ASSOCIATIONS BETWEEN ADVERSE CHILDHOOD EXPERIENCES AND THEIR IMPLICATIONS FOR PATIENTS WITH DIABETES IN ADULTHOOD

Inauguraldissertation
zur Erlangung des Grades eines Doktors der Humanbiologie
des Fachbereichs Medizin
der Justus-Liebig-Universität Gießen

vorgelegt von Zara, Sandra
aus Bad Soden am Taunus

Gießen 2025

Aus dem Fachbereich Medizin der Justus-Liebig-Universität Gießen

Klinik für Psychosomatik und Psychotherapie

Gutachter:
Univ.-Prof. Dr. med. Johannes Kruse

Univ.-Prof. Dr. med. Jan de Laffolie

Tag der Disputation: 19.10.2026

TABLE OF CONTENT

1. Overview 1

2. Diabetes mellitus 3

2.1. Classification and etiology 3

2.2. Prevalence, morbidity, and health care costs 4

2.3. Diabetes treatment 6

2.4. Psychological burden 8

2.4.1. Depressive and anxiety symptoms and disorders 10

2.4.2. Diabetes-related distress 13

2.4.3. Suicide and suicidal ideation 15

2.4.4. Loneliness 17

2.5. Adverse Childhood Experiences 19

2.6. Personality functioning and the epistemic stance 22

3. Overview of the manuscripts 27

3.1. Overview of publication I – citation, summary of contents, and author contributions 33

3.1.1. English summary of publication I 34

3.1.2. Deutsche Zusammenfassung für Publikation I 34

3.1.3. Author contributions 34

3.2. Overview of publication II – citation, summary of contents, and author contributions 36

3.2.1. English summary of publication II 37

3.2.2. Deutsche Zusammenfassung für Publikation II 37

3.2.3. Author contributions 37

3.3. Overview of publication III – citation, summary of contents, and author contributions 39

3.3.1. English summary of publication III 40

3.3.2. Deutsche Zusammenfassung für Publikation III 40
3.3.3. Author contributions 40
3.4. Overview of publication IV – citation, summary of contents, and author contributions 42
3.4.1. English summary of publication IV 43
3.4.2. Deutsche Zusammenfassung für Publikation IV 43
3.4.3. Author contributions 43
4. General discussion 84
4.1. Part I – ACEs as a risk factor 86
4.1.1. ACEs and diabetes 86
4.1.2. ACEs and psychological burden, diabetes-related distress, and diabetes self-management 87
4.1.3. ACEs and broader phenomena: loneliness 88
4.1.4. Part I – Conclusion 90
4.2. Part II – Underlying mechanisms 91
4.2.1. Diabetes 91
4.2.2. Psychological burden, diabetes-related distress, and diabetes self-management 93
4.2.3. Broader phenomena: loneliness 96
4.2.4. Part II – Conclusion 98
4.3. Part III – Practical implications and outlook 99
4.3.1. Addressing ACEs as a risk factor 99
4.3.2. Considering psychological burden and personality functioning 100
4.3.3. Practical implications 102
4.4. Strengths and Limitations 103
5. German summary and English abstract 106
5.1. Deutsche Zusammenfassung 106
5.2. English Abstract 107

6. List of abbreviations, figures, and tables 108

7. References 109

8. Complete list of publications 137

9. List of conference presentations..... 141

10. Ehrenwörtliche Erklärung 142

11. Danksagung.....143

12. Curriculum Vitae 144

INTRODUCTION

1. OVERVIEW

Diabetes mellitus poses a rapidly progressive health care challenge all across the globe. The increasing prevalence of this non-communicable disease, characterized by heightened blood sugar levels and disrupted insulin regulation, is associated with both individual burden as well as system-associated issues. While on an individual level patients with diabetes suffer from heightened morbidity, premature mortality, and a decreased quality of life, they also produce higher health-care costs compared to the general population.

Delaying the numerous diabetes-associated subsequent diseases such as micro- and macrovascular complications as much as possible is usually at the center of diabetes treatment, primarily requiring daily blood sugar control and self-management by the patient. However, extensive evidence has emphasized both the high prevalence and the importance of psychological burden as well as diabetes-related distress (the emotional burden of living with the disease) in patients with diabetes. Not only pose psychological burden and related issues additional challenges in and of themselves, but they further interact negatively with somatic aspects of diabetes as well as the daily self-management demands. Among the most prevalent psychological burden are e.g., symptoms of depressive and anxiety disorders, and diabetes-related distress. Moreover, suicidal ideation has been identified as very common in patients with diabetes, even independently from depressive symptoms. Recently, phenomena closely intertwined with psychological burden have gained research interest, for example loneliness. Suicidal ideation and loneliness have shown to equally contribute to negative diabetes-associated outcomes, complicating diabetes treatment, increasing health care costs and decreasing the quality of life for those affected. To better understand why patients with diabetes show these high frequencies of numerous psychological burden, psychosocial aspects have increasingly been recognized over the past decades. One potentially shared link might be the highly prevalent phenomenon of Adverse Childhood Experiences (ACEs). ACEs (sexual, physical, and emotional abuse as well as neglect, and household dysfunctions) have been linked to numerous psychopathologies, e.g., depression and anxiety disorders or personality disorders, and recently also to chronic physical illnesses, e.g., diabetes and cardiovascular diseases. However, the study results for patients with diabetes tend to be heterogeneous regarding the effects of various ACE types and the methodologically diverse assessments complicate the result's comparability. Additionally, underlying

mechanisms linking ACEs, diabetes, and psychological burden have primarily been confined to biological mechanisms. To date, research on psychological mechanisms is scarce. Studies addressing psychological mechanisms in patients with diabetes independently from ACEs, mainly contribute to an understanding of disease outcomes or diabetes self-management – considering that impaired diabetes self-management and reduced medication adherence pose huge risk factors for the course of the disease. Hence, often rather isolated aspects of psychological mechanisms like emotion regulation or certain behavioral issues are focused on. However, a line of research in the field of mental health takes a broader approach to understanding psychological burden. Instead of considering distinct aspects of impairments associated with psychological burden, overall underlying impairments of basic psychological capacities are emphasized. Personality functioning is an established transdiagnostic construct in psychology and psychosomatic medicine, allowing for a dimensional assessment of basic psychological capacities such as affect regulation and communication, identity, and building secure relationships. It has proven to be of great clinical importance, and hence, has partly been included in the new 11th edition of International Classification of Diseases (ICD-11) and first guidelines on the treatment of impaired personality functioning are currently being developed (Guideline report: Diagnostics, therapy and rehabilitation of patients with severe impairment of personality functioning). Considering the dimensional and transdiagnostic construct of personality functioning as well as the closely related constructs mentalization and epistemic trust in order to assess a persons' overall psychological functioning is not completely novel. Personality functioning, mentalization (the ability to understand one self as well as others considering internal mental states), and epistemic trust (the ability to trust in socially transmitted information and take opportunities for social learning) develop in early childhood with secure attachment experiences, which is why ACEs as a disruption of their healthy development play a central role in understanding impairments in personality functioning and related psychological burden. However, research in patients with diabetes is very limited.

Given the need to better understand the high frequency of psychological burden, diabetes-related distress, as well as the phenomena suicidal ideation and loneliness in patients with diabetes in order to develop targeted interventions and improve diabetes treatment, this dissertation aims to investigate the role of ACEs and personality functioning in individuals with diabetes.

2. DIABETES MELLITUS

2.1. Classification and etiology

Diabetes mellitus is a highly prevalent non-communicable disease characterized by steadily heightened blood glucose levels leading to severe somatic secondary diseases and high psychological burden in the long run (Bundesärztekammer (BÄK) et al., 2023; Haak et al., 2020; World Health Organization, 2023). Diabetes mellitus can be classified into four categories; type 1 diabetes, type 2 diabetes, other specific types of diabetes and gestational diabetes (American Diabetes Association, 2017), with the majority of individuals affected falling into the pathogenic categories of either type 1 or type 2 diabetes. Even though there are similarities, the pathophysiology of the diabetes types differs from one another. Type 1 diabetes mainly occurs in children, adolescents, and young adults, but can also manifest itself in old age. It is primarily characterized by an autoimmune destruction of the insulin-producing β-cells in the pancreas, potentially resulting in a severe underproduction or even a complete lack of insulin (Scherm et al., 2024; Zajec et al., 2022). Type 2 diabetes is usually diagnosed in people from the age of 60 (Jacobs et al., 2019), but also increasingly in younger adults (Reinehr, 2013). It typically occurs due to an insulin secretion defect and increasing insulin resistance. As long as insulin secretion can be increased to overcome insulin resistance, the metabolism remains balanced. As soon as the β-cells are no longer able to do this, type 2 diabetes occurs (Schatz, 2013). Risk factors for diabetes have been extensively discussed, including genetic, environmental, and dietary aspects (Norris et al., 2020). In the development and progression of type 2 diabetes, lifestyle aspects, such as an unhealthy diet, insufficient exercise, and being overweight have been identified as risk factors, with meta-analytic evidence suggesting a 75% lower risk of diabetes for persons with a healthy lifestyle compared to people considered to have the least healthy lifestyle (hazard ratio (HR) 0.25 (95% confidence interval (CI) [0.18, 0.35])) (Zhang et al., 2020).

2.2. Prevalence, morbidity, and health care costs

Results from the 2021 Global Burden of Disease study show that the global age-standardized prevalence of diabetes mellitus is at 6.1% (Ong et al., 2023). In Germany, the prevalence of diabetes lies even higher at approximately 10%, with around 9 million people diagnosed with type 2 diabetes in 2023, and additionally 32,000 children and adolescents as well as 340,000 adults being diagnosed with type 1 diabetes (Seidel-Jacobs et al., 2025). Following the global upward trend in diabetes prevalences of the last decades, projections accounting for e.g., decreasing mortality rates indicate that this trend will continue in the future and that the prevalence of diabetes mellitus in Germany will increase to between 10.7 million (+54%) and 12.3 million (+77%) by 2040 (Tönnies et al., 2019). In addition to the high number of diagnosed diabetes cases, undiagnosed cases with their initially subtle symptoms should not be underestimated. Studies based on data from England report that 30% (approximately 1 million) of patients with type 2 diabetes were undiagnosed between 2013 and 2019 (Office for National Statistics (ONS), 2024). For the German population, studies based on blood sugar levels determined that 2% of patients were undiagnosed, amounting to 1.6 million individuals (Heidemann et al., 2016). However, estimates based on glucose testing are considered to be even higher, but corresponding studies are so far lacking (Scherm et al., 2024).

