychological inflexibility has moderate to high positive correlations with miscellaneous behavioural and physical health outcomes such as symptoms of anxiety, depression and somatization, general mental health, specific phobia, perceived physical health and symptoms of trauma. Hereby positive correlations means that higher psychological inflexibility goes along with greater manifestations of problems or symptoms. In a sample of Asian American students above mentioned connections between psychological inflexibility and symptoms of depression, anxiety and somatization – sorted by descending height of correlation – were reassured (Masuda, Mandavia, & Tully, 2014). Additionally, Hayes et al. (2006) summarized outcomes of various longitudinal studies which led them to the assumption of a predictive role of psychological inflexibility regarding psychopathologies.

In the Netherlands a study was conducted with adult individuals diagnosed with depression and/or anxiety (Fledderus, Bohlmeijer, Fox, Schreurs, & Spinhoven, 2013). Thereby the effect of working on gaining higher psychological flexibility with Acceptance and Commitment Therapy (ACT) has been investigated. As a result participants displayed a positive effect on the severity of anxiety and depression by psychological flexibility, meaning reductions of anxiety and depression via heightened psychological flexibility over time.

Respective to trauma symptoms it was shown explicitly that women who experienced childhood sexual abuse scored higher in the measurement of psychological inflexibility than women without such experiences (Hayes et al., 2004). Regarding to symptoms of depression, anxiety and somatization in a female sample, it was possible to highlight a correlation between these symptoms and psychological inflexibility even after controlling for experienced potential traumatic events (Tull, Gratz, Salters, & Roemer, 2004).

Following the lead of previous research, the mediating role of psychological inflexibility between traumatic events and psychopathologies has been examined. One study focused on experienced child sexual abuse, and its severity and psychological distress as sequelae mediated by psychological inflexibility in a non-clinical sample (Rosenthal, Rasmussen-Hall, Palm, Batten, & Follette, 2008). The result suggests a significant mediation and depicts 21 percent of the total effect between sexual abuse and general psychological distress as accounted for by psychological inflexibility.

Looking at child abuse in general – including all five subtypes, instead of concentrating on sexual abuse – and the consequence of engaging in problem behaviour, British researchers hypothesized that psychological inflexibility may be an influential mediator (Kingston, Clarke, & Remington, 2010). Herein, problem behaviour included deliberate self-harm, (excessive) use of nicotine, alcohol and illicit drugs, restrictive and binge eating and others. Investigations have been conducted with structural equation modeling and suggested a fully mediation by psychological inflexibility.

### **1.5 Present study**

The current state of research leads to multiple pursuable strands and poses questions to elaborate. Institutional child abuse is still underrepresented in current research. Therefore this study was conducted with the aim to contribute to the replenishment of this gap. Due to observations during literature research, it is believed that this is one of the first studies thematising (institutional) child abuse in Austria with the aim to provide more knowledge to build upon later. Hypothesis are going to be investigated in one or two samples, depending on the research question: The main group, consisting of individuals who grew up in facilities of the Viennese youth welfare, meanwhile experiencing institutionalized child abuse. The control group consisting of individuals who grew up at home, meanwhile experiencing child abuse to a greater or lesser extent.

Summarizing the bulk of information, the available literature implies first that various correlations between institutional child abuse, emotion regulation, psychological inflexibility and symptoms of anxiety, depression and somatization exist. Therefore the initial action will approach following:

Research Question 1: Does a positive correlation exist between child abuse, emotion regulation, psychological inflexibility and symptoms of anxiety, depression and somatization?

Associated hypotheses:

$H_0(1.1)$ : There is no correlation or even a negative one between institutional child abuse and difficulties in goal-directed behaviour.

$H_1(1.1)$ : There is a positive correlation between institutional child abuse and difficulties in goal-directed behaviour.

In correspondence to  $H_0$  and  $H_1$  respectively, the pair of hypotheses  $H_0$  and  $H_1$  for

- 1.2 institutional child abuse and limited access to ER-strategies
- 1.3 institutional child abuse and psychological inflexibility
- 1.4 institutional child abuse and symptoms of anxiety
- 1.5 institutional child abuse and symptoms of depression
- 1.6 institutional child abuse and symptoms of somatization
- 1.7 difficulties in goal-directed behaviour and symptoms of anxiety
- 1.8 difficulties in goal-directed behaviour and symptoms of depression
- 1.9 difficulties in goal-directed behaviour and symptoms of somatization
- 1.10 difficulties in goal-directed behaviour and psychological inflexibility
- 1.11 limited access to ER-strategies and symptoms of anxiety
- 1.12 limited access to ER-strategies and symptoms of depression
- 1.13 limited access to ER-strategies and symptoms of somatization
- 1.14 limited access to ER-strategies and psychological inflexibility
- 1.15 psychological inflexibility and symptoms of anxiety
- 1.16 psychological inflexibility and symptoms of depression
- 1.17 psychological inflexibility and symptoms of somatization

are verbalized.

Second, most of the previous literature focuses on one specific type or different types of child abuse separately (Cutajar et al., 2010; Dias et al., 2015; Hovens et al., 2010; Spitzer et al., 2008; Subic-Wrana et al., 2011; Wolfe et al., 2006), instead of investigating the multiplicity of abuse. This study will not discriminate, instead it will use the multiplicity approach and take into account that an individual may

experience 1 (*single*), 2 (*double*) or all 3 (*triple*) types of abuse (emotional, physical and sexual abuse, excluding neglect) during childhood. This is justified by the fact that types of abuses usually co-occur, rather than appear separately (Kessler et al., 2010). Furthermore, in this respect the study of Negele et al. (2015) is considered to act as a model. Thereby the question emerges, if different characteristics of psychological distress and symptom severities, difficulties in emotion regulation and psychological inflexibility arise in individuals who experienced single, double or triple type of child abuse.

Research Question 2: Do groups with single, double and triple type of experienced institutionalized child abuse differ from each other with respect to the symptoms of anxiety, depression and somatization, general psychological distress, difficulties in emotion regulation and psychological inflexibility?

Associated hypotheses:

H<sub>0</sub>(2.1): Groups with single, double and triple type of experienced institutional child abuse do not differ from each other with respect to the symptoms of anxiety.

H<sub>1</sub>(2.1): Groups with single, double and triple type of experienced institutional child abuse do differ from each other with respect to the symptoms of anxiety.

In correspondence to H<sub>0</sub> and H<sub>1</sub> respectively, the pair of hypotheses H<sub>0</sub> and H<sub>1</sub> are verbalized for the following:

- 2.2 symptoms of depression
- 2.3 symptoms of somatization
- 2.4 psychological distress
- 2.5 difficulties in goal-directed behaviour
- 2.6 limited access to ER-strategies
- 2.7 general emotion regulation
- 2.8 psychological inflexibility

Third, few studies have been realized regarding a mediational function of emotion regulation between different types of childhood adversities and psychopathologies. As it seems, up to now, mainly females and students have been

investigated as sample groups in this process (e.g., Burns et al., 2010; Goldsmith et al., 2013; Soenke et al., 2010; Sundermann & DePrince, 2015). It was shown successfully that different types of abuse and cumulative adversities had a significant influence on developing PTSD (Burns et al., 2010), Borderline (Carvalho Fernando et al., 2014), GAD (Soenke et al., 2010), depression (Abravanel & Sinha, 2015) and symptoms of anxiety and depression (Goldsmith et al., 2013; Sundermann & DePrince, 2015) mediated by ER. Symptoms of somatization have been ignored in this constellation till now, not surprisingly, as it is one of the most impalpable symptom-clusters and probably as a consequence the least researched syndrome in combination with experienced child abuse. Herein the symptoms of somatization shall be pursued equally to symptoms of anxiety and depression, as previous research suggests increased risks to develop them on condition of exposure to (institutional) child abuse likewise (e.g., Brown et al., 2005; Dias et al., 2015; Lueger-Schuster et al., 2014; Spitzer et al., 2008). Furthermore, some studies reported that it could be found a sole (Abravanel & Sinha, 2015) or an especially strong connection (Brockmeyer et al., 2012; Salters-Pedneault et al., 2006; Soenke et al., 2010) with two emotion regulation processes: accessing ER strategies and engaging in goal-directed behaviour. Evidence predominantly exists for a partial mediation, merely one study showed a full mediation (Soenke et al., 2010).

Research Question 3: Is the positive connection between experienced child abuse and symptoms of anxiety in adulthood mediated by emotion regulation difficulties?

Associated hypotheses:

H<sub>0</sub>(3.1): There is no effect of mediation via emotion regulation processes affecting the connection between child abuse and symptoms of anxiety.

H<sub>1</sub>(3.1): There is an effect of mediation via emotion regulation processes affecting the connection between child abuse and symptoms of anxiety.

In correspondence to H<sub>0</sub> and H<sub>1</sub> (3.1) respectively, the pair of hypotheses H<sub>0</sub> and H<sub>1</sub> (3.2) for symptoms of depression and the pair of hypotheses H<sub>0</sub> and H<sub>1</sub> (3.3) for symptoms of somatization are verbalized.