A large body of evidence could establish the increased morbidity, mortality, and impaired quality of life of patients with diabetes (Miller et al., 2016; Röckl et al., 2017; Smith-Palmer et al., 2016). Diabetes-associated complications are highly common, with varying prevalences regarding age and gender. They comprise neuropathies, diabetic foot syndrome, nephropathies, and retinopathies as well as cardiovascular complications, promoting e.g., foot amputations, kidney failure, and vision loss, resulting in additional medical treatments for the patient (Bundesärztekammer (BÄK) et al., 2023). Studies analyzing health insurance data indicate that obesity, high blood pressure, coronary heart disease, heart failure, stroke, and depression are among the most prevalent accompanying diseases in patients with diabetes compared to individuals without diabetes across all age groups (Schmidt et al., 2021). For example, high blood pressure is prevalent in 80.7% of women and 79% of men with diabetes compared to 56% and 55.1% of women and men without diabetes. Depressive symptoms were observed in 26.9% of women and 19.8% of men with diabetes compared to 15.9% of women and 11.4% of men without diabetes (Schmidt et al., 2021). This multitude of burden and morbidity is ultimately jointly

responsible for the fact that 2.7% [2.58, 2.87] of global deaths and 2.8% [2.51, 3.10] of global Disability-Adjusted Life Years (DALYS) – which consider the years of life lost (YLL) and the years of life lost to disability (YLD) – are associated with diabetes mellitus (Vos et al., 2020). Over the last few decades, the global burden of diabetes has constantly increased. While various reasons for this phenomenon have been discussed, comprising e.g., demographic changes (ageing of the population), lifestyle changes (less physical activity, more obesity, more smoking), as well as environmental factors or the evolution of the disease, an extensive review indicates that metabolic risks and lifestyle factors contributed the most to premature death and DALYS of diabetes (Lin et al., 2020). This development will not only pose increasing challenges for patients with diabetes in terms of elevated morbidity and mortality as well as reduced quality of life, but also for the health care system that will face soaring annual direct costs e.g., for the use of health care or medication, as well as indirect costs due to e.g., increased sick leave and early retirement (König et al., 2021). Analyses from the U.S. show that the total estimated cost of diabetes are $412.9 billion – $306.6 billion in direct costs and $106.3 billion in indirect costs (Parker et al., 2024). The largest proportion of indirect costs was attributable to reduced work productivity while working due to health conditions (presenteeism) ($35.8 billion), lost productivity due to 338,526 premature deaths ($32.4 billion), and reduced employment due to disability ($28.3 billion) (Parker et al., 2024). Studies projecting the economic burden of diabetes mellitus in Germany indicate that total health care expanses will rise substantially until 2040 compared to 2010, by 1–281% for type 1 diabetes (€1 to 4 billion) and by 8–364% for type 2 diabetes (€30 to 131 billion) (Voeltz et al., 2024).

2.3. Diabetes treatment

One of the primary treatment goals for both type 1 and type 2 diabetes is to balance the metabolism and keep the blood sugar levels as close to normal as possible in order to avoid or postpone secondary diseases, while keeping the treatment burden and disruptions of day to day life as minimal as possible. The glycated hemoglobin $A1_c$ ($HbA1_c$) value is a key parameter for monitoring blood sugar control in patients with diabetes, reflecting the average blood sugar level over the past two to three months, making it a valuable tool for assessing the effectiveness of diabetes management (American Diabetes Association, 2021). An $HbA1_c$ level < 7.5% is considered as target value (Landgraf et al., 2020). While in order to reach this goal in patients with type 1 diabetes intensified insulin or insulin pump therapy is applied, type 2 diabetes therapy usually initially includes oral antidiabetics, such as metformin, that can later be combined with injectable hypoglycemic substances, similar to insulin therapy in type 1 diabetes. Additionally, especially in patients with type 2 diabetes, basic lifestyle changes in the form of a more healthy diet and increased activity play a central role. Further, the proper training of the patient as well as family members is important to increase their competence in dealing with the diabetes and its treatment requirements as well as maintaining their quality of life (Haak et al., 2020). Accordingly, in Germany extensive health policy efforts have been made to support this patient group, including disease management programs and specialized diabetes clinics. Data from a German statutory health insurance shows that around 4.7 million people with type 2 and 225,000 people with type 1 diabetes are treated in a "Disease-Management-Programm" (DMP) – a structured treatment program for chronically ill patients (Gemeinsamer Bundesausschuss, 2022; DMP Für Patienten Mit Typ-1-Diabetes Aktualisiert, 2020). The aim of these programs is to improve the cross-sectoral treatment process and the quality of medical care for chronically ill patients. It comprises e.g., individual therapy planning together with the treating physician, training programs, medical check-ups, smoking counseling, structured drug registration as well as the prevention and treatment of concomitant and secondary diseases (Bundesamt für Soziale Sicherung, 2024). Despite these extensive programs, the individual is primarily responsible for the successful management of the disease that requires a high degree of daily and continuous self-management, medication adherence as well as adequate lifestyle changes. This comes with various challenges, and insufficient adherence to medication or other aspects of diabetes therapy as well as inadequate glycemic control are common issues. Regarding e.g., the setting of an individual $HbA1_c$ target, a

collaborative approach incorporating both the patient and the treating physician, considering e.g., age, the presence of other health conditions, and the patient's lifestyle is suggested (Landgraf et al., 2023). The goal is to set realistic and achievable values that allow for optimal blood sugar control while minimizing the risk of complications. Despite this shared decision making, many patients do not achieve their agreed-upon $HbA1_c$ targets. Studies in the German population indicate that only 43% of patients with type 2 diabetes reach their $HbA1_c$ targets (Santos et al., 2023). Numbers from a representative U.S.-population study show that even up to 75% of patients with type 1 or type 2 diabetes fail to achieve the $HbA1_c$ target value of < 7% as recommended by the American Diabetes Association, or individualized blood sugar targets (Hankosky et al., 2023). This raises the question what hinders patients with diabetes from adequately managing their blood sugar and which factors might negatively influence this challenge, despite receiving proper training and education. Studies investigating how $HbA1_c$ values develop over a certain time period indicate that e.g., race or living in low-income areas are associated with a lack of improvement in $HbA1_c$ over a 3-year period in patients with type 2 diabetes (Louie et al., 2024), indicating that socioeconomic characteristics affect proper diabetes treatment. A systematic review in patients with type 2 diabetes further revealed high non-persistence rates (not continuing medication throughout the prescribed period) ranging from 20% to 37%, and that non-adherence rates (not complying in terms of drug schedules and dosages) to insulin treatment within a 12-month period are as high as 44% (Gimeno et al., 2024). With these high frequencies of inadequate diabetes self-management, the difficulties in meeting the target $HbA1_c$ values can be better understood. Factors associated with insufficient blood sugar control are suggested to comprise primarily lifestyle factors e.g., poor adherence to diet and medications, lack of exercise, and smoking (Bitew et al., 2023). However, research recently focused on the role of psychological burden regarding blood sugar control. A longitudinal multicenter study showed that patients with type 1 diabetes and worsening depressive symptoms over a 5-year period also exhibited poorer blood sugar levels compared to individuals without depressive symptoms or depressive symptoms that improved after two years (Kampling et al., 2017). A prospective study demonstrated that depressive symptoms were linked to inadequate blood sugar levels, non-adherence, and adverse health behaviors over one year (Dirmaier et al., 2010). Hence, while psychological aspects have to be considered for successful diabetes treatment, associated factors and underlying mechanisms are not yet fully understood.

2.4. Psychological burden

In individuals with diabetes, psychological burden is a highly prevalent phenomenon, including but not limited to adjustment disorders, anxiety and depressive disorders, personality and eating disorders as well as posttraumatic stress disorders (Benton et al., 2023; Guerrero Fernández De Alba et al., 2020; Kruse et al., 2024; Lukaschek et al., 2013). Especially *depressive* and *anxiety* disorders and symptoms have been of interest in diabetes research. Moreover, *diabetes-related distress*, which describes the emotional burden of living with the disease has generated a large number of studies.

Given that diabetes by itself is already a high burden for the affected individual and that the co-occurrence of mental disorders poses an even greater challenge for the onset as well as the management of the disease, the pressing need to expand our knowledge in this regard becomes evident. Psychological burden and diabetes interact and influence each other negatively. In a recent study based on health care claims data, a bidirectional association between mental disorders and chronic diabetes complications in patients with type 1 and type 2 diabetes was demonstrated. It was shown that having a mental health disorder increased the hazard of developing a chronic diabetes complication (HR 1.4 – 2.5, $p < .05$), and a chronic diabetes complication increased the hazard of developing a mental disorder (HR 1.9 – 2.9, $p < .05$) (Watanabe et al., 2024). Further, an observational study in patients with type 2 diabetes showed that the mortality risk was higher if a mental health comorbidity was present (Odds ratio (OR) = 1.24, 95% CI [1.16, 1.31]), and that mental health comorbidity also increased the likelihood of hospitalization for general reasons (OR = 1.16, 95% CI [1.10, 1.23]) as well as regarding diabetes-specific reasons (OR = 1.51, 95% CI [1.18, 1.93]) (Guerrero Fernández De Alba et al., 2020). Severe mental disorders in patients with diabetes, for example schizophrenia, major depression, and bipolar disorder, were associated with a nearly twofold higher mortality (Fleetwood et al., 2023). Similar associations could be observed in patients with type 1 diabetes, indicating that psychiatric comorbidities contribute to an elevated risk of diabetic ketoacidosis in patients with type 1 diabetes – a potentially life-threatening complication which is caused by an insulin deficiency (Ehrmann et al., 2020). Moreover, extensive research on the quality of life in patients with diabetes further emphasizes the individual burden of living with the disease. In a German 5-year follow up observational study, as many as 25% of patients with diabetes reported low well-being and average mental and physical health-related quality of life (Sommer, Borgmann, et al., 2024). For all diabetes

patients, well-being and physical health-related quality of life decreased from baseline to follow-up, while regarding mental quality of life, differences according to diabetes subtypes were found (e.g., increase in severe autoimmune diabetes, severe insulin-deficient diabetes, and mild age-related diabetes, as well as decrease in severe insulin-resistant diabetes and mild obesity-related diabetes) (Sommer, Borgmann, et al., 2024). Against this background it becomes evident why research on risk factors for psychological burden and mental disorders in individuals with diabetes is extensive, and has suggested e.g., obesity, neuropathy, complications, and sociodemographic aspects (Busili et al., 2024; Kim et al., 2024). However, broader, underlying mechanisms in these associations have not yet been sufficiently researched.

In addition to the detrimental impact of mental health disorders and their associations with diabetes morbidity and mortality, research has repeatedly emphasized that psychological symptoms are also associated with lower medication and treatment adherence in patients with diabetes (Hoogendoorn et al., 2024; Świątoniowska-Lonc et al., 2021). A recent review indicates that among others, anxiety, diabetes-related distress as well as stress and concerns about medication negatively affect diabetes self-care and medication adherence in patients with type 2 diabetes (Świątoniowska-Lonc et al., 2021). This is also underpinned by longitudinal evidence, showing that higher baseline depressive symptoms and diabetes-related distress are independently associated with lower medication adherence in patients with type 2 diabetes over 36 months ($p < .001$) (Hoogendoorn et al., 2024). Hence, psychological burden in patients with diabetes is not only a serious and potentially treatment worthy issue by itself, but it further negatively affects the course of the disease regarding diabetes self-management and adherence, ultimately preventing individuals from successfully managing subsequent diseases and maintaining their quality of life.

Regarding mental health research in general, more recent studies also highlight the relevance of burden-associated suicidal ideation independently from depressive symptoms as well as broader social phenomena, such as loneliness. These phenomena, which are closely linked to mental disorders and psychological burden, have generally received a great amount of attention. Regarding suicidal ideation and the prevention of suicide, the World Health Organization (WHO) has tried to mitigate their risk with e.g., prevention guidelines such as the Comprehensive Mental Health Action Plan (*Live Life*, 2021; World Health Organization, 2025). Similarly, especially loneliness has been

focused in the light of the recent COVID-19 pandemic. In response to the rising rates of loneliness during this period, loneliness and social isolation have been recognized as significant public health concerns in recent years (World Health Organization, 2024). Further, new endeavors were undertaken, such as the German initiative against loneliness by the Federal Ministry for Family Affairs, Senior Citizens, Women and Youth (Bundesministerium für Familie, Senioren, Frauen und Jugend., 2023). Taken together, while the public has picked up on the importance of suicidal ideation as well as loneliness and their association with impaired mental health, the knowledge of these aspects in individuals with diabetes is so far limited.

2.4.1. Depressive and anxiety symptoms and disorders

Due to their high prevalence, a particularly large number of studies has been specifically conducted on *depressive* and *anxiety symptoms* and *disorders* in patients with diabetes.

Depressive symptomatology can be characterized by numerous different depressive symptoms. While the core symptoms are depressed mood, reduced energy, and loss of interest, numerous other symptoms can occur, for example, feeling anxious, reduced self-worth and energy, less ability to concentrate, sleep disorders, fluctuating appetite, and even suicidal ideation (World Health Organization, 1992). The prevalence of depressive disorders is nearly doubled in patients with diabetes compared to the general population (F. Wang et al., 2019), with a bidirectional relationship of diabetes and depression. While diabetes has been shown to increase the risk of depressive symptomatology, depressive symptomatology increases the risk of developing diabetes. More specifically, a meta-analysis of longitudinal studies indicates that patients with depressive symptoms have a 38% increased risk of developing type 2 diabetes (Rotella et al., 2012). Vice versa, patients with diabetes have a 34% increased risk of developing a depressive disorder (Chireh et al., 2019). Efforts to understand the bidirectional links between diabetes and depression have so far consolidated a number of different mechanisms, including both physiological mechanisms such as inflammation and oxidative stress, as well as psychosocial aspects such as income inequality and education level, affecting the access to adequate treatment and the capability in treating the chronic disease (Y. Liu et al., 2024). Meta-analytic evidence demonstrates that approximately one quarter of patients with diabetes experiences depressive disorders of different severity (Khaledi et al., 2019). The detrimental impact of depressive symptoms in patients with diabetes is emphasized by their close association with an increased risk of diabetes-associated complications.

However, taking a closer look at the results provides heterogeneous findings: a meta-analysis of longitudinal studies shows that patients with diabetes and depressive disorders have a 38% and 33% increased risk for macrovascular and microvascular complications respectively, with rather consistent findings on macrovascular complications but mixed findings for microvascular complications (Nouwen et al., 2019). The same meta-analysis further indicated that the risk of developing depression in patients with diabetes and macro- or microvascular complications is far lower than developing complications in patients with diabetes and depressive symptoms (9 and 24%) (Nouwen et al., 2019). Depressive symptoms are further linked to worse diabetes self-management as well as higher $HbA1_c$ values (Schmitt et al., 2021). Moreover, research consistently shows that the presence of depressive symptoms in patients with diabetes increases healthcare costs: analyses of data from a German statutory health insurance indicate that major depression symptoms are associated with significantly higher costs (Sommer, Linnenkamp, et al., 2024). This association is largely driven by a greater use of general medical services, as depression complicates diabetes management by worsening glycemic control, promoting complications, and reducing adherence to self-care behaviors. Studies show that systematically targeting depressive symptoms in patients with diabetes improves depression outcomes, however, regarding clinical outcomes (e.g., $HbA1_c$), results are heterogeneous (Van Der Feltz-Cornelis et al., 2021). This poses the question if and how patients with diabetes and depressive symptoms are reached by psychotherapeutic treatment and which access barriers they might face. Accordingly, it is especially concerning that in patients with diabetes and depressive symptoms health care costs for psychotherapy and antidepressants per person in Germany seem to be rather low (€111 and €76 respectively) (Brüne et al., 2021). Patients with diabetes are exposed to major depressive episodes with a mean duration of close to two years throughout their life span (De Groot et al., 2016). These numbers are much higher compared to population-based samples, where the mean duration of major depressive episodes is suggested to be three months (Spijker et al., 2002). While spontaneous remission is possible in depressive disorders (Whiteford et al., 2013), the prolonged average duration of depressive episodes in patients with diabetes compared to the general population indicates that it might not be adequately detected, and hence, treatment might not be readily available, or depressive symptoms are more treatment resistant. In fact, a large comparative analysis of Ireland, England, and the U.S.A. showed that the prevalence of undiagnosed depression was

higher in individuals with diabetes (e.g., England: 19.4% (95% CI [16.6, 22.1]) vs. 11.7% (95% CI [11.0, 12.5]) (McGrath et al., 2021).

Together with depressive disorders, *anxiety disorders* are amongst the highest psychological comorbidities in patients with diabetes, with similar prevalences. Research indicates a prevalence of anxiety symptoms and disorders in patients with diabetes as high as 25.5% (Kershaw et al., 2023). Patients with diabetes show around twice the risk of developing an anxiety disorder and elevated anxiety symptoms compared to patients without diabetes (Smith et al., 2013). Anxiety disorders are characterized by excessive worry, fear, and hyperarousal that can be debilitating and counterproductive (American Psychiatric Association, 2000). Common symptoms of anxiety include feeling nervous, restless, or tense, having a sense of impending danger, panic, or doom, increased heart rate, rapid breathing (hyperventilation), sweating, trembling, feeling weak or tired, trouble concentrating or thinking about anything other than the present worry (American Psychiatric Association, 2000). Further, fears of acute complications such as hypoglycemia or subsequent diseases and complications are specific topics patients with diabetes seem to develop anxiety about (Smith et al., 2018). Analogous to depressive disorders, studies also demonstrated an interaction between type 2 diabetes and anxiety disorders (Atasoy et al., 2021; Mersha et al., 2022). A prospective cohort study showed that patients with symptoms of a generalized anxiety disorder had a 2-fold increased incidence of type 2 diabetes, and correspondingly, symptoms of a generalized anxiety disorder independently doubled the risk of type 2 diabetes (Atasoy et al., 2021). Further, evidence demonstrates that anxiety boosts the progression from prediabetes to type 2 diabetes (Jiang et al., 2020). An investigation in patients with type 2 diabetes demonstrated that, among other factors, an $HbA1_c$ value > 8.5% ($p < .001$) predicts a higher rate of anxiety (Albai et al., 2024). Vice versa, symptoms of anxiety and anxiety disorders have also shown to negatively affect blood sugar control, medication adherence as well as health-related quality of life (Ali et al., 2024; Gonzalez Heredia et al., 2021; X. Liu et al., 2020). Moreover, a study showed that those with an anxiety diagnosis were more likely to visit emergency departments (incidence rate ratio 1.27, 95% CI [1.21, 1.34]), and to have a high-cost status (OR = 1.29, 95% CI [1.23, 1.36]), which was defined as the incurring total health care costs being in the top 20% among all system members (Iturralde et al., 2019). Hence, ample evidence emphasizes the prominent role of anxiety symptoms and disorders for both the onset as well as the course of the disease.

2.4.2. Diabetes-related distress

Next to mental disorders, especially depressive and anxiety disorders and symptoms, patients with diabetes often cope with specific emotional distress related to their diabetes. This illness-related emotional burden of living with diabetes is called *diabetes-related distress*, and has been recognized as a common phenomenon with as many as 42% of patients with type 1 diabetes and 24% to 36% of patients with type 2 diabetes reporting elevated diabetes-related distress (Kampling & Kruse, 2020). It has been increasingly studied over the past decades and comprises feelings such as being overwhelmed or frustrated with the lifelong self-management, or worrying about secondary diseases (Polonsky et al., 1995). While the symptoms of diabetes-related distress can resemble depressive symptoms, the source of the distress is tied to the diabetes disease itself. Hence, it has been outlined as a delineated construct which is not interchangeable with depressive disorders (Snoek et al., 2015), even though the two constructs are closely associated: almost 40% of those who exhibit depressive symptoms also suffer from increased diabetes-related distress (Du et al., 2023). Attempts to capture diabetes-related distress created time efficient self-report measures such as the Problem Areas in Diabetes Scale (PAID) (Polonsky et al., 1995; Welch et al., 1997) or the Diabetes Distress Scale (DDS) (Fisher et al., 2012; Polonsky et al., 2005). The PAID suggests four main domains of diabetes related distress: disease related, treatment related, food related, and social support related (Polonsky et al., 2005), highlighting that the problem areas can extend to more than just regulating blood glucose levels, and hence, pointing to more complex interactions of daily disease management and well-being of patients with diabetes.

Findings from a recent German nationwide study suggest that diabetes-related distress does not differ between men and women (Du et al., 2023), which is different from general psychological burden such as depressive and anxiety symptoms, that usually occur more frequently in women (Nübel et al., 2022). Moreover, diabetes-related distress is associated with younger age (OR = 0.96, 95% CI [0.94, 0.98]), immigration background (OR = 2.26, 95% CI [1.16, 4.42]), insulin use (OR = 2.57, 95% CI [1.45, 4.56]), the presence of diabetes-specific complications (OR = 1.80, 95% CI [1.10, 2.94]), and depressive symptoms (OR = 5.34, 95% CI [3.24, 8.81]) (Du et al., 2023).

There is also evidence for a strong connection between high diabetes-related distress and impaired diabetes self-management as well as poor blood sugar control (Asuzu et al., 2017; Schmitt et al., 2021). Schmitt and colleagues demonstrated that in patients with

type 1 diabetes both diabetes-related distress as well as depressive symptoms negatively affected diabetes self-management, hence, resulting in higher blood glucose levels, whereas in patients with type 2 diabetes only depressive symptoms were associated with lower self-management resulting in higher $HbA1_c$ values (Schmitt et al., 2021). In a population-based survey in patients with type 2 diabetes from Denmark, higher diabetes-related distress was significantly associated with elevated $HbA1_c$ (OR = 1.8, 95% CI [1.5, 2.0]), while there was no association with depressive symptoms (Dalsgaard et al., 2024). This emphasizes the need to not only carefully distinguish the constructs from one another and subsequently, develop targeted interventions, but also to highlight the different associations in the diabetes types. Currently, detailed information on psychological interventions targeting diabetes-related distress for patients with type 1 diabetes is scarce, and according to a Cochrane review, high-quality evidence on psychological interventions to alleviate diabetes-related distress in patients with type 2 diabetes is insufficient as well (Chew et al., 2017). Twelve Randomized Controlled Trials (RCTs) failed to show a significant reduction in diabetes-related distress through psychological interventions compared to usual care (standardized mean difference: -0.07, 95% CI [-0.16, -0.03]; $p = .17$) (Chew et al., 2017). Regarding blood glucose levels, in 11 RCTs small reductions by psychological interventions after 6 to 12 months follow up could be observed (mean difference: -0.14%, 95% CI [-0.27, 0.00]; $p = .05$) (Chew et al., 2017). The majority of the trials took place in the U.S.A. In Germany, first results were obtained by a RCT employing a short-term integrated psychosomatic treatment program for patients with diabetes and high blood glucose levels as well as diabetes-related distress. In the intervention group, a reduction in $HbA1_c$ levels over a 6-month period could be achieved (-0.53 percentage points, 95% CI [-0.89, -0.16]; $p = .005$) and diabetes-related distress showed to be lower both at 6- and at 12-month follow up (−5.25, 95% CI [−9.74, −0.77]; −5.35, 95% CI [−10.26, −0.45]) (Kampling, et al., 2022). However, these types of treatments are still not readily available in standard diabetes care, and have yet to be developed and tailored to the specific needs of the high-risk group of patients with diabetes, diabetes-related distress, psychological burden, and inadequate $HbA1_c$ levels.