Fourth, aside from emotion regulation, psychological inflexibility has been considered as mediator (Kingston et al., 2010; Rosenthal et al., 2008). It would seem that this has not been investigated in an institutionalized group sample previously. Again, symptoms of somatization will be pursued equally to symptoms of anxiety and depression.

Research Question 4: Is the positive connection between experienced child abuse and symptoms of anxiety in adulthood mediated by psychological inflexibility?

Associated hypotheses:

$H_0(4.1)$ : There is no effect of mediation via psychological inflexibility affecting the connection between child abuse and symptoms of anxiety.

$H_1(4.1)$ : There is an effect of mediation via psychological inflexibility affecting the connection between child abuse and symptoms of anxiety.

In correspondence to  $H_0$  and  $H_1$  (4.1) respectively, the pair of hypotheses  $H_0$  and  $H_1$  (4.2) for symptoms of depression and the pair of hypotheses  $H_0$  and  $H_1$  (4.3) for symptoms of somatization are verbalized.

All hypotheses are going to be carried out statistically for the institutionalized group, as well as the at-home-group, for the purpose of thoroughness. In the latter case, of course, the experienced abuse does not refer to institutionalized abuse, rather the abuse at home has been ascertained.

## **2 Method**

### **2.1 Procedure**

This study was embedded in a bigger research project called “Wiener Heimstudie” (English: Viennese children’s home survey). It is a research project implemented by the faculty of psychology, which started at the 1st of June 2014 and will draw to an end at 31st of May 2017. The projects’ aim is to investigate psychosocial long-term effects of institutional violence (abuse and neglect) in facilities of the Viennese youth welfare. Thereby, data of emotional, physical and sexual violence experienced in childhood within such institutions have been collected. In the sequel, data are compared with Viennese individuals grown up at home devoid of experiences of institutional violence in childhood. This and further scientifically and systematically investigations shall induce an overview of consequences, to facilitate concepts of support and to develop preventive strategies (Lueger-Schuster, 2014). The data of this cross-sectional study were collected by face-to-face interviews and administered questionnaires.

### **2.2 Sample**

In total 346 adult individuals participated in the study. 219 individuals represented the institutionalized group, and 127 individuals served as control group. Inclusion criteria for the institutionalized group were specified as being born before 1974 ideally and growing up in Vienna during childhood (including adolescence) in a facility of the Viennese youth welfare at least partially. To grant the comparableness of the two groups based on their regional similarities whilst childhood, the main requirement for participants of the control group was growing up in Vienna or the surrounding suburbs. Subjects of both groups participated voluntarily and had the right to withdraw from the study at any time without consequences. It has been tried to match the participants regarding sex, age and achieved graduation.

### **2.3 Recruiting and data collection**

The research team included professors of the faculty as well as prepared and supervised study assistants, PhD and master students. They recruited the sample and conducted the data collection. Recruiting of the institutionalized group took place in cooperation with the organisation “Weißer Ring”, the biggest victim

assistance organisation within Austria. The invitation to participate was sent by the organisation to those affected. Insight and anonymized analysis of documentation from child protective services and “Weißer Ring” have been taken into consideration. Furthermore interviews and questionnaires have been conducted by the research team with a preceded informed consent only.

Recruitment of the control group took place by hanging posters on bulletin boards in public space and varying clubs located in Vienna and suburbs as well as by distributions of flyers at events all over Vienna and placing an advertisement in a free local newspaper delivered by post to Viennese households. On fitting social media platforms announcements have been posted regarding the study and e-mails have been sent to a number of senior citizens’ homes. The announcement indicated that the study was about a scientific reprocessing of violence and abuse within the facilities of the Viennese youth welfare. No expense allowance were offered. Interested individuals were instructed to call a contact-hotline, the staff checked if the person met the criteria to participate and fixed a date for the survey. During the paper-and-pencil interview a series of questionnaires including the measures described below and other measures not used in the current study were administered. The averaged test duration amounted to 2 hours 35 minutes for the institutionalized group and to 2 hours for the control group.

## **2.4 Measures**

Childhood Trauma Questionnaire (CTQ; Bernstein et al., 1994; German: Wingenfeld et al., 2010): This retrospective self-report questionnaire constituted of 28 items serves as a screening instrument for histories of abuse and neglect experienced in childhood and adolescence. It differentiates between physical, sexual, and emotional abuse (PA, SA, and EA respectively) and physical and emotional neglect (PN and EN) and their severity. Each item commences with the wording “As I grew up...”, and is rated on a 5-point-scale from 1 (not at all) to 5 (very often). Items are summed to calculate the scores of particular maltreatment types as well as the total score. Higher values indicate a higher degree of maltreatment. Four of five collected Cronbach’s alphas from the original study (Bernstein et al., 1994) lay between .89 and .96, displaying excellent reliability. The subscale physical neglect achieves a Cronbach’s alpha of .62 only, thereby displaying a questionable reliability. In this study the subscales concerning abuse (PA, SA, and EA) have been

deployed solely. The Cronbach's alphas of the abuse scales ranged for the institutionalized sample from .76 to .97, presenting acceptable to excellent reliabilities and for the at-home sample from .87 to .89, presenting good reliabilities.

The original version Acceptance and Action Questionnaire (AAQ-II; Bond et al., 2011) as well as the English-based German version Fragebogen zu Akzeptanz und Handeln II (FAH-II; Gloster, Klotzsch, Chaker, Hummel, & Hoyer, 2011) are composed of seven items each. They are measuring the construct psychological inflexibility, which consists of the unwillingness to experience undesired feelings and thoughts (e.g., "I'm afraid of my feelings") and the impairment in daily functioning due to this internal events (e.g., "My painful experiences and memories make it difficult for me to live a life that I would value"). Each item is rated on a 7-point-scale from 1 (never true) to 7 (always true).

The original study with four different samples displayed Cronbach's alphas between .84 and .97, indicating good to excellent internal consistency. Items are summed to calculate the total score, ranging from 7 to 49. Higher values indicate a higher degree of psychological inflexibility. The Cronbach's alphas for the current samples are .92 (institutionalized) and .88 (at-home), presenting excellent and good reliabilities.

Difficulties in Emotion Regulation Scale (DERS; Gratz & Roemer, 2004): This self-report questionnaire comprises 36 items, divided into six subscales, which show the overall level of emotion dysregulation. The questionnaire is based upon the theoretical and empirical framework of adaptive emotion regulation defined by Thompson (Thompson, 1994; Thompson & Calkins, 1996). Thereby the developers conceptualized the scale into six areas (apparent from the subscales) showing possible difficulties in emotion regulation. In this study two of the six subscales are relevant only: Difficulties engaging in goal directed behaviour (ER-GOALS; e.g., "When I'm upset, I have difficulty concentrating") and Limited access to emotion regulation strategies (ER-STRAT; e.g., "When I'm upset, my emotions feel overwhelming") with five and eight items, respectively. Answers are given on a 5-point-scale ranging from 1 (almost never) to 5 (almost always). The subscales display very good reliabilities with Cronbach's alphas of .89 (ER-GOALS) and .88 (ER-STRAT). Higher values indicate greater problems with goal directed behaviour

and less possibilities to use appropriate strategies of emotion regulation, respectively. The Cronbach's alphas for this institutionalized and at-home samples are .88 and .83 (ER-GOALS) as well as .91 and .87 (ER-STRAT) respectively, presenting good to excellent reliabilities.

Brief Symptom Inventory 18 (BSI-18; Derogatis, 2001; German: Franke et al., 2010): This self-reported questionnaire has been developed to measure psychological symptoms of anxiety (BSI-ANX), depression (BSI-DEP) and somatization (BSI-SOM) within the last seven days with six items respectively. Each item commences with the wording "How much did you suffer from..." followed by psychological symptoms (e.g., "feeling fearful", "feeling lonely", "heart or chest pain"). Symptoms are classified with a 5-point-scale from 0 (not at all) to 4 (extremely) depending on their frequencies. Summarized the 18 items present an overall score of psychological distress (BSI-GEN). Higher values indicate an increased level of distress perceived by the individual. The Cronbach's alphas of the three subscale range from .76 to .87, presenting acceptable to good reliabilities. The subscales are displaying good reliabilities for the institutionalized sample with Cronbach's alphas of .82 (BSI-ANX), .86 (BSI-DEP) and .80 (BSI-SOM). Acceptable reliabilities with Cronbach's alphas of .73 (BSI-ANX), .78 (BSI-DEP) and .74 (BSI-SOM) are presented for the at-home group.

Furthermore sociodemographic data (e.g., gender, age, marital status, number of children, highest achieved graduation, current profession, and monthly net income) has been gathered.

## **2.5 Statistical analysis**

The descriptive and inference statistical analysis of data took place through IBM SPSS statistics 23.0 for Windows. Prior to analysis, data was examined for accuracy of data entry, missing values and fit of assumptions according to chosen statistical analysis. Missing values in the independent variable were not replaced, as the independent variable was classified as crucial for the statistical analysis, and therefore it was chosen not to alter them in any form. As a consequence, data sets with a missing value in the independent variable were excluded. Individual missing values in dependent variables were replaced using mean substitution, on condition

that at least 80 percent of the respective subscale were available as basis for computations (Tabachnick & Fidell, 2000). Otherwise, the data concerning this specific subscale of the individual in question has been excluded. Therefore the sampling size may vary depending on the specific question of research.

The level of significance ( $\alpha$ -error-level) was established at  $\alpha = .05$ . Thereby a result has been considered as statistically significant on condition that the determined p-value was lower than .05. Due to multiple calculations of comparison and correlation Bonferroni-Holm correction took place to avoid heightened familywise error rates (Holm, 1979):  $\alpha_{\text{corr}} = \alpha / k - 1$  ( $k$  = simultaneous tests). The  $\alpha$ -level was corrected for each test and its subscales, respectively. The adjusted  $\alpha$ -levels read as follows:

For total scale and three subscales:

$$\alpha / k = .01, \alpha / k - 1 = .02, \alpha / k - 2 = .03, \alpha / k - 3 = .05$$

For total scale and two subscales OR three subscales:

$$\alpha / k = .02, \alpha / k - 1 = .03, \alpha / k - 2 = .05$$

For two subscales:

$$\alpha / k = .03, \alpha / k - 1 = .05$$

Based on the central limit theorem it is possible to assume an approximated normal distribution of means at a sample size of  $N \geq 30$  (Bortz & Schuster, 2010; Field, 2009). Additionally to the central limit theorem, at prevailing homogeneity of variance parametric methods were used for the statistical analysis. Homogeneity of variances has been tested by Levene-Test, whereby an insignificant outcome facilitates the assumption of homogeneity of variances (Field, 2009).

Differences between more than two groups have been examined with one-way analysis of variance for independent samples (ANOVAs). Resting upon the classification of severity of maltreatment from Häuser et al. (2011) participants with severe forms of maltreatment (CTQ-subscale: Cut-off value of  $\geq 16$  for emotional abuse, cut-off value of  $\geq 13$  for physical and sexual abuse, respectively) have been included into the analysis for hypothesis 2.1 to 2.8 solely. The omega squared  $\omega^2$  has been determined as measure of effect size and has been chosen over partial Eta-squared  $\eta_p^2$ . Both are based on the sums of squares, but omega squared  $\omega^2$  considers that estimations for a population are made by a slightly varying formula, partial Eta-squared  $\eta_p^2$  does not consider this, therefore latter is marginally more

biased (Field, 2009). Values from  $\omega^2 \geq .01$ , from  $\omega^2 \geq .06$  and from  $\omega^2 \geq .14$  are classified as small, medium and large effects, respectively. Results of samples with inhomogeneous variances have been examined with the appropriate alternative called Welch's F-test. Additionally, pairwise group comparisons have been conducted for significant results displayed with ANOVA by the post-hoc Tukey's test to check differences between two investigated groups at a time. Tukey's test has been chosen because it is the most powerful when testing a large number of means, when it is possible to classify the sample sizes as equal and assumptions of population variances to be similar are made for the groups (Field, 2009). Following the recommendation of Field (2009), Games-Howell procedure was used in addition to compare the results of Tukey's test, in order to eliminate possible wrong outcomes because of an uncertainty of equivalent population variances.

Hypothesis of correlation have been reviewed with Pearson's product-moment correlation. Coefficients greater than  $r = .10$ ,  $r = .30$  and  $r = .50$  are interpreted as small, medium and large effects, respectively (Cohen, 1988). The coefficient of determination  $R^2$  has been quoted in percent and shows the predicted proportion of variance of the dependent variable.

Parallel multiple mediator analysis were conducted with a macro named PROCESS from Hayes (2013). It is a compact feature enabling to compute all necessities surrounding mediation and moderation analysis. The foundation for any mediation analysis is the correlation of all variables with each other. As clarification, in accordance with previous literature it is possible to propose X as the independent variable, Y as the dependent variable and M as intervening mediator variable. There are two distinct pathways from X to Y. The first is called direct effect (c), thereby not passing by M. The indirect effect (a and b) goes through M, which means, X is influencing M, and M in consequence influences Y. As illustrated by Figure 1, it is possible to investigate the altered direct effect (c') which indicates the remaining direct effect after subtracting the indirect effect out. The R squared  $R^2$  has been determined as measure of effect size with values from  $R^2 \geq .01$ , from  $R^2 \geq .09$  and from  $R^2 \geq .25$  representing small, medium and large effects, respectively (Cohen, 1988).

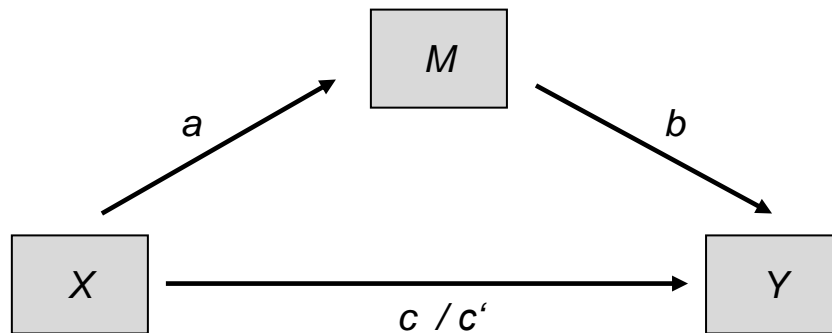


Figure 1. A conceptual diagram of a single mediation model according to Hayes (2013).  $X$  = Independent variable.  $M$  = Mediator.  $Y$  = Dependent variable.  $a$  and  $b$  = Indirect effects.  $c$  = Direct effect.  $c'$  = Altered direct effect.

One possible extension of this concept is called parallel multiple mediator model. Thereby, two or more possible mediators – there must not exist causality between them – are examined. This model is most suitable in case of an existing correlation of mediators. While quantifying a specific indirect effect of one mediator, the other mediator(s) are held constant. According to Hayes (2013) the advantage of one multiple parallel analysis compared to several single mediation analysis are a potential power boost and it enables comparisons of indirect effect sizes (e.g.,  $a_1$ ,  $a_2$ ,  $b_1$ ,  $b_2$ ) between investigated mediators (Figure 2).

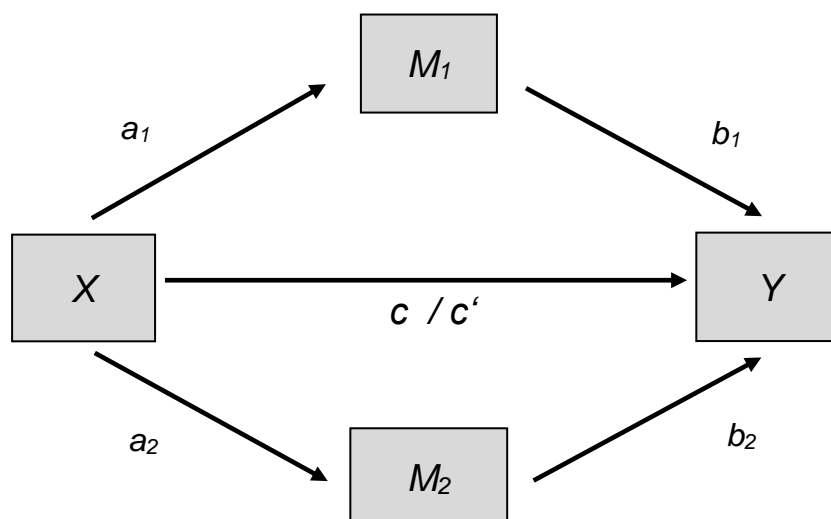


Figure 2. A conceptual diagram of a parallel mediation model according to Hayes (2013).  $X$  = Independent variable.  $M_1$  and  $M_2$  = Mediators.  $Y$  = Dependent variable.  $a_1$ ,  $a_2$ ,  $b_1$ ,  $b_2$  = Indirect effects.  $c$  = Direct effect.  $c'$  = Altered direct effect.



### 3 Results

#### 3.1 Descriptive data

In total 346 individuals participated, of these 219 individuals constituted the institutionalized group and 127 individuals the control group. No significant differences between the institutionalized and at-home groups were detected in marital status,  $\chi^2(3, n = 344) = 3.260, p = .353$ ; number of children,  $t(274.159) = 0.650, p = .516$ ; or age  $t(236.968) = -1.507, p = .133$  composition.

Albeit, there were statistically significant differences in gender,  $\chi^2(1, n = 346) = 21.668, p < .001$ ; achieved graduation,  $\chi^2(6, n = 346) = 133.946, p < .001$ ; and recent work status  $\chi^2(10, n = 345) = 74.075, p < .001$  detected. Looking closer at achieved graduation of the two groups, lower education levels in the institutionalized group became apparent (Figure 3). On average, the institutionalized group scored significantly higher than the at-home group on the range of values of emotional  $t(338) = 17.101, p < .001$ , physical  $t(333.967) = 21.461, p < .001$  and sexual abuse  $t(219.697) = 10.370, p < .001$ , anxiety  $t(335.142) = 9.432, p < .001$ , depression  $t(318.798) = 9.663, p < .001$ , somatization  $t(342.743) = 8.255, p < .001$ , psychological inflexibility  $t(338.925) = 10.119, p < .001$ , dysregulation of emotion referring to Goals  $t(320.916) = 6.944, p < .001$  and Strategies  $t(340.843) = 7.737, p < .001$ . Detailed comparative demographics of these samples can be seen in Table 2.