2.4.3. Suicide and suicidal ideation

According to the WHO, suicide accounted for 1.1% of all deaths worldwide in 2021, making it a critical public health challenge (World Health Organization, 2025). In Germany, the Federal Statistical Office reported 10,300 deaths by suicide in 2023; a drastic figure compared to the only 2,800 recorded traffic fatalities in that year (Statistisches Bundesamt, 2023, 2024). To address this, the WHO created an implementation guide outlining evidence-based interventions to prevent suicide, as well as included suicide prevention in their Comprehensive Mental Health Action Plan (*Live Life*, 2021; World Health Organization, 2025). Suicide mostly occurs during severe psychological crises preceded by suicidal ideation. Suicidal ideation comprises contemplations and wishes regarding death and suicide, with different severity levels, and can range from passive wishes to be dead to active plans to end one's life (Harmer et al., 2025). While the prevalence of suicidal ideation in the German general population is around 10% (Forkmann et al., 2012), specifically burdened populations have shown to exhibit higher rates of suicidal ideation. For example, suicidal ideation is significantly associated with (chronic) diseases, such as, among others, heart attack, diabetes, or chronic lung disease (odds of suicidal ideation in patients with diabetes: 1.52, 95% CI [1.35, 1.71]), and the risk of suicidal ideation increases with the number of chronic conditions (Guo et al., 2024; Lutz et al., 2016). Further, populations with mental disorders show also significantly higher prevalences of suicidal ideation of approximately 37%, especially those with depressive disorders (Teismann et al., 2024). Given that individuals with diabetes are often subject to multimorbidity and are at twice the risk for e.g., depressive and anxiety disorders compared to the general population, one can likely assume patients with diabetes being a high-risk group for suicidal ideation and suicide. While research should be available in abundance, this topic has only recently gained more attention in diabetes research. Moreover, it seems to be studied better in youth with type 1 diabetes compared to adults including patients with type 2 diabetes (Guerrero-Ramírez & Cumba-Avilés, 2018; Matlock et al., 2017; Renaud-Charest et al., 2024). However, a meta-analysis encompassing cross-sectional studies shows a prevalence of suicidal ideation among patients with diabetes of 16.2% and a significantly higher risk for suicide attempts (OR = 1.45, 95% CI [1.07, 1.96]) (Elamoshy et al., 2018; B. Wang et al., 2017). With the frequency of suicidal ideation being nearly twice as high in individuals with diabetes compared to the general population as well as the serious potential outcomes of suicidal ideation in terms of suicide attempts and completed suicide, understanding these

thoughts and wishes in patients with diabetes is of utmost importance to maintain the quality of life and target those issues in clinical care – which needs to be enhanced by researching risk and associated factors. Diabetes-specific characteristics as risk factors for suicidal ideation have been identified, e.g., being insulin-dependent, a duration of diabetes ≥ 5 years, and $HbA1_c$ levels ≥ 6.5% (Handley et al., 2016; Lee et al., 2014). Regarding psychological risk factors, one of the most prominent risk factors for suicidal ideation and suicidal crises in patients with diabetes are depressive symptoms (Lee et al., 2014; Löfman et al., 2012; Matlock et al., 2017). However, recent research indicates that suicidal ideation in patients with diabetes is increased even when controlling for depressive symptoms (Lutz et al., 2016; Tabb et al., 2017), which raises the question of which other factors, independently from diabetes itself and depressive symptoms, could be associated with suicidal ideation. Preliminary evidence further points to the relevance of diabetes-related distress, emphasizing the role of subjective disease burden (Handley et al., 2016). Other lines of research also focus on psychological aspects in this regard. In a population-based study, psychological abilities such as low emotional stability have shown to play a central role regarding suicidal ideation (Vidal-Arenas et al., 2022). Similarly, in the context of self-harm, which can have suicidal intent, the detrimental role of impaired psychological abilities (including among others, emotion regulation) was emphasized (Ernst, Brähler, et al., 2022). Moreover, psychosocial risk factors such as child maltreatment have increasingly been researched in the context of suicidal ideation (Angelakis et al., 2019). In patients with diabetes however, research is still limited, especially regarding psychological and psychosocial risk factors, and investigations in more diverse diabetes populations to generalize the findings are needed.

2.4.4. Loneliness

While not classified as a mental disorder in the clinical sense, psychological burden in the form of loneliness has gained a tremendous amount of attention, both health-politically as well as in the research landscape – especially following the aftermath of the COVID-19 pandemic. Loneliness is defined as the subjective feeling of being socially isolated independent from the quantity and/or quality of social engagements (Hawkley & Cacioppo, 2010; Solmi et al., 2020). To a certain extent, loneliness is a normal feeling and can be adaptive as it motivates us to seek social and emotional connection with others (Hawkley & Cacioppo, 2010). However, suffering from ongoing and distressing subjective feelings of being socially isolated, disconnected from others, and of not belonging can severely impact mental well-being. Particularly chronic loneliness is suggested to have a negative impact on physical and mental health, quality of life, and premature mortality (Morina et al., 2021; Petitte et al., 2015). In reaction to these findings as well as the increased frequency of loneliness during the COVID-19 pandemic (Ernst, Niederer, et al., 2022), loneliness and social isolation have been recognized as significant public health concerns in recent years (World Health Organization, 2024). Loneliness has been observed across different populations and demographic groups, e.g., young adults (Cacioppo & Cacioppo, 2018; Matthews et al., 2019), but especially patients with chronic illnesses have shown to be a high-risk group for loneliness and the negative impacts on the onset and the course of their disease has been established (Morina et al., 2021; Petitte et al., 2015). A systematic review linked loneliness to adults with heart disease, hypertension, stroke, and lung disease (Petitte et al., 2015). However, the authors conclude that metabolic diseases are so far understudied, even though the prevalence of loneliness in individuals with diabetes has recently been estimated to be around 30% – nearly twice as high as in the German general population (Entringer, 2022; Wicaksana et al., 2025). While recent research tried to amplify evidence in this area by focusing on patients with diabetes, findings on e.g., the associations and underlying mechanisms of this phenomenon are still scarce. Research suggests an independent association between loneliness and type 2 diabetes, with loneliness elevating the risk of its development by around 22% (Christiansen et al., 2021; Song et al., 2023). Further, a prospective cohort study demonstrated a dose-response relationship between loneliness and incident type 2 diabetes (Rosenkilde et al., 2024). Moreover, loneliness in patients with diabetes is linked to an increased risk for diabetes-related complications (X. Wang et al., 2023) as well as higher blood sugar levels (Y.-C. Huang et al., 2023), emphasizing

its relevance for the onset as well as the course of the disease. A recent review based on a limited amount of studies and focusing on older individuals with diabetes suggests sociodemographic characteristics, diabetes-associated aspects (e.g., diabetes-related complications, diabetes-related distress) as well as psychological burden in the form of e.g., depressive symptoms as relevant factors for loneliness in this patient group (Cho et al., 2024). Against the background of the increased occurrence of depressive disorders and symptoms in patients with diabetes, it also seems obvious to take a closer look at loneliness as such and to examine associated risk factors. Nevertheless, it still remains unclear which factors contribute to loneliness in general and more specifically, in patients with diabetes.

2.5. Adverse Childhood Experiences

While research regarding the occurrence of psychological burden in patients with diabetes is steadily growing, associated factors mainly focus on biological and sociodemographic aspects. However, in recent years psychosocial aspects seem to be gathering momentum, in particular, adverse childhood experiences (ACEs). Considering ACEs in the development of psychological burden and psychopathology is established in other lines of research, but only recently evidence is starting to build on their relevance for the onset of somatic illnesses, including diabetes.

ACEs are a major public health concern all across the globe, with an estimated over 55 million children affected only in Europe (Sethi et al., 2018). Mainly two operationalizations of the phenomenon can be found throughout the literature: ACEs and child maltreatment. While ACEs and child maltreatment both comprise sexual, emotional and physical abuse as well as emotional and physical neglect, ACEs additionally include household members with mental illness or substance use, domestic violence, incarceration of household members as well as parental separation/divorce (Kalmakis & Chandler, 2014). In Germany, nearly 44% of the general population report at least one type of ACE of at least moderate severity, with the most common experiences being parental separation and divorce (19.4%), alcohol consumption and drug abuse of a family member (16.7%), emotional neglect (13.4%), and emotional abuse (12.5%) (Witt et al., 2019). Regarding child maltreatment of at least moderate severity, recent investigations in the German population indicate that as many as 26.1% experienced child maltreatment, with prevalences being the highest for physical neglect (10%), followed by emotional neglect (7.5%), physical abuse (8.1%) and emotional abuse (8.1%), and sexual abuse (6.1%) (Klinger-König et al., 2023).

Individuals with a history of ACEs are affected by increased morbidity and mortality as well as a decreased quality of life (Brown et al., 2009; Weber et al., 2016). Moreover, meta-analytic evidence on the annual costs of ACEs suggests that $581 billion in Europe are attributable to ACEs, with more than 75% of these costs resulting from individuals with two or more ACEs (Bellis et al., 2019). ACEs are an established risk factor for adult psychopathology as well as numerous adverse health outcomes throughout the life course. Felitti and colleagues (1998) contributed one of the first groundbreaking studies, demonstrating an association between ACEs and a myriad of health outcomes including but not limited to drug abuse, depression, and suicide attempt. Evidence suggests that

child maltreatment is strongly associated with mental disorders like depressive and anxiety disorders (Gardner et al., 2019; Li et al., 2016), posttraumatic stress disorder (Messman-Moore & Bhuptani, 2017), or borderline personality disorder (Hailes et al., 2019). While this direct association between adverse events in childhood and psychopathology in adulthood is quite well understood and underscored by meta-analytic evidence (Gardner et al., 2019; Humphreys et al., 2020), research on the underlying pathways of this association is still expanding. Numerous studies investigated the role of e.g., functional and structural brain abnormalities, which were identified more frequently in patients with depressive disorders or chronic pain exposed to adverse childhood events (Antoniou et al., 2023). Further, meta-analytic evidence employing both cross-sectional and longitudinal studies has linked ACEs to impairments in emotion regulation (Gruhn & Compas, 2020; Lavi et al., 2019). While impairments in emotion regulation can be one path to promote health-harming behaviors, such as smoking, or emotional eating (Rogers et al., 2018; Shriver et al., 2020), a considerable amount of research has independently shown a close association between ACEs and health-harming behaviors, such as smoking, alcohol dependency, and obesity (Westermair et al., 2018) – all factors that also have been proven to cause numerous physical health problems (Burton et al., 2024). In fact, recent research has linked ACEs to diabetes (Hughes et al., 2017; Klinger-König et al., 2023). Studies investigating the relationship between ACEs and diabetes found that experiencing childhood stressors is associated with a significantly elevated risk of diabetes in adulthood (H. Huang et al., 2015; Huffhines et al., 2016; Shields et al., 2016). In representative population-based studies it could be shown that the mere exposure to ≥ 4 types of ACEs (compared to none) increased the presence of type 2 diabetes significantly (Bellis et al., 2015; Schüssler-Fiorenza Rose et al., 2022). Accordingly, in patients with diabetes higher ACE scores correlated with a higher Body-Mass-Index (BMI) and increased $HbA1_c$ values (Ittoop et al., 2020). Further, a study investigating the relationship between ACEs, diabetes, and mortality found patients with diabetes and ACEs had a 132% higher mortality compared to people without diabetes and no ACEs, highlighting the negative impact on the onset as well as the course of both type 1 and type 2 diabetes in adulthood (J. A. Campbell et al., 2019). In a U.S. American national longitudinal study, people with ACEs were more likely to have higher BMI, waist circumference, blood fasting insulin levels as well as insulin resistance (J. A. Campbell et al., 2018), adding evidence to the association between ACEs and pre-diabetes measures. While preliminary evidence for an overall association between ACEs and diabetes in adulthood can be found throughout the

literature, the differential impact of various types of ACEs on diabetes in adulthood is heterogeneous among studies. Some found sexual abuse or emotional abuse being the strongest predictor for diabetes (Atasoy et al., 2022; J. A. Campbell et al., 2018), other studies have found that neglect has the strongest association with diabetes (H. Huang et al., 2015). Regarding severity and frequency across ACE types, the strongest association with diabetes was observed when both severe and frequent physical and sexual abuse were reported (Shields et al., 2016). The heterogeneity of the results indicates that the underlying mechanisms of the different types of ACEs and diabetes need further research.