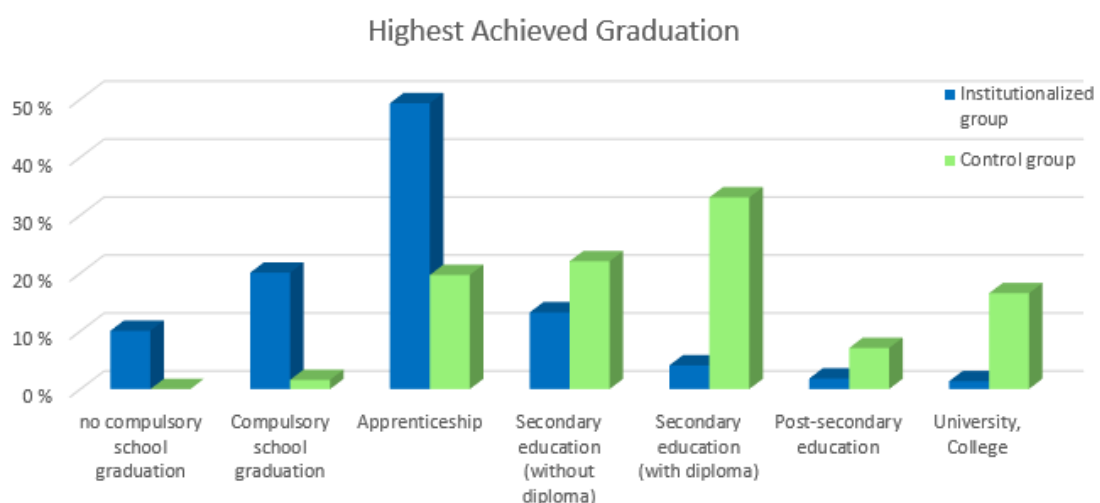


Figure 3. Data regarding the highest achieved graduation in percent differentiated by group

Table 2. Sample demographics, specified separately for the institutionalized as well as the at-home group.

	Institutionalized	At-home
Age		
Mean (SD)	57.90 (9.55)	59.63 (10.71)
Median	57	58
Range	29-87	40-86
Gender – Male, n (%)	131 (59.8)	43 (33.9)
Marital status, n (%)		
Single	35 (16.0)	13 (10.2)
In relationship	97 (44.3)	65 (51.2)
Divorced/widowed	87 (39.7)	47 (37.0)
Number of children (SD)	1.57 (1.61)	1.47 (1.22)
ER-GEN – Total difficulties in ER (SD)	32.06 (12.64)	23.02 (7.84)
ER-GOALS: goals-directed behaviour	14.71 (5.72)	10.92 (4.30)
ER-STRAT: access to ER-strategies	17.35 (7.99)	12.09 (4.59)
BSI-GEN Total psychological distress (SD)	19.25 (15.25)	6.38 (7.12)
BSI-ANX: Symptoms of Anxiety	6.81 (5.84)	2.37 (2.88)
BSI-DEP: Symptoms of Depression	6.11 (6.15)	1.51 (2.60)
BSI-SOM: Symptoms of Somatization	6.33 (5.51)	2.50 (3.11)
PSY-INF: Psychological Inflexibility (SD)	23.43 (11.92)	13.39 (6.44)
CTQ-GEN – Total child abuse (SD)	48.11 (14.07)	21.99 (8.47)
Emotional abuse	18.41 (4.84)	9.24 (4.67)
Physical abuse	17.30 (5.64)	6.76 (3.37)
Sexual abuse	12.20 (7.41)	6.31 (2.77)
Experienced severe child abuse in n (%)	213	127
Emotional abuse (Cut-off $\geq 16$ )	152 (71.4)	13 (10.2)
Physical abuse (Cut-off $\geq 13$ )	165 (78.2)	8 (6.4)
Sexual abuse (Cut-off $\geq 13$ )	98 (46.7)	7 (5.6)
Multiplicity of severe abuse in n (%)	200	123
0 - No type	20 (10.0)	105 (85.4)
1 - Single type	40 (20.0)	12 (9.8)
2 - Double type	66 (33.0)	5 (4.1)
3 - Triple type	74 (37.0)	1 (0.8)

Note: ER = Emotion Regulation, measured with the Difficulties in Emotion Regulation Scale. BSI = Brief Symptom Inventory. PSY-INF = Psychological Inflexibility, measured with the Acceptance and Action Questionnaire. CTQ = Childhood Trauma Questionnaire. Experienced severe child abuse was measured and calculated based on the CTQ and its' cut-off values. In regards to the questionnaires, mean age and number of children standard deviations (SD) are stated within the brackets, otherwise they represent percent values (%).

### 3.2 Correlation analysis

In an effort to explore the relationship between (institutionalized) child abuse, emotion regulation, psychological inflexibility and symptoms of anxiety, depression and somatization, zero-order correlations were computed. Therefore the total child abuse scale (CTQ-GEN), the two subscales of emotion regulation (ER-GOALS and ER-STRAT), psychological inflexibility (PSY-INF) and the three subscales referring to symptoms of anxiety (BSI-ANX), depression (BSI-DEP) and somatization (BSI-SOM) have been used. Bonferroni-Holm correction was used because of the high number of correlations (see chapter 2.5 for more details). The assumptions that data are at least interval and the sampling distribution is normally distributed were met. Therefore Pearson product-moment correlations were conducted for the institutionalized and the control group, separately. All scales and subscale of both groups were significantly correlated with each other as seen in Table 3.

Within the institutionalized group, experienced child abuse (CTQ-GEN) evinced the weakest relationship with goals-directed behaviour (ER-GOALS) and the strongest relationships with symptoms of anxiety (BSI-ANX) ( $r = .23$ ,  $R^2 = 5.06$ ,  $p = .001$  to  $r = .35$ ,  $R^2 = 12.04$ ,  $p < .001$ ). This indicated that a higher degree of abuse during childhood is accompanied by increased perceived symptoms of anxiety, depression and somatization, greater problems with goal directed behaviour as well as usage of appropriate strategies and greater psychological inflexibility in adulthood. Notably, two scales were associated with every other scale with medium to strong effects: psychological inflexibility ( $r = .34$ ,  $R^2 = 11.29$ ,  $p < .001$  to  $r = .73$ ,  $R^2 = 53.14$ ,  $p < .001$ ) and symptoms of anxiety ( $r = .35$ ,  $R^2 = 12.04$ ,  $p < .001$  to  $r = .74$ ,  $R^2 = 54.02$ ,  $p < .001$ ). All three subscales regarding psychological distress, namely symptoms of anxiety (BSI-ANX), depression (BSI-DEP) and somatization (BSI-SOM) correlated significantly with the scales goals-directed behaviour (ER-GOALS), access to ER-strategies (ER-STRAT) and psychological inflexibility (PSY-INF) displaying at least medium effects ( $r = .38$ ,  $R^2 = 14.44$ ,  $p < .001$  to  $r = .68$ ,  $R^2 = 45.83$ ,  $p < .001$ ). In consequence, higher perceived psychological distress went along with greater difficulties in emotion regulation and psychological inflexibility. The lowest correlation appeared between experienced abuse (CTQ-GEN) and goals-directed behaviour (ER-GOALS) ( $r = .23$ ,  $R^2 = 5.06$ ,  $p = .001$ ).

Table 3. Pearson Product-Moment Correlations among reports of Symptoms (BSI), subscales of Emotion Regulation (ER), Psychological Inflexibility (PSY-INF), and retrospectively reported child abuse (regarding emotional, physical and sexual abuse) on the Child Trauma Questionnaire (CTQ) as summarized experienced abuse

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
(1) CTQ-GEN Summarized experienced Abuse	r p N R <sup>2</sup>	.347** <.001 200 12.04	.256** <.001 200 6.55	.299** <.001 200 8.94	.225** .001 198 5.06	.246** <.001 198 6.05	.336** <.001 198 11.29
(2) BSI-ANX Symptoms Anxiety	.322** <.001 123 10.37	r p N R <sup>2</sup>	.735** <.001 218 54.02	.565** <.001 218 31.92	.586** <.001 216 34.34	.655** <.001 216 42.90	.701** <.001 216 49.14
(3) BSI-DEP Symptoms Depression	.230** .005 123 5.29	.638** <.001 127 40.70	r p N R <sup>2</sup>	.607** <.001 218 36.84	.528** <.001 216 27.88	.644** <.001 216 41.47	.677** <.001 216 45.83
(4) BSI-SOM Symptoms Somatization	.191* .017 123 3.65	.516** <.001 127 26.63	.449** <.001 127 20.16	r p N R <sup>2</sup>	.403** <.001 216 16.24	.380** <.001 216 14.44	.442** <.001 216 19.54
(5) ER-GOALS Goals-directed behaviour	.219** .008 123 4.80	.399** <.001 127 15.92	.441** <.001 127 19.45	.379** <.001 127 14.36	r p N R <sup>2</sup>	.690** <.001 216 47.61	.613** <.001 216 37.58
(6) ER-STRAT Access to ER-Strategies	.218** .008 123 4.75	.460** <.001 127 21.16	.607** <.001 127 36.84	.344** <.001 127 11.83	.554** <.001 127 30.69	r p N R <sup>2</sup>	.729** <.001 216 53.14
(7) PSY-INF Psychological Inflexibility	.362** <.001 123 13.10	.517** <.001 127 26.73	.663** <.001 127 43.96	.451** <.001 127 20.34	.549** <.001 127 30.14	.650** <.001 127 42.25	r p N R <sup>2</sup>

Note. Data above the diagonal (top left to bottom right) refers to the institutionalized group which grew up in an institutional setting. Data below the diagonal refers to the control group which grew up at home. Results of significance are stated under consideration of Bonferroni-Holm correction. R<sup>2</sup> is quoted in percent. \*  $p < .05$  = Correlation is significant at the .05 level (1-tailed). \*\*  $p < .01$  = Correlation is significant at the .01 level (1-tailed).

Within the control group correlations were slightly lower than in the institutionalized group in general. Experienced child abuse (CTQ-GEN) evinced the weakest relationship with symptoms of somatization (BSI-SOM) and the strongest relationships with psychological inflexibility (PSY-INF) ( $r = .19$ ,  $R^2 = 3.65$ ,  $p = .017$  to  $r = .36$ ,  $R^2 = 13.10$ ,  $p < .001$ ). This indicated just as in the institutionalized group that a higher degree of abuse during childhood was accompanied by increased perceived distress, difficulties in emotion regulation as well as psychological inflexibility in adulthood. Again, the two scales psychological inflexibility ( $r = .36$ ,  $R^2 = 13.10$ ,  $p < .001$  to  $r = .66$ ,  $R^2 = 43.96$ ,  $p < .001$ ) and symptoms of anxiety ( $r = .32$ ,

$R^2 = 10.37$ ,  $p < .001$  to  $r = .64$ ,  $R^2 = 40.70$ ,  $p < .001$ ) showed associations with each other scale with at least medium effects.

Notably, all three subscales regarding psychological distress (BSI-ANX, BSI-DEP, BSI-SOM) correlated with the scales goals-directed behaviour (ER-GOALS), access to ER-strategies (ER-STRAT) and psychological inflexibility (PSY-INF) displaying medium to large effects solely ( $r = .38$ ,  $R^2 = 14.36$ ,  $p < .001$  to  $r = .66$ ,  $R^2 = 43.96$ ,  $p < .001$ ). This implied that higher perceived psychological distress went along with greater difficulties in emotion regulation and psychological inflexibility. The lowest correlation turned out between experienced abuse (CTQ-GEN) and symptoms of somatization (BSI-SOM) ( $r = .19$ ,  $R^2 = 3.65$ ,  $p = .017$ ).

### 3.3 Analysis of variance and post-hoc analysis

For the comparison of single, double and triple type of experienced severe abuse an analysis of variance (ANOVA) with Bonferroni-Holm correction was conducted. For the statistical analysis it was not possible to generate representative groups within the control group due to undersized samples (see Table 1), therefore following section focused on the institutionalized group exclusively. In total the sample for this hypothesis consisted of 40 participants in the “single type” group, 66 participants in the “double type” group and 74 participants in the “triple type” group of experienced child abuse. Solely 20 individuals of the institutionalized group did not experience any type of abuse severely as shown by the Childhood Trauma Questionnaire and 19 individuals did not complete the questionnaire. These 39 participants have been excluded for this analysis. It was possible to show significant differences after the Bonferroni-Holm correction between groups regarding general psychological distress (BSI-GEN)  $F(2, 177) = 4.467$ ,  $p = .013$ ,  $\omega^2 = .04$  and its subcomponent symptoms of anxiety (BSI-ANX)  $F(2, 177) = 5.460$ ,  $p = .005$ ,  $\omega^2 = .05$ , as well as psychological inflexibility (PSY-INF)  $F(2, 175) = 3.399$ ,  $p = .036$ ,  $\omega^2 = .03$ .

The subscale symptoms of depression (BSI-DEP) [ $F(2, 177) = 1.169$ ,  $p = .313$ ,  $\omega^2 = .00$ ] and the subscale regarding access to ER-strategies (ER-STRAT) [ $F(2, 175) = 3.272$ ,  $p = .040$ ,  $\omega^2 = .02$ ] did not show significant differences between groups. Nevertheless, after the Bonferroni-Holm correction it was possible to notice a tendency of difference between groups in relation to the general emotion regulation (ER-GEN)  $F(2, 175) = 3.708$ ,  $p = .026$ ,  $\omega^2 = .03$ ; and its subscale

regarding goals-directed behaviour (ER-GOALS)  $F(2, 175) = 2.964$ ,  $p = .054$ ,  $\omega^2 = .02$ . The assumptions for ANOVA were not fulfilled regarding symptoms of somatization (BSI-SOM) because of missing homogeneity of variances. Therefore, the Welch's F-test was conducted, which showed significant differences between the groups, *Welch's F*  $(2, 111.707) = 5.144$ ,  $p = .007$ ,  $\omega^2 = .04$ . Table 4 gives an overview of this results.

Source	df	F	p	$\alpha_{corr}$	$\omega^2$
Symptoms of anxiety (BSI-ANX)	2, 177	5.460	.005*	.01	.05
Symptoms of somatization (BSI-SOM)	2, 111.707	5.144	.007*	.02	.04
General symptoms (BSI-GEN)	2, 177	4.467	.013*	.03	.04
Symptoms of depression (BSI-DEP)	2, 177	1.169	.313	.05	.00
General emotion regulation (ER-GEN)	2, 175	3.708	.026+	.02	.03
Access to ER-strategies (ER-STRAT)	2, 175	3.272	.040	.03	.02
Goals-directed behaviour (ER-GOALS)	2, 175	2.964	.054+	.05	.02
Psychological Inflexibility (PSY-INF)	2, 175	3.399	.036*	.05	.03

Note: \*. Result is significant after Bonferroni-Holm correction, +. Result shows a tendency after Bonferroni-Holm correction.

Thereafter, to identify which groups differed from each other in the scales which displayed significant differences (BSI-ANX, BSI-GEN, PSY-INF) and tendencies towards significance (ER-GEN, ER-GOALS) Tukey and Games-Howell procedures were computed as post-hoc analysis. Due to the violation of assumption of homogeneity of variances, only the Games-Howell test has been conducted for symptoms of somatization (BSI-SOM). Results revealed that a difference between the groups of “single type” and “triple type” as well as “double type” and “triple type” existed. Regarding general symptoms the group “triple type” differed significantly from the group “single type” ( $p = .038$ ) and the group “double type” ( $p = .032$ ). Participants who experienced triple type of abuse reported more general symptoms ( $M = 23.72$ ,  $SD = 17.30$ ) than participants with experienced single type ( $M = 16.23$ ,  $SD = 12.79$ ) and double type ( $M = 17.08$ ,  $SD = 14.66$ ) of abuse. This was the case for reported symptoms of anxiety ( $p = .015$  for “single type” and  $p = .019$  for “double type”) as well as symptoms of somatization ( $p = .007$  for “single type” and  $p = .045$  for “double type”), likewise (see Table 5). Regarding psychological inflexibility the group “triple type” differed significantly from “single type” ( $p = .043$ ), exclusively. Participants who experienced triple type of abuse reported significantly higher psychological inflexibility than participants who experienced a single type of abuse ( $M = 26.38$ ,  $SD = 11.77$  and  $M = 20.67$ ,  $SD = 11.24$ ). As seen above, results of two

scales have been classified as tendency towards significance. Regarding general emotion regulation (ER-GEN) as well as goals-directed behaviour (ER-GOALS) the group “triple type” differed tendentially from the group “single type” ( $p = .024$  and  $p = .050$ ) (see Table 5).

Summarized, the null hypotheses regarding symptoms of depression (BSI-DEP), general emotion regulation (ER-GEN), its subscales goals-directed behaviour (ER-GOALS) and access to ER-strategy (ER-STRAT) were maintained, since no significant differences between the three examined groups were found. All other null hypotheses have been rejected due to significant differences between groups.

Table 5. Post-hoc-comparisons by Tukey’s test between the three multiplicity groups (single, double or triple type of abuse) in regards to Symptoms, Emotion Regulation and Psychological Inflexibility

	<u>Group 1</u>		<u>Group 2</u>		<u>Group 3</u>	
Scales with significant differences	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
General Symptoms	16.23***	12.79	17.08***	14.66	23.72*/**	17.30
Symptoms Anxiety	5.55***	5.38	6.06***	5.19	8.73*/**	6.42
Symptoms Somatization <sup>a</sup>	4.90***	4.12	5.59***	5.34	7.97*/**	6.37
Psychological Inflexibility	20.67***	11.24	22.65	12.39	26.38*	11.77
	<u>Group 1</u>		<u>Group 2</u>		<u>Group 3</u>	
Scales with <b>tendencies</b> only	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
General emotion regulation	27.79***	11.71	33.54	13.83	34.55*	12.70
ER – Subscale Goals	13.03***	5.77	15.31	5.99	15.72*	5.52

*Note.* Group 1 = single type of abuse. Group 2 = double type of abuse. Group 3 = triple type of abuse. *M* = Mean. *SD* = Standard Deviation. ER = Emotion Regulation. \* = significant mean difference in contrast to group 1(\*), 2(\*\*) or 3(\*\*\*). <sup>a</sup> comparisons were realized with Games-Howell test only, due to missing homogeneity of variances. All significant results shown by Tukey’s test turned out significant in the Games-Howell test likewise.