However, regarding psychological aspects as underlying pathways between ACEs and diabetes, research is limited. One of the aims of this dissertation is to add to the evidence on psychological mechanisms that might enhance diabetes after ACEs. So far, research is focusing on e.g., certain personality types or aspects of psychological capacities, such as emotion regulation. For example, Hazrati-Meimaneh and colleagues (2020) linked higher neuroticism (the disposition to experience negative affects, including anger, anxiety, self-consciousness, irritability, emotional instability, and depression) to decreased medication adherence and self-care-behavior. However, higher extraversion, agreeableness, and conscientiousness were positively associated with medication adherence (Hazrati-Meimaneh et al., 2020). Further, there has been research interest in the role of (negative) emotions – as evidenced by various studies trying to link type D personality (people tending to experience negative emotions but inhibiting their expression) to mainly type 2 diabetes (Conti et al., 2016). In a large survey conducted in the Netherlands, patients with diabetes and type D personality tended to experience more loneliness, less relationship adjustment (satisfaction, consensus, cohesion and affectional expression) as well as lower social support (Spek et al., 2018). These studies indicate a strong interest regarding personality traits and psychological abilities, and first attempts to identify underlying mechanisms were made. Here, preliminary evidence emerged on the role of personality aspects in individuals with diabetes. Regarding the detrimental effects of ACEs, recently dimensional constructs of personality aspects and psychological functions have been coming into focus. This offers great potential to expand the knowledge on the role of ACEs and personality aspects in individuals with diabetes.

2.6. Personality functioning and the epistemic stance

In the context of ACEs and associated psychopathology, a substantial amount of research has focused on underlying and maintaining factors. In this regard, next to biological mechanisms, especially personality aspects have gained research interest. However, rather isolated aspects of personality and intra- and interpersonal abilities such as emotion regulation were being investigated so far. With the research field of mental health taking a broader approach to the underlying mechanisms of e.g., ACEs and psychopathology, the transdiagnostic dimensional construct of *personality functioning* has stimulated steadily growing evidence. Further, related constructs such as *mentalization* and epis*temic trust, mistrust, and credulity* are gaining more prominence for both the development and maintenance of psychopathology and preliminary evidence even implies an association with somatic diseases. However, this line of research has yet to be expanded to individuals with diabetes.

Personality functioning describes basic psychological capacities regarding the self and others, e.g., communication, identity or attachment, that are assumed to develop in early childhood in the context of secure attachment experiences with caregivers (Beebe et al., 2010a). Personality functioning in its core is not a novel construct. One of the ground laying works has been conducted by Otto Kernberg, who originally attempted to conceptualize different levels of personality organization (Persönlichkeitsorganisation) in order to assess character pathology (Kernberg, 1970). Based on this work, Gerd Rudolf later carried these concepts further and developed the Operationalized Psychodynamic Diagnosis (OPD) system, which is a psychodynamic multiaxial system for diagnosis and treatment planning (OPD Task Force, 2008). Personality functioning (also called structure) describes a person's basic psychological abilities with regard to the self, e.g., identity and self-esteem, and in relation to others, e.g., empathy and intimacy in the four domains cognition/perception, regulation, communication, and attachment (OPD Task Force, 2008). This differentiated dimensional assessment of a person's psychological abilities and similar dimensional approaches have been considered in the Alternative Model of Personality Disorders (AMPD) in the 5th edition of the Diagnostic and Statistical Manual of Mental Disorders (DSM-5) (American Psychiatric Association, 2013) as well as the new ICD-11, replacing a so far categorical assessment of personality disorders by a dimensional severity rating (Bach & Simonsen, 2021; Tyrer et al., 2019).

Personality functioning is assumed to develop in early childhood through social learning processes and benevolent attachment experiences (Beebe et al., 2010b). However, disruptions of this process might severely impair the child's healthy development of personality functioning (Fonagy, Campbell, et al., 2017; Fonagy, Luyten, et al., 2017; Luyten et al., 2020; Maercker et al., 2021). Due to its timely occurrence with the developmental phase of personality functioning, ACEs can cause such disruptions, and evidence on both the clinical and practical implications of impairments in personality functioning is expanding. Impaired personality functioning goes along with difficulties in building and maintaining relationships, having an unstable identity and sense of self-worth, and not adequately perceiving as well as communicating emotions. Not only is it associated with psychopathology, such as symptoms of depression and anxiety, somatization, and eating disorders (Freier … **Zara** et al., 2022; Kerber et al., 2023; Klein et al., 2022), but also with phenomena related to psychopathology, such as loneliness, and suicidal ideation (Boone et al., 2025; Ernst et al., 2023). Further, impaired personality functioning emerged as a mediating factor between ACEs and anxiety and depressive symptomatology, (complex) posttraumatic stress disorder ((c)PTSD), somatic symptoms as well as body dysmorphic concerns (Dagnino et al., 2020; Freier…**Zara**…et al., 2022; Kampling…**Zara**…et al., 2024; Kampling, Kruse,…**Zara**…et al., 2022; Krakau et al., 2021).

While the relationship between impairments of personality functioning and psychopathologies has been well researched, associations with somatic aspects have been studied more regarding comorbidity, e.g., somatic comorbidities in persons with borderline personality disorder – a disorder which has impairments in personality functioning at its core (Doering, 2019; Jeung & Herpertz, 2014). The distinct relationship between impairments of personality functioning and somatic illnesses has only recently been addressed. For example, Spitzer and colleagues (2022) investigated relationships between impairments of personality functioning and somatic illnesses and could find consistent associations between neurological, urogenital, dermatological, and musculoskeletal diseases. This association might be conveyed by impaired health behavior or neurobiological underpinnings. Recognizing the negative impact of ACEs on health behavior and stress responses contributes to deteriorating somatic health – however, more extensive research is needed to better understand this association (Spitzer et al., 2022). Taken together, these findings indicate that impaired personality

functioning plays a relevant role regarding mental and physical health, especially following ACEs. To date, these findings have yet to be extended to patients with diabetes.

An important ability that is a prerequisite for the adequate development of personality functioning is *epistemic trust*. Epistemic trust is defined as a persons' ability to trust in socially transmitted information and take opportunities for social learning. It refers to different types of information; both factual knowledge, such as reading and writing, as well as cultural knowledge, such as rituals, processing, and coping with emotions as well as relationships in the broadest sense (Fonagy & Nolte, 2023; Nolte, 2024). Epistemic trust is postulated as adaptive ability, which is influenced by context. A healthy development of epistemic trust further requires epistemic vigilance, which describes a kind of evolutionary protection against misinformation, an appropriate skepticism towards the information conveyed by others (Mascaro & Sperber, 2009). Due to the complex social environment we live in, epistemic vigilance is necessary, and we have to quickly find out who to trust and who not to trust. Epistemic trust is built in secure attachment experiences between child and caregiver through e.g., eye contact, contingent relatedness, and relating in the sense of focusing attention and adopting perspectives. The key factor for building epistemic trust is the ability of the learner to recognize that the communicator or knowledge provider recognizes him or her as the thinking and understanding actor that he or she experiences him- or herself as – the recipient feels personally recognized (Nolte, 2024). The new concept of epistemic trust is gaining increasing research interest, especially disruptions of epistemic trust in the form of *epistemic mistrust* and *epistemic credulity* through e.g., ACEs. Epistemic mistrust relates to a persons' tendency to treat every information source as unreliable and not trustworthy, hence, avoiding being influenced by communication from others (C. Campbell et al., 2021). Epistemic credulity describes a persons' lack of clarity about his or her own position, which can lead to high vulnerability to misinformation or exploitation by others (C. Campbell et al., 2021). It has been suggested that many types of psychopathology could be characterized by temporary or permanent disruptions of epistemic trust and the social learning process it enables (Fonagy & Campbell, 2017). To date, some studies have shown that the epistemic stance acts as a predictor for personality functioning (Kampling…**Zara**…et al., 2024; Kampling, Kruse…**Zara**…et al., 2022) and could pose as a link between ACEs and psychopathologies as well as somatic symptom burden and diseases such as diabetes (Kampling, Kruse…**Zara**…et al., 2022; Kampling…**Zara**…et

al., 2024; **Zara** et al., 2023). However, specifically in patients with diabetes, knowledge on these constructs is limited.

Against this background, the question arises which role (impaired) personality functioning and the related construct of epistemic trust might play in patients with diabetes regarding their most prevalent mental health issues, namely psychological burden in the form of e.g., depressive, anxiety, and somatic symptoms, diabetes-related distress as well as broader phenomena such as suicidal ideation and loneliness. Considering that ACEs are a prominent risk factor for both mental health issues and physical illness including diabetes, as well as impairments in personality functioning, these associations and underlying mechanisms will be researched in this dissertation.

OVERVIEW OF THE MANUSCRIPTS

3. OVERVIEW OF THE MANUSCRIPTS

Patients with diabetes have long been identified as a high risk group in terms of somatic and psychological burden. On the one hand, evidence on the detrimental role of *ACEs* for the onset as well as the course of the disease has accumulated. On the other hand, individuals with diabetes and ACEs seem to be more vulnerable for various types of *psychological burden* and burden-associated symptomology, such as *suicidal ideation* and *loneliness*. Due to the close associations with diabetes self-management, diabetes-associated complications and not at last reduced quality of life, the question of underlying mechanisms has been raised. Recently, personality aspects and abilities, for example, emotion regulation have come into focus in this regard. The transdiagnostic concept of *personality functioning* as well as the relatively novel constructs of *epistemic trust, mistrust,* and *credulity* are increasingly stimulating new research. Impairments of personality functioning and disruptions of epistemic trust (epistemic mistrust and credulity) have repeatedly shown to be associated with psychopathology and even somatic multimorbidity. Hence, to deepen our understanding of the role of ACEs for the occurrence of ACEs and psychological burden in terms of *somatic, depressive, and anxiety symptoms,* and burden-associated symptomology such as *suicidal ideation* and *loneliness* in individuals with diabetes, impairments in personality functioning and related disruptions of epistemic trust are the main research goal of this dissertation.

Based on retrospective cross-sectional studies employing both *representative population-based data* as well as data from a *clinical diabetes sample with inadequate glycemic control*, four research articles addressing those objectives were published as part of the present dissertation as outlined in Table 1.