### 3.4 Mediation analysis

Parallel multiple mediation analyses, using ordinary least squares path analyses, were computed to examine hypothesis 3.1 to 3.3 and 4.1 to 4.3 simultaneously with the macro PROCESS (Hayes, 2013) in SPSS. The employed variables in this analyses were continuous variables. Standardized scores were created for all following calculations.

#### 3.4.1 Symptoms of Anxiety

The first iteration with PROCESS was used to test the hypothesis that emotion regulation and psychological inflexibility served as mediators between child abuse and symptoms of anxiety (Hypotheses 3.1 and 4.1). Experienced child abuse

indirectly influenced symptoms of anxiety in adulthood through its effect on emotion regulation and psychological inflexibility. Regarding the institutionalized group, it can be seen from Figure 4 and Table 6 that participants who experienced more abuse during childhood showed more difficulties in emotion regulation ( $a_{1,IG} = .347, p < .001$ ) as well as psychological inflexibility ( $a_{2,IG} = .444, p < .001$ ), and participants with higher indications of difficulties in emotion regulation and psychological inflexibility developed stronger symptoms of anxiety ( $b_{1,IG} = .333, p < .001$ ;  $b_{2,IG} = .451, p < .001$ ). For the indirect effects ( $ab_{1,IG} = .116$ ;  $ab_{2,IG} = .200$ ) the conducted bias corrected bootstrap confidence intervals were based on 1.000 bootstrap samples and were entirely above zero (ER-GEN: 0.054 to 0.208; PSY-INF: 0.116 to 0.306) indicating a significant difference between the direct effect (c) and the altered direct effect (c'). Evidence existed that child abuse influenced symptoms of anxiety independent of its effect on emotion regulation and psychological inflexibility ( $c' = .154, p = .024$ ).

Similar results were depicted within the control group (Figure 4 and Table 6). Summarized, there was a significant indirect influence of experienced child abuse on symptoms of anxiety in adulthood through its effect on emotion regulation and psychological inflexibility ( $ab_{1,CG} = .078$ ;  $ab_{2,CG} = .104$ ). As in the institutionalized group, results indicated a present independent influence of child abuse on symptoms of anxiety after emotion regulation and psychological inflexibility have been controlled ( $c' = .190, p = .037$ ).

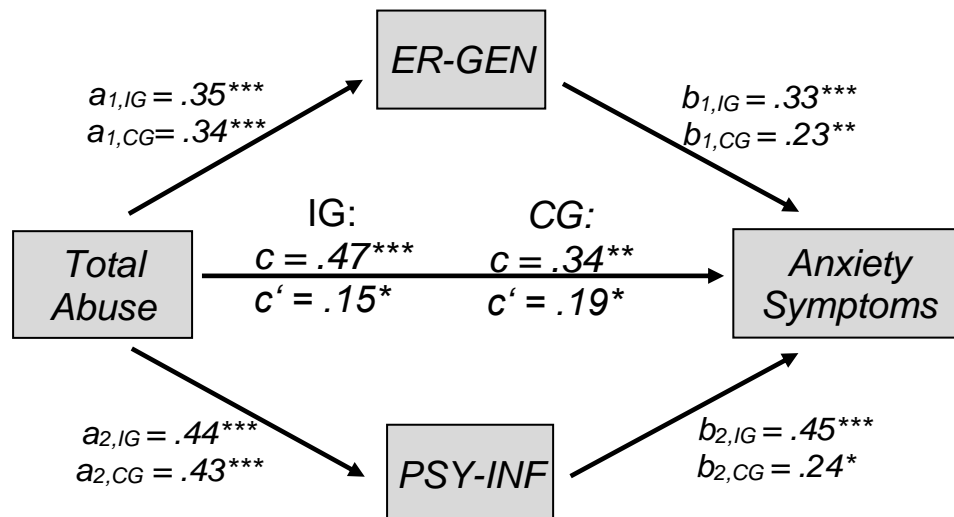


Figure 4. Path diagram representing the relationship between Total Abuse, Emotion Regulation (ER-GEN), Psychological Inflexibility (PSY-INF), and symptoms of anxiety (BSI-ANX) regarding the institutionalized (IG) and the control (CG) group. \* $p < .05$ , \*\* $p < .01$ , \*\*\*  $p < .001$ .  $c$  = Total direct effect,  $c'$  = Direct effect after accounting for mediated effect of mediators.



Table 6. Regression Coefficients, Standard Errors, and Model Summary Information for the presumed development of anxiety symptoms. For the parallel multiple mediator model depicted in Figure 4.

Antecedent	Consequent – Institutionalized Group									
	M <sub>1</sub> (ER-GEN)					M <sub>2</sub> (PSY-INF)				
	Coeff.	SE	p			Coeff.	SE	p		Y (BSI-ANX)
X (ABUSE)	a <sub>1</sub>	0.347	0.093	< .001	a <sub>2</sub>	0.444	0.089	< .001	c'	0.154 0.068 .024
M <sub>1</sub> (ER-GEN)		—	—	—		—	—	—	b <sub>1</sub>	0.333 0.070 < .001
M <sub>2</sub> (PSY-INF)		—	—	—		—	—	—	b <sub>2</sub>	0.451 0.074 < .001
Constant	im <sub>1</sub>	0.080	0.092	.384	im <sub>2</sub>	0.045	0.087	.605	iv	-0.028 0.063 .650
										R <sup>2</sup> = 0.577
										R <sup>2</sup> = 0.113
										F(1, 196) = 13.827, p < .001
										F(3, 194) = 88.245, p < .001
Antecedent	Consequent – Control Group									
	M <sub>1</sub> (ER-GEN)					M <sub>2</sub> (PSY-INF)				
	Coeff.	SE	p			Coeff.	SE	p		Y (BSI-ANX)
X (ABUSE)	a <sub>1</sub>	0.340	0.122	.006	a <sub>2</sub>	0.434	0.102	< .001	c'	0.190 0.900 .037
M <sub>1</sub> (ER-GEN)		—	—	—		—	—	—	b <sub>1</sub>	0.229 0.085 .008
M <sub>2</sub> (PSY-INF)		—	—	—		—	—	—	b <sub>2</sub>	0.239 0.102 .021
Constant	im <sub>1</sub>	-0.175	0.126	.167	im <sub>2</sub>	-0.154	0.105	.144	iv	-0.098 0.088 .265
										R <sup>2</sup> = 0.330
										R <sup>2</sup> = 0.061
										F(1, 121) = 7.801, p = .006
										F(3, 119) = 19.576, p < .001

Note. X = Independent variable. M<sub>1</sub> and M<sub>2</sub> = Mediator. Y = Dependent variable. a<sub>1,2</sub> and b<sub>1,2</sub> = Indirect effects. i = Intercept. R<sup>2</sup> = Coefficient of determination. SE = Standard errors. p < .05 = Coefficient is significant at the .05 level.

### 3.4.2 Symptoms of Depression

The next imputations with PROCESS were used to test whether or not emotion regulation and psychological inflexibility served as mediators between child abuse and symptoms of depression (Hypotheses 3.2 and 4.2). Experienced child abuse indirectly influenced symptoms of depression in adulthood through its effect on emotion regulation and psychological inflexibility. Regarding the institutionalized group, it can be seen from Figure 5 and Table 7 that participants who experienced more abuse during childhood showed more difficulties in emotion regulation ( $a_{1,IG} = .347, p < .001$ ) as well as psychological inflexibility ( $a_{2,IG} = .444, p < .001$ ). In addition results showed that participants with higher indications of difficulties in emotion regulation and psychological inflexibility developed stronger symptoms of depression ( $b_{1,IG} = .352, p < .001$ ;  $b_{2,IG} = .427, p < .001$ ). For the indirect effects ( $ab_{1,IG} = .122$ ;  $ab_{2,IG} = .189$ ) the conducted bias corrected bootstrap confidence intervals were based on 1.000 bootstrap samples and were entirely above zero (ER-GEN: 0.056 to 0.227; PSY-INF: 0.095 to 0.301) indicating a significant difference between the direct effect (c) and the altered direct effect (c'). Furthermore evidence existed that child abuse did not influence symptoms of depression independent of its effect on emotion regulation and psychological inflexibility ( $c' = .040, p = .599$ ).

Concerning the control group, it was possible to inspect similar results (Figure 5 & Table 7). Summarized, experienced child abuse indirectly influenced symptoms of depression in adulthood through its effect on emotion regulation and psychological inflexibility significantly ( $ab_{1,CG} = .070$ ;  $ab_{2,CG} = .164$ ). Besides, results indicated no existing independent influence of child abuse on symptoms of depression after emotion regulation and psychological inflexibility have been controlled ( $c' = -.008, p = .908$ ).

Table 7. Regression Coefficients, Standard Errors, and Model Summary Information for the presumed development of depression symptoms. For the parallel multiple mediator model depicted in Figure 5.

Antecedent	Consequent – Institutionalized Group									
	M <sub>1</sub> (ER-GEN)					M <sub>2</sub> (PSY-INF)				
	Coeff.	SE	p			Coeff.	SE	p		Y (BSI-DEP)
X (ABUSE)	a <sub>1</sub>	0.347	0.093	< .001	a <sub>2</sub>	0.444	0.089	< .001	c'	0.040 0.076 .599
M <sub>1</sub> (ER-GEN)		—	—	—		—	—	—	b <sub>1</sub>	0.352 0.078 < .001
M <sub>2</sub> (PSY-INF)		—	—	—		—	—	—	b <sub>2</sub>	0.427 0.082 < .001
Constant	im <sub>1</sub>	0.080	0.092	.384	im <sub>2</sub>	0.045	0.087	.605	iv	0.045 0.070 .522
										R <sup>2</sup> = 0.497
										R <sup>2</sup> = 0.113
										F(1, 196) = 13.827, p < .001
										F(3, 194) = 63.777, p < .001
Antecedent	Consequent – Control Group									
	M <sub>1</sub> (ER-GEN)					M <sub>2</sub> (PSY-INF)				
	Coeff.	SE	p			Coeff.	SE	p		Y (BSI-DEP)
X (ABUSE)	a <sub>1</sub>	0.340	0.122	.006	a <sub>2</sub>	0.434	0.102	< .001	c'	-0.008 0.070 .908
M <sub>1</sub> (ER-GEN)		—	—	—		—	—	—	b <sub>1</sub>	0.205 0.066 .002
M <sub>2</sub> (PSY-INF)		—	—	—		—	—	—	b <sub>2</sub>	0.378 0.079 < .001
Constant	im <sub>1</sub>	-0.175	0.126	.167	im <sub>2</sub>	-0.154	0.105	.144	iv	-0.214 0.068 .002
										R <sup>2</sup> = 0.479
										R <sup>2</sup> = 0.131
										F(1, 121) = 7.801, p = .006
										F(3, 119) = 36.511, p < .001

Note. X = Independent variable. M<sub>1</sub> and M<sub>2</sub> = Mediator. Y = Dependent variable. a<sub>1,2</sub> and b<sub>1,2</sub> = Indirect effects. i = Intercept. R<sup>2</sup> = Coefficient of determination. SE = Standard errors. p < .05 = Coefficient is significant at the .05 level.

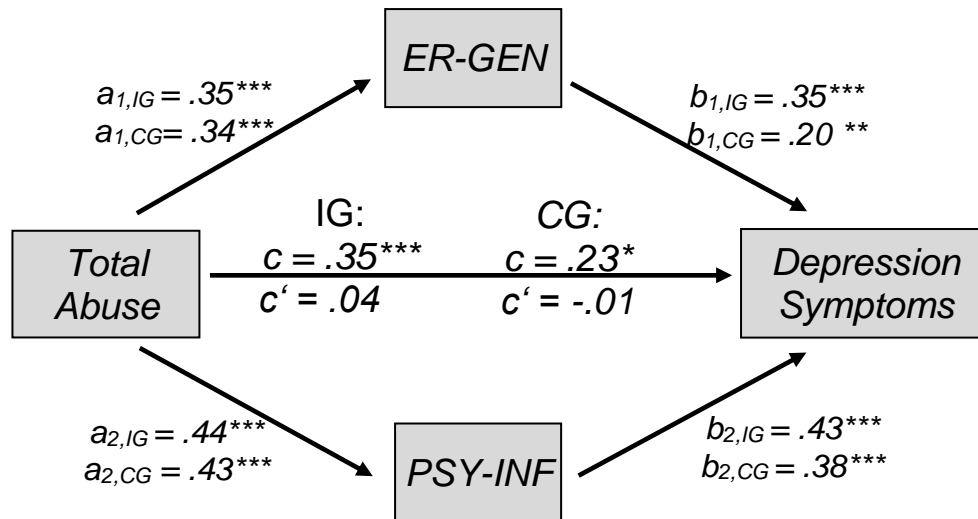


Figure 5. Path diagram representing the relationship between Total Abuse, Emotion Regulation (ER-GEN), Psychological Inflexibility (PSY-INF), and symptoms of depression (BSI-DEP) regarding the institutionalized (IG) and the control (CG) group. \* $p < .05$ , \*\* $p < .01$ , \*\*\*  $p < .001$ .  $c$  = Total direct effect,  $c'$  = Direct effect after accounting for mediated effect of mediators.

### 3.4.3 Symptoms of Somatization

The last hypothesis, approaching the expectation that emotion regulation and psychological inflexibility served as mediators between child abuse and symptoms of somatization (Hypotheses 3.3 and 4.3) were once more computed using PROCESS. Regarding the institutionalized group, Figure 6 and Table 8 denote that participants who experienced more abuse during childhood showed more difficulties in emotion regulation ( $a_{1,IG} = .347$ ,  $p < .001$ ) as well as psychological inflexibility ( $a_{2,IG} = .444$ ,  $p < .001$ ). Additionally it can be seen that participants with higher indications of difficulties in emotion regulation and psychological inflexibility developed stronger symptoms of somatization ( $b_{1,IG} = .207$ ,  $p < .030$ ;  $b_{2,IG} = .244$ ,  $p < .015$ ). For the indirect effects ( $ab_{1,IG} = .072$ ;  $ab_{2,IG} = .108$ ) the conducted bias corrected bootstrap confidence intervals were based on 1.000 bootstrap samples and were entirely above zero (ER-GEN: 0.008 to 0.174; PSY-INF: 0.023 to 0.230) indicating a significant difference between the direct effect ( $c$ ) and the altered direct effect ( $c'$ ). The independent influence of the effect of child abuse on symptoms of somatization after controlling for emotion regulation and psychological inflexibility persisted ( $c' = .224$ ,  $p = .015$ ).

A mediation analysis within the control group was not possible ultimately, as the defined condition “variables have to correlate with each other” was not fulfilled

in one case. More precisely, difficulties in emotion regulation and symptoms of somatization were not correlated significantly ( $b_{1CG} = .196, p = .061$ ).

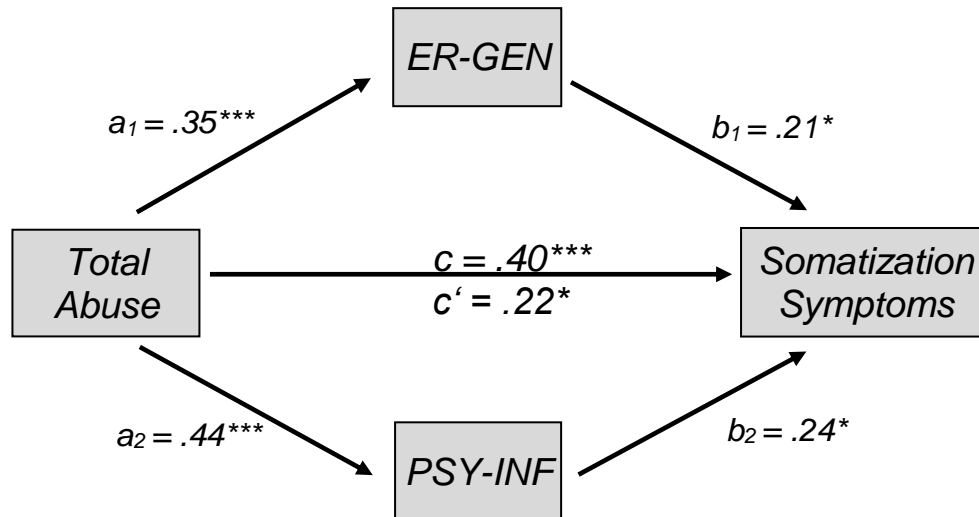


Figure 6: Path diagram representing the relationship between Total Abuse, Emotion Regulation (ER-GEN), Psychological Inflexibility (PSY-INF), and symptoms of somatization (BSI-SOM) regarding the institutionalized group. \* $p < .05$ , \*\* $p < .01$ , \*\*\*  $p < .001$ .  $c$  = Total direct effect,  $c'$  = Direct effect after accounting for mediated effect of mediators.

Table 8. Regression Coefficients, Standard Errors, and Model Summary Information for the presumed development of somatization symptoms within the institutionalized group. For the parallel multiple mediator model depicted in Figure 6.

Antecedent	Consequent											
	M <sub>1</sub> (ER-GEN)			M <sub>2</sub> (PSY-INF)			Y (BSI-SOM)					
	Coeff.	SE	p	Coeff.	SE	p	Coeff.	SE	p			
X (ABUSE)	a <sub>1</sub>	0.347	0.093	<.001	a <sub>2</sub>	0.444	0.089	<.001	c'	0.224	0.091	.015
M <sub>1</sub> (ER-GEN)	—	—	—	—	—	—	—	—	b <sub>1</sub>	0.207	0.094	.030
M <sub>2</sub> (PSY-INF)	—	—	—	—	—	—	—	—	b <sub>2</sub>	0.244	0.099	.015
Constant	im <sub>1</sub>	0.080	0.092	.384	im <sub>2</sub>	0.045	0.087	.605	iv	0.003	0.084	.974
			R <sup>2</sup> = 0.066				R <sup>2</sup> = 0.113					R <sup>2</sup> = 0.238
			F(1, 196) = 13.827, p < .001				F(1, 196) = 24.994, p < .001					F(3, 194) = 20.170, p < .001

Note. X = Independent variable. M<sub>1</sub> and M<sub>2</sub> = Mediator. Y = Dependent variable. a<sub>1,2</sub> and b<sub>1,2</sub> = Indirect effects. i = Intercept. R<sup>2</sup> = Coefficient of determination. SE = Standard errors. p < .05 = Coefficient is significant at the .05 level.