Table 1. Overview of the manuscripts of this dissertation with title, journal, journal impact factor (IF), and research aims

MANUSCRIPT I	Associations of different types of child maltreatment and diabetes in adulthood – the mediating effect of personality functioning: Findings from a population-based representative German sample, *Annals of Epidemiology*, 2023 [IF: 5.6] Aims: To explore 1) the association between different types of ACEs and diabetes in adulthood and 2) the mediating effect of personality functioning in this association.
MANUSCRIPT II	Diabetes-related distress and psychological burden in patients with type 1 and type 2 diabetes – the role of child maltreatment, personality functioning, and epistemic trust: findings from a German clinical inpatient sample, *Frontiers in Psychiatry*, 2025 [IF: 3.2] Aims: To investigate if patients with diabetes and ACEs compared to those without 1) show higher diabetes-related distress and more frequent psychological burden, 2) show higher impairments in personality functioning and epistemic trust, mistrust, and credulity, and 3) if these associations are mediated by personality functioning, and disruptions of epistemic trust.
MANUSCRIPT III	Suicidal ideation in patients with diabetes and childhood abuse – the mediating role of personality functioning: Results of a German representative population-based study, *Diabetes Research and Clinical Practice, 2024* [IF: 5.1] Aims: To examine 1) the prevalence of suicidal ideation in patients with diabetes and ACEs compared to those without, 2) the association between ACEs and suicidal ideation, and 3) the mediating effect of personality functioning in this association.
MANUSCRIPT IV	Exploring loneliness in individuals with diabetes – the role of childhood abuse and neglect, and personality functioning: findings from a German population-based sample, *Journal of Psychosomatic Research*, 2025 [IF: 3.3] Aims: To analyze 1) the frequency of loneliness in individuals with diabetes compared to individuals without diabetes, 2) the association between ACEs, personality functioning, the epistemic stance, and loneliness, 3) the mediating role of personality functioning in the association between ACEs and loneliness.

Methodologically, both *direct associations* between *ACEs* and the respective *outcome* were established. The mediating role of *personality functioning* was investigated applying *mediation models*. Although this dissertation comprises solely cross-sectional analyses, the temporally upstream nature of ACEs and the theoretical framework proposes that a mediation model can be assumed, which postulates ACEs as independent variable. The development of personality functioning in the first years of life with close relationships requires epistemic trust, which is modeled as covariate/predictor including its disruptions epistemic mistrust and credulity. For a schematic display see also Figure 1.

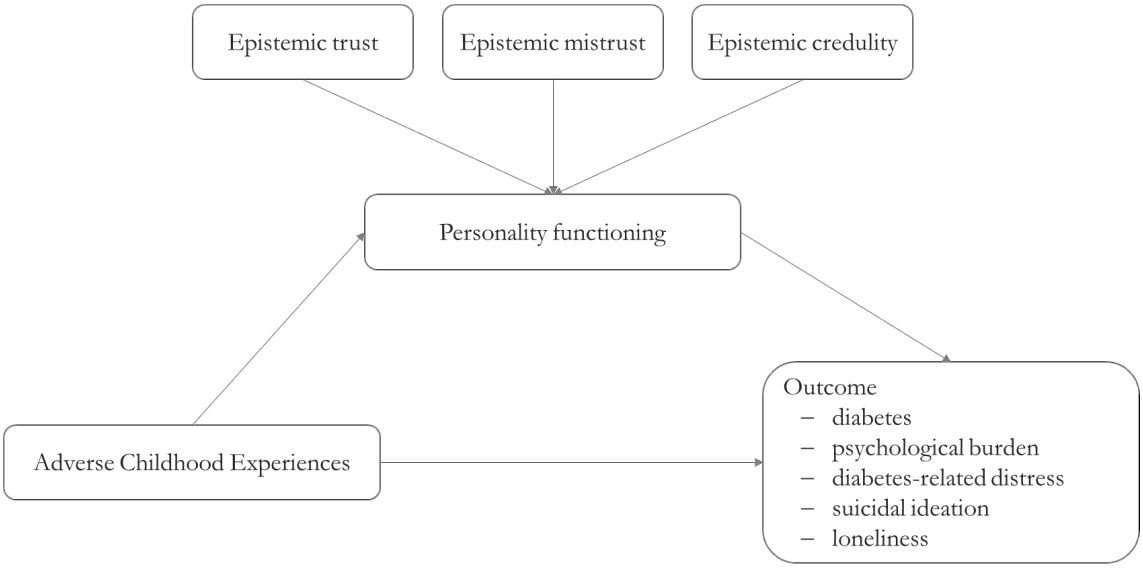


Figure 1. Schematic display of the proposed associations between Adverse Childhood Experiences (ACEs) and the respective outcome investigated in this dissertation as well as the indirect (mediating) effect of personality functioning, with epistemic trust, mistrust, and credulity modeled as predictors/covariates.

In addition, further articles related to the present work have been published, but have not been included in the dissertation. These articles can be found in Table 2.

Table 2. Publications related to this dissertation

No.	Publication title	Impact Factor
13	**Zara, S.**, Kruse, J. & Kampling, H. (2025). Access to a Newly Adapted Diabetes-Specific Multimodal Cross-Sectoral and Interdisciplinary Psychotherapeutic Care Option for a High-Risk Group of Patients With Diabetes Mellitus and Distress: Protocol for the minDBe Pilot Study, JMIR Research Protocols, 14:e73199. Doi: 10.2196/73199	1.5 (2024)
12	Klein, E. M., Kasinger, C., Ernst, M., Brähler, E., **Zara, S.**, Benecke, C., Kruse, J., & Kampling, H. (2025). Assessment of Personality Functioning Across Immigrant Groups-Measurement Invariance and Its Association with Mental Distress in a German Population-Based Sample. Journal of personality assessment, 107(5), 599–610. https://doi.org/10.1080/00223891.2025.2454021	2.8 (2024)
11	Kampling, H., Riedl, D., Lampe, A., Nolte, T., Brähler, E., Ernst, M., Fegert, J. M., Geisel, T., Hettich-Damm, N., Jud, A., **Zara, S.**, & Kruse, J. (2025). Somatic symptom disorder and the role of epistemic trust, personality functioning and child abuse: Results from a population-based representative German sample. Journal of affective disorders, 373, 429–437. https://doi.org/10.1016/j.jad.2024.12.096	4.9 (2024)
10	Kampling, H., **Zara, S.**, & Kruse, J. (2024). Somatische Belastungsstörungen und die Rolle des epistemischen Vertrauens. PiD – Psychotherapie im Dialog, 25(04): 33–36. doi: 10.1055/a-2249-8040	-
9	Kruse, J., **Zara, S.**, & Kampling, H. (2024). Diabetes und depressive Störungen, Ärztliche Psychotherapie, 19(1), 17-21. doi: 10.21706/aep-19-1-17	-
8	Kampling, H., Riedl, D., Hettich, N., Lampe, A., Nolte, T., **Zara, S.**, Ernst, M., Brähler, E., Sachser, C., Fegert, J. M.,	5.4 (2022)

	Gingelmaier, S., Fonagy, P., Krakau, L., & Kruse, J. (2024). To trust or not to trust in the thrall of the COVID-19 pandemic: Conspiracy endorsement and the role of adverse childhood experiences, epistemic trust, and personality functioning. Social science & medicine (1982), 341, 116526. https://doi.org/10.1016/j.socscimed.2023.116526	
7	Kruse, J., **Zara, S.**, & Kampling, H. (2023). Diabetes mellitus und Extrembelastungen in der Kindheit, Ärztliche Psychotherapie, 18(3), 171-175. doi:10.21706/aep-18-3-171	-
6	**Zara, S.**, Brähler, E., Sachser, C., Fegert, J. M., Häuser, W., Krakau, L., Kampling, H., & Kruse, J. (2023). Supplementary data analyses for the associations of child maltreatment and diabetes in adulthood and the mediating effect of personality functioning. Data in Brief, 49, 109441. doi: 10.1016/j.dib.2023.109441	1.2 (2022)
5	**Zara, S.**, Kampling, H., Friederich, H.-C., Heuft, G., Grobe, T., Marschall, U., Szecsenyi, J., Liebau, M., Schunter, J., Wild, B., Hartmann, M., Werner, S. & Kruse, J. (2024). Patienten mit Diabetes mellitus in der ambulanten psychotherapeutischen Versorgung. Psychotherapie 68, 157–164 (2023). https://doi.org/10.1007/s00278-023-00644-y	1.0 (2023)
4	**Zara, S.**, Kruse, J., Leveling, A., Schmitz, J., Hempler, I., & Kampling, H. (2022). Capturing diabetes-related distress and burden from the individual perspective of patients with type 1 or type 2 diabetes: study protocol for an explorative study applying a mixed-methods design. JMIR Research Protocols, 11(8). doi: 10.2196/38477	0.58 (2021)
3	Kampling, H., Kruse, J., Lampe, A., Nolte, T., Hettich, N., Brähler, E., Sachser, C., Fegert, J. M., Gingelmaier, S., Fonagy, P., Krakau, L., **Zara, S.** & Riedl, D. (2022). Epistemic trust and personality functioning mediate the	5.435 (2021)

	association between adverse childhood experiences and posttraumatic stress disorder and complex posttraumatic stress disorder in adulthood. Frontiers in Psychiatry 13:919191. doi: 10.3389/fpsyt.2022.919191	
2	Freier, A., Kruse, J., Schmalbach, B., **Zara, S.**, Werner, S., Brähler, E., Fegert, J.M., & Kampling, H. (2022). Supplementary Data for the Mediation Effect of Personality Functioning – Gender Differences, Separate Analyses of Depression and Anxiety Symptoms and Inferential Statistics of the Relationship between Personality Functioning and Different Types of Child Maltreatment. Data in Brief, 42, 108272. doi: 10.1016/j.dib.2022.108272	0.28 (2021)
1	Freier, A., Kruse, J., Schmalbach, B., **Zara, S.**, Werner, S., Brähler, E., Fegert, J. M., & Kampling, H. (2022). The mediation effect of personality functioning between different types of child maltreatment and the development of depression/anxiety symptoms - A German representative study. Journal of affective disorders, 299, 408–415. https://doi.org/10.1016/j.jad.2021.12.020	6.533 (2021)

3.1. Overview of publication I – citation, summary of contents, and author contributions

---

ASSOCIATIONS OF DIFFERENT TYPES OF CHILD MALTREATMENT AND DIABETES IN ADULTHOOD – THE MEDIATING EFFECT OF PERSONALITY FUNCTIONING: FINDINGS FROM A POPULATION-BASED REPRESENTATIVE GERMAN SAMPLE

Sandra Zara, Elmar Brähler, Cedric Sachser, Jörg M Fegert, Winfried Häuser, Lina Krakau, Hanna Kampling, & Johannes Kruse

– Citation –

Zara, S., Brähler, E., Sachser, C., Fegert, J. M., Häuser, W., Krakau, L., Kampling, H., & Kruse, J. (2023). Associations of different types of child maltreatment and diabetes in adulthood – the mediating effect of personality functioning: Findings from a population-based representative German sample. Annals of Epidemiology, 78, 47–53. https://doi.org/10.1016/j.annepidem.2022.12.004

3.1.1. English summary of publication I

This article examined the association between different types of ACEs (sexual, physical, and emotional abuse as well as physical and emotional neglect), personality functioning, and diabetes in adulthood. The main finding of this article is the mediating effect of personality functioning in the association between abuse types of ACEs and diabetes. Personality functioning mediated the association between sexual, physical, and emotional abuse as well as diabetes. All abuse types of ACEs as well as physical neglect were associated with diabetes, while for emotional neglect, no association with diabetes could be found.

3.1.2. Deutsche Zusammenfassung für Publikation I

Dieser Artikel untersuchte den Zusammenhang zwischen verschiedenen Arten von Missbrauch und Vernachlässigung in der Kindheit (sexueller, körperlicher und emotionaler Missbrauch sowie körperliche und emotionale Vernachlässigung) und Diabetes im Erwachsenenalter. Dabei wurden die Persönlichkeitsfunktionen, auch Strukturniveau genannt, als vermittelnder Faktor in diesem Zusammenhang exploriert. Das Hauptergebnis des Artikels demonstriert einen Zusammenhang zwischen sämtlichen untersuchten Arten von Missbrauch und Diabetes. Ein beeinträchtigtes Strukturniveau mediierte den Zusammenhang zwischen sexuellem, körperlichem und emotionalem Missbrauch und Diabetes. Während sich ebenso für körperliche Vernachlässigung ein Zusammenhang mit Diabetes fand, konnte dies für emotionale Vernachlässigung nicht gezeigt werden.

3.1.3. Author contributions

The conceptual idea of this article was developed by Sandra Zara, PD Dr. phil. Hanna Kampling, and Prof. Dr. med. Johannes Kruse. After the main research questions have been defined, Sandra Zara conducted a systematic literature search on the relevant subjects (diabetes, adverse childhood experiences or child maltreatment respectively, and personality related constructs) in relevant databases. The data was obtained from two representative population-based survey waves (2016 and 2019) conducted in cooperation with the University of Leipzig and the independent demography research institute USUMA GmbH Berlin. The surveys are conducted regularly and conceptualized by professors from different universities across Germany. The subjects covered comprise psychological, psychosomatic, psychosocial as well as somatic areas. Sandra Zara

identified the proper statistical analysis for each research question, conducted all statistical analyses, interpreted the data and wrote the original draft of the manuscript. PD Dr. phil. Hanna Kampling contributed to the writing of the manuscript. Prof. Dr. med. Johannes Kruse and PD Dr. phil. Hanna Kampling supervised the writing of the manuscript. The version to be published was then sent to all co-authors for editing and refining. Sandra Zara addressed all comments from the co-authors and was responsible for selecting an adequate journal for submission, the submission and review process as well as the publishing process of the article.



Univ.-Prof. Dr. med. Johannes Kruse

3.2. Overview of publication II – citation, summary of contents, and author contributions

---

DIABETES-RELATED DISTRESS AND PSYCHOLOGICAL BURDEN IN PATIENTS WITH TYPE 1 AND TYPE 2 DIABETES – THE ROLE OF CHILD MALTREATMENT, PERSONALITY FUNCTIONING, AND EPISTEMIC TRUST: FINDINGS FROM A GERMAN CLINICAL INPATIENT SAMPLE

Sandra Zara, Imogen Carla Ullrich, Anna Maria Leveling, Friederike Gisela Genoveva Saretzki, Jana Schmitz, Michael Eckhard, Johannes Kruse & Hanna Kampling

– Citation –

Zara S, Ullrich IC, Leveling AM, Saretzki FGG, Schmitz J, Eckhard M, Kruse J & Kampling H (2025). Diabetes-related distress and psychological burden in patients with type 1 and type 2 diabetes – the role of child maltreatment, personality functioning, and epistemic trust: findings from a German clinical inpatient sample. *Front. Psychiatry* 16:1608601. doi: 10.3389/fpsyt.2025.1608601

3.2.1. English summary of publication II

This article explored the association between ACEs, diabetes-related distress, and psychological burden as well as the mediating role of personality functioning and the epistemic stance in a clinical sample of patients with type 1 and 2 diabetes and inadequate glycemic control. The main finding of this article is the mediating role of impaired personality functioning in the association between ACEs and diabetes-related distress, major depressive syndrome, and somatoform syndrome. Patients with ACEs compared to those without showed higher diabetes-related distress and higher frequencies of psychological burden as well as higher impairments in personality functioning and higher epistemic mistrust and credulity.

3.2.2. Deutsche Zusammenfassung für Publikation II

Forschungsgegenstand von Publikation II waren die Zusammenhänge zwischen Missbrauch und Vernachlässigung in der Kindheit, diabetesbezogenen Belastungen und psychischen Belastungen sowie die mediierende Rolle des Strukturniveaus und des epistemischen Vertrauens in einer klinischen Stichprobe von Patienten mit Typ 1 und Typ 2 Diabetes und schlecht eingestelltem Blutzucker. Das Hauptergebnis dieser Arbeit ist die mediierende Rolle des Strukturniveaus im Zusammenhang zwischen Missbrauch und Vernachlässigung in der Kindheit und diabetesbezogenen Belastungen, depressiven Symptomen sowie soamtischen Symptomen. Darüber hinaus konnten bei Patienten mit Erfahrungen von Missbrauch und Vernachlässigung im Vergleich zu Patienten ohne diese Erfahrungen höhere diabetesbezogene Belastungen, psychische Belastungen sowie stärkere Beeinträchtigungen des Strukturniveaus, höheres epistemisches Misstrauen und höhere Leichtgläubigkeit festgestellt werden.

3.2.3. Author contributions

The conceptual idea of this article was developed by Sandra Zara, PD Dr. phil. Hanna Kampling and Prof. Dr. med. Johannes Kruse. Sandra Zara participated in the research design of the Ed-iPP-study (“Capturing Diabetes-Related Distress and Burden From the Perspective of Patients With Type 1 or Type 2 Diabetes: an Explorative Mixed Methods Study”). The data for this article was derived from the Ed-iPP study and the study protocol was written by Sandra Zara (**Zara** et al., 2022). The Ed-iPP study aimed to explore individual diabetes-related distress and burden from the patient perspective employing both qualitative and quantitative methods. This article is based on quantitative self-report

questionnaire data. Sandra Zara outlined the research questions, selected the adequate statistical analysis for each research question, conducted all statistical analyses, interpreted the data and wrote the original draft of the manuscript. PD Dr. phil. Hanna Kampling contributed to the writing of the manuscript. Prof. Dr. med. Johannes Kruse and PD Dr. phil. Hanna Kampling supervised the writing of the manuscript. The final version was sent to all co-authors for editing and refining. Sandra Zara addressed all comments from the co-authors and was responsible for selecting an adequate journal for submission, the submission and review process as well as the publishing process of the article.



Univ.-Prof. Dr. med. Johannes Kruse

3.3. Overview of publication III – citation, summary of contents, and author contributions

---

SUICIDAL IDEATION IN PATIENTS WITH DIABETES AND CHILDHOOD ABUSE – THE MEDIATING ROLE OF PERSONALITY FUNCTIONING: RESULTS OF A GERMAN REPRESENTATIVE POPULATION-BASED STUDY

Sandra Zara, Johannes Kruse, Elmar Brähler, Cedric Sachser, Jörg M Fegert, Karl-Heinz Ladwig, Mareike Ernst & Hanna Kampling

– Citation –

Zara, S., Kruse, J., Brähler, E., Sachser, C., Fegert, J. M., Ladwig, K. H., Ernst, M., & Kampling, H. (2024). Suicidal ideation in patients with diabetes and childhood abuse - The mediating role of personality functioning: Results of a German representative population-based study. *Diabetes research and clinical practice*, 210, 111635. https://doi.org/10.1016/j.diabres.2024.111635

3.3.1. English summary of publication III

This article aimed to assess the prevalence of suicidal ideation in patients with diabetes, explore its association with different types of ACEs (sexual, physical, and emotional abuse), and examine the mediating role of personality functioning in this association based on a representative population sample. The main finding of this article is the mediating role of personality functioning in the association between emotional abuse and suicidal ideation in patients with diabetes. Further, a dose–response relationship between the number of abuse experiences and suicidal ideation could be observed.

3.3.2. Deutsche Zusammenfassung für Publikation III

Ziel dieses Artikels war es, die Prävalenz von Suizidgedanken bei Patienten mit Diabetes zu erfassen und die Zusammenhänge mit Erfahrungen von Missbrauch (sexuell, körperlich, emotional) in der Kindheit sowie die mediierende Rolle des Strukturniveaus basierende auf bevölkerungsrepräsentativen Daten zu erfassen. Das Hauptergebnis dieser Arbeit ist die mediierende Rolle des Strukturniveaus im Zusammenhang zwischen emotionalem Missbrauch und Suizidgedanken. Zudem findet sich eine Dosis-Wirkungs-Beziehung zwischen der Anzahl an Missbrauchserfahrungen in der Kindheit und dem Auftreten von Suizidgedanken bei Patienten mit Diabetes.

3.3.3. Author contributions

The conceptual idea of this article was developed by Sandra Zara, PD Dr. phil. Hanna Kampling and Prof. Dr. med. Johannes Kruse. After the main research questions have been defined, Sandra Zara conducted a systematic literature search on the relevant subjects (Suicidal ideation, diabetes, adverse childhood experiences or child maltreatment respectively, and personality related constructs) in the relevant data bases. The data was obtained from a representative population-based survey (2021) conducted in cooperation with the University of Leipzig and the independent demography research institute USUMA GmbH Berlin. The surveys are conducted regularly and conceptualized by professors from different universities across Germany. The subjects covered comprise psychological, psychosomatic, psychosocial as well as somatic areas. Sandra Zara identified the proper statistical analysis for each research question, conducted all statistical analyses, interpreted the data and wrote the original draft of the manuscript. PD Dr. phil. Hanna Kampling contributed to the writing of the manuscript. Prof. Dr. med. Johannes Kruse and PD Dr. phil. Hanna Kampling supervised the writing of the

manuscript. The version to be published was then sent to all co-authors for editing and refining. Sandra Zara addressed all comments from the co-authors and was responsible for selecting an adequate journal for submission, the submission and review process as well as the publishing process of the article.



Univ.-Prof. Dr. med. Johannes Kruse

3.4. Overview of publication IV – citation, summary of contents, and author contributions

---

EXPLORING LONELINESS IN INDIVIDUALS WITH DIABETES – THE ROLE OF CHILDHOOD ABUSE AND NEGLECT, AND PERSONALITY FUNCTIONING: FINDINGS FROM A GERMAN POPULATION-BASED SAMPLE

Sandra Zara, Johannes Kruse, Elmar Brähler, Mareike Ernst, Jörg M Fegert, Astrid Lampe, Tobias Nolte, Miriam Rassenhofer, David Riedl & Hanna Kampling

– Citation –

Zara, S., Kruse, J., Brähler, E., Ernst, M., Fegert, J. M., Lampe, A., Nolte, T., Rassenhofer, M., Riedl, D., & Kampling, H. (2025). Exploring loneliness in individuals with diabetes – The role of childhood abuse and neglect, and personality functioning: Findings from a German population-based sample. Journal of Psychosomatic Research, 198, 112390. https://doi.org/10.1016/j.jpsychores.2025.112390

3.4.1. English summary of publication IV

This article aimed to examine the frequency of loneliness in individuals with diabetes, explore associated factors, and explore the mediating role of personality functioning and the epistemic stance in the association between ACEs and loneliness based on a representative population sample. The main finding of this article is the mediating role of personality functioning in the association between ACEs and loneliness in individuals with diabetes. Further, loneliness was present in 24.8% of individuals with diabetes and associated with being single, greater depression and anxiety symptoms, as well as impaired personality functioning.

3.4.2. Deutsche Zusammenfassung für Publikation IV

Dieser Artikel zielte darauf ab, die Häufigkeit von Einsamkeit bei Personen mit Diabetes zu erfassen und zudem mit Einsamkeit assoziierte Faktoren zu explorieren sowie die mediierende Rolle des Strukturniveaus und des epistemischen Vertrauens zu untersuchen. Das Hauptergebnis dieser Arbeit ist die mediierende Rolle des Strukturniveaus im Zusammenhang zwischen Erfahrungen von Missbrauch und Vernachlässigung in der Kindheit und Einsamkeit bei Personen mit Diabetes. Zudem berichteten 24,8 % der Personen mit Diabetes von Einsamkeit, was mit ledig sein, höheren Ausprägungen von Angst- und depressiver Symptomatik sowie stärkeren Beeinträchtigungen des Strukturniveaus assoziiert war.

3.4.3. Author contributions

The conceptual idea of this article was developed by Sandra Zara, PD Dr. phil. Hanna Kampling and Prof. Dr. med. Johannes Kruse. After the main research questions have been defined, Sandra Zara conducted a systematic literature search on the relevant subjects (loneliness, loneliness in individuals with diabetes, adverse childhood experiences or child maltreatment respectively, and personality related constructs) in the relevant data bases. The data was obtained from a representative population-based survey wave (2021) conducted in cooperation with the University of Leipzig and the independent demography research institute USUMA GmbH Berlin. The surveys are conducted regularly and conceptualized by professors from different universities across Germany. The subjects covered comprise psychological, psychosomatic, psychosocial as well as somatic areas. Sandra Zara identified the proper statistical analysis for each research question, conducted all statistical analyses, interpreted the data and wrote the original

draft of the manuscript. PD Dr. phil. Hanna Kampling contributed to the writing of the manuscript. Prof. Dr. med. Johannes Kruse and PD Dr. phil. Hanna Kampling supervised the writing of the manuscript. The version to be published was then sent to all co-authors for editing and refining. Sandra Zara addressed all comments from the co-authors and was responsible for selecting an adequate journal for submission, the submission and review process as well as the publishing process of the article.



Univ.-Prof. Dr. med. Johannes Kruse

MANUSCRIPTS

Annals of Epidemiology 78 (2023) 47–53

Contents lists available at ScienceDirect

Annals of Epidemiology

journal homepage: sciencedirect.com/journal/annals-of-epidemiology

Original article

Associations of different types of child maltreatment and diabetes in adulthood – the mediating effect of personality functioning: Findings from a population-based representative German sample

Sandra Zara, M.Sc[a,*], Elmar Brähler, Prof. Dr[b,c], Cedric Sachser, Dr[d], Jörg M Fegert, Prof. Dr[d], Winfried Häuser, Prof. Dr[e,f], Lina Krakau, M.Sc[b], Hanna Kampling, Dr.[a,1], Johannes Kruse, Prof. Dr[a,g,1]

[a] Department of Psychosomatic Medicine and Psychotherapy, Justus Liebig University Giessen, Gießen, Germany
[b] Department Psychosomatic Medicine and Psychotherapy, Johannes Gutenberg University Mainz, Mainz, Germany
[c] Integrated Research and Treatment Center for Adiposity Diseases, Behavioral Medicine Research Unit, University Medical Center Leipzig, Leipzig, Germany
[d] Department of Child and Adolescent Psychiatry/Psychotherapy, Ulm University, Ulm, Germany
[e] Department of Psychosomatic Medicine and Psychotherapy, Technische Universität München, München, Germany
[f] Department of Internal Medicine I, Klinikum Saarbrücken, Saarbrücken, Germany
[g] Department for Psychosomatic Medicine and Psychotherapy, Medical Center of the Philipps University Marburg, Marburg, Germany

ARTICLE INFO

Article history:
Received 18 September 2022
Revised 5 December 2022
Accepted 14 December 2022
Available online 29 December 2022

Keywords:
Diabetes mellitus
Noncommunicable diseases
Child abuse
Personality functioning
Mediation analysis

ABSTRACT

Purpose: This study aimed to examine the role of personality functioning in the association between various types of child maltreatment (CM) (sexual, physical, and emotional abuse as well as physical and emotional neglect) and diabetes in adulthood.
Methods: Analyses are based on representative data of the German population (N = 5,041) from 2016 to 2019. Self-report questionnaires assessed diagnosis of diabetes, child maltreatment (CTQ), personality functioning (OPD-SQS), and symptoms of depression/anxiety (PHQ-4). Odd ratios were calculated to examine the association between CM and diabetes, and mediation analyses including PHQ-4 as covariate were conducted to examine the role of personality functioning.
Results: All CM types significantly elevated the odds of having diabetes in adulthood. Personality functioning mediated the association between abuse and diabetes (sexual: b = 0.012, 95% CI [.002, 0.022], P_M = 25.0%, physical: b = 0.009, 95% CI [.001, 0.017], P_M = 12.0%, and emotional: b = 0.013, 95% CI [.002, 0.024], P_M = 59.8%), but not between neglect and diabetes.
Conclusions: CM is associated with an increased risk of diabetes, with personality functioning being a relevant mediator for CM abuse types. Hence, by focusing on CM prevention and considering impaired personality functioning in diabetes treatment, diabetes self-management and health behavior could be improved.

© 2022 The Author(s). Published by Elsevier Inc.
This is an open access article under the CC BY-NC-ND license
(http://creativecommons.org/licenses/by-nc-nd/4.0/)

Introduction

Child maltreatment (CM) such as emotional, sexual and physical abuse, as well as emotional and physical neglect are a worldwide phenomenon, affecting 31% of the general population in Germany [1]. Recent research has been focusing on the negative implications of CM for patients with diabetes, demonstrating that experiencing CM is associated with a significantly elevated risk of diabetes in adulthood [2–4]. In a representative population-based study, it could be shown that the mere exposure to ≥ 4 types

The authors have no conflicts of interest to disclose.

* Corresponding author. Department of Psychosomatic Medicine and Psychotherapy, Justus Liebig University Giessen, Ludwigstrasse 76, D-35392 Gießen, Germany. Tel.: +49 641/99-45654 Fax: 0641/985-45609.
E-mail address: Sandra.zara@psycho.med.uni-giessen.de (S. Zara).
[1] Joint last author.

https://doi.org/10.1016/j.annepidem.2022.12.004
1047-2797/© 2022 The Author(s). Published by Elsevier Inc. This is an open access article under the CC BY-NC-ND license
(http://creativecommons.org/licenses/by-nc-nd/4.0/)

of CM (compared to none) increased the presence of type 2 diabetes by approximately three times [5]. The adverse impact of CM among patients with diabetes is also reflected by higher mortality rates, higher BMI as well as higher $HbA1_c$ values [6,7], emphasizing the relevance of understanding the underlying pathways through which CM and diabetes are linked.

Underlying endocrinological pathways that might explain the relationship between CM and diabetes, such as a dysregulated cortisol stress reactivity, increased inflammatory markers as well as impairments of hormones contributing to obesity, have long been an object of interest [8–13]. Another focus has been on the negative implications of CM on health behavior. There is ample evidence that CM is associated with e.g. increased risk of smoking, physical inactivity, and obesity in the general population [14] – all of which are well researched risk factors for type 2 diabetes [15,16]. The mechanisms through which CM and impaired health behaviors as well as self-management are linked [17,18] have not yet been fully understood. Recent research on the associations of CM and psychopathologies has been focusing on the mediating role of personality functioning [19–21] – a dimensional measure of basic psychological capacities, that has been included in both the recent DSM-5 and ICD-11 [22,23] – which might also play an important role for the development of diabetes (e.g. through unfavorable health behaviors). Personality functioning describes psychological capacities in the areas 1) self-perception and object-perception, 2) self-regulation and regulation of relationships, 3) internal and external communication, as well as 4) attachment to internal and external objects [24] that develop in early childhood [25]. Early experiences of CM, especially if experienced repeatedly, hamper their development, and thus, result in impaired personality functioning. With regard to diabetes, it has already been shown that certain aspects of personality are associated with diabetes-related distress, diabetes treatment adherence, and self-care behavior [17,18,26]. Therefore, considering personality functioning in patients with diabetes might help to broaden our understanding of the association between CM and diabetes.

To our knowledge, there are no studies investigating the role of personality functioning in patients with CM and diabetes. Based on a representative population-based sample of the German population, the aim of our study was to examine (1) the association between different types of CM and diabetes in adulthood and (2) the mediating effect of personality functioning in the relationship between different types of CM and diabetes in adulthood.

Material and methods

Survey method and participants

For this study, data from two survey waves of the representative surveys conducted in cooperation with the independent demography research institute USUMA Berlin were evaluated. Data of a representative sample of the German population were collected between October and November 2016 (N = 2,510) and May and July 2019 (N = 2,531), yielding a total of N = 5,041 participants. For each survey, the procedure was the same. Households within predefined regions were selected by a random route procedure. In households with multiple persons, one person was randomly selected using the Kish-Selection-Grid. Inclusion criteria were sufficient German language skills, an age > 14 and informed consent before taking part in the study. The surveys were conducted in accordance with the Declaration of Helsinki and fulfilled the ethical guidelines of the International Code of Marketing and Social Research Practice of the International Chamber of Commerce and the European Society of Opinion and Marketing Research. Ethical approval was obtained by the Ethics Committee of the Medical Faculty of the University of Leipzig for each survey (no. 297/16-ek & no. 145/19-ek).

Assessment

Child maltreatment

Different forms of CM were assessed with the Childhood Trauma Questionnaire (CTQ), which is a widely used screening tool for childhood abuse and neglect and used in adults and adolescents from the age of 12. Participants answer questions regarding sexual, emotional and physical abuse and emotional and physical neglect on a scale with response options ranging from 1="not at all" to 5="very often." Each subscale consists of 5 items, resulting in sum scores for each subscale from 5 to 25 and hence, for the total questionnaire from 25 to 125. According to Häuser and colleagues [27], the degree of severity is classified as *none to minimal, low to moderate, moderate to severe* and *severe to extreme*. Prevalences for each type of CM are calculated by evaluating CM as present for each person who has at least experienced moderate to severe CM. The German version of the CTQ was validated by Klinitzke and colleagues [28] and shows good internal consistency, except for physical neglect: sexual abuse: α=0.89, physical abuse: α=0.80, emotional abuse: α=0.87, physical neglect: α=0.55 and emotional neglect: α=0.83. In this study, with the exception of physical neglect, the CTQ showed good to excellent total internal consistency and subscale internal consistency as follows: total: α=0.87, sexual abuse: α=0.92, physical abuse: α=0.84, emotional abuse: α=0.86, physical neglect: α=0.55 and emotional neglect: α=0.86.

Personality functioning

The OPD-SQS is a self-report questionnaire to screen for deficits in personality functioning. It comprises the three subscales, 1) self-perception, 2) interpersonal contact, and 3) relationship model, with four items on each scale. Response options range from 0="does not apply at all" to 4="fully applies", resulting in a sum score ranging from 0 to 48, with higher scores indicating more severe deficits in personality functioning. While the subscale "self-perception" addresses identity perception and self-reflective capacities (e.g. "If I think a lot about myself, I get confused."), the scale "interpersonal contact" refers to interrelation and communication with others (e.g. "I sometimes misjudge