## 4 Discussion

The overall aim of this study was to investigate a combination of various problems and symptoms in adulthood and its relationship to experienced child abuse. Thereby, the study group consisted of people who grew up in an institutionalized out-of-home care, which embodies a scarcely examined group. The control group consisted of individuals who grew up with their families. Main foci were set in the areas of psychological inflexibility and difficulties in emotion regulation as well as symptoms of anxiety, depression and somatization. Experienced child abuse was not distinguished by the types emotional, physical and sexual abuse. Based on the suggestion of Walker et al. (1999) a distinction regarding their multiplicity (1 to 3 kinds of abuse) took place instead.

The first group of hypotheses (1.1 to 1.17) was used as basis to connect results from various previous literature, regarding positive correlations between experienced child abuse, psychological distress (shown by perceived symptoms of anxiety, depression and somatization), difficulties in emotion regulation (within the processes of goal-directed behaviour and access to ER-strategies) and psychological inflexibility with each other. Thereby findings of this study substantiated previous results, showing the positive relations between these constructs in the institutionalized as well as in the at-home group.

The second group of hypotheses (2.1 to 2.8) focused on co-occurrences of different types of abuse, so called multiplicity, in the institutionalized group solely. Thereby it was possible to show significant differences but only with small effects. Regarding general psychological distress, symptoms of anxiety and symptoms of somatization distinctions were perceptible. Individuals who experienced a triple type of child abuse differed from individuals who experienced a single as well as a double type of abuse. The triple and single group showed a significant difference regarding psychological inflexibility and a tendency of difference regarding difficulties in general emotion regulation.

The third and fourth group of hypotheses (3.1 to 3.3 and 4.1 to 4.3) proposed a mediation between child abuse and symptoms of psychological distress via difficulties in emotion regulation and psychological inflexibility. The groups of hypotheses have been merged in the course of work. Up to now single mediators have been tested separately in studies to provide a first overview and incentives for further research. However, the downside of this procedure is a too simplistic view

on complex dynamics (Hayes, 2013). Using parallel multiple mediation analyses the pursued aim was to acknowledge this simplification and deepen the present knowledge. By this means, it was possible to ascertain that between child abuse and symptoms of anxiety (both groups) as well as somatization (institutionalized group only), there was a partially mediating effect via difficulties in emotion regulation and psychological inflexibility. The results were conform to previous mentioned outcomes with GAD in particular (Soenke et al., 2010) and symptoms of anxiety in general (Goldsmith et al., 2013).

Additionally this seems to be the first study successfully examining and displaying a mediation analysis with symptoms of somatization as possible outcome variable in the context of child abuse. This might be due to the conflicting results and opinions over the last decades regarding the potential relations between symptoms of somatization and child abuse. It seems like the main problem with the concept of somatization is its broadness which makes it hard to define for study purposes, thereby generating contradictory results within the scientific community. This study was based on previous research, revealing correlations of somatization symptoms with abuse, emotion dysregulation and psychological inflexibility (e.g., Hayes et al., 2004; Lilly & Valdez, 2012; Spitzer et al., 2008). Partly studies showed slightly similar (e.g., Masuda et al., 2014), partly contradictory results (cf. Romans, Belaise, Martin, Morris, & Raffi, 2002). This observation might underline the necessity for further research in the matter of child abuse and somatization especially. Through the application of the Brief Symptom Inventory 18, a well-established measure, which was used previously regarding research within the area of child abuse it was possible to contribute to this area. Turning back to the results of this study, between child abuse and symptoms of depression (in both groups) a full mediation via the mediators emotion regulation and psychological inflexibility was shown.

Furthermore it was possible to replicate an interesting feature with respect to the institutionalized group of this study. As Lueger-Schuster et al. (2014) discovered in their sample already, a gender imbalance occurred. This means that more men than women participated in the institutionalized group. In contrast, the at-home-group contained more women than men.



## 4.1 Limitations

Several issues should be mentioned regarding this study. First, this study focused on emotional, physical and sexual abuse solely, emotional and physical neglect has not been considered. This led to a self-chosen limitation. Paying attention to the questionable reliability (Cronbach's Alpha .62) of the physical neglect subscale the exclusion might be justified. Nevertheless, further research should contemplate to observe the whole known spectrum of maltreatment, including the two types of neglect, to convey a more comprehensive statement.

Second, this study was realized within very specific groups: growing up within the region of Vienna and in the case of the main group, growing up at least partially in the Viennese youth welfare system. The findings can serve as foundation for further research, but generalizability is confined. In addition, findings regarding the prevalence rates of severe abuse within the control (at-home) group of this research ( $\leq 11\%$ ) do not conform to previous prevalence rates within a German population of  $\leq 3\%$  (Häuser et al., 2011). Nevertheless they show similar contributions regarding severe multiplicity rates of  $< 10$  percent for experienced single type, around 4 percent for experienced double type and less than 1 percent for experienced triple type of abuse. As a consequence it was not possible to test within the at-home group for differences by experienced multiplicity, as the sample size turned out insufficient for an expressive statistical analyses ( $n < 20$ ). It must be pointed out that for an unknown reason a crucial difference of the prevalence rates in this study and the above mentioned study exists. This is likely to be due to the relatively small sample size of the current study. Regardless, there is the need for inquiry to conform this assumption, as another possibility might be a non-comparability of the German and Austrian population.

Finally, the most serious point of critic might be the formation of groups based on the criteria of multiplicity. Due to the chosen operationalization it was assumed that the single type as well as the double type group each represent a homogeneous group. This means for example, an individual with experienced emotional and sexual abuse was treated equally as an individual with experienced emotional and physical abuse or physical and sexual abuse. This might impair the results of this study, as it is unclear whether there is a variation of child abuse sequelae due to the diverse types of child abuse. Up to now ambiguities are addressed shown by diverse results (e.g., Dias et al., 2015; Spitzer et al., 2008; Subic-Wrana et al., 2011). As a

consequence there is no clear evidence for a certain defined kind of abuse and linked sequelae. There is the need to investigate the two angles of approach in future research: type of abuse and multiplicity. As for now, it is unclear whether different types of abuse lead to different sequelae. Should it be possible to differentiate clearly between these in the future, the multiplicity approach has to be reconsidered. Based on future findings the thought of considering weighing, which enables the representation of a more precise and differentiable image, could be a possibility.

## **4.2 Practical implications**

The question if there is a risk to develop a variety of adverse outcomes later in life and its persistence due to the experience of child abuse was stated and answered positively this time and several times in the past (e.g., Lindert et al., 2014). Therefore, it is essential to develop and provide successful intervention and therapy earliest possible which can support the parties concerned. On the one hand an intervention could lead to a positive outcome such as the reduction of symptoms and distress. On the other hand a prevention before negative outcomes can even develop would be even more desirable. Difficulties in emotion regulation were depicted as key target in therapeutic work (Goldsmith et al., 2013), especially for symptoms of depression and anxiety (Brockmeyer et al., 2012). Actually, there are treatment approaches which focus on the improvement of emotion regulation like the dialectical behaviour therapy (DBT) or acceptance and commitment therapy (ACT).

The findings showed that emotion regulation and psychological inflexibility mediated the impact of child abuse on psychological distress like symptoms of anxiety, depression and somatization in adulthood. This stresses the necessity to develop interventions fitted for abused individuals. Pioneers in this field might be Cloitre, Cohen and Koenen (2014) who developed a scientifically sounded therapy program for adult survivors of sexual child abuse. Thereby they focused not only on possible traumatic memories and other symptoms of post-traumatic stress disorders, but also on one resource to overcome such traumas: emotion regulation. The first phase of this intervention is focused upon the extension and consolidation of skills in regards to emotion regulation. Based upon this skills training, the second phase concentrates on the reprocessing of traumatic events. It would be desirable for the

future to examine the possibility to use this therapy program – or parts of it – for adults who experienced other types of child abuse or multiple types of child abuse. Resting upon the results of this study, a developed comprehensive therapy program for survivors of child abuse would include training components to reduce difficulties in emotion regulation and to increase psychological flexibility. By means of the enhancement of this components suffering of psychological distress and developing specific mental disorders may be reduced.

As seen, child abuse at home and in institutions has the capability to influence an individual up to his or her adult life. Child welfare services were conceptualized to support and nurture children, where nobody else is capable of doing this demanding task. It is essentially to provide best possible environment including close-meshed cooperation, support and supervision of caregivers, psychoeducation and the opening of structures to further exploit totalitarian structures to prevent future endangerments in the setting, making interventions preferably expendable.

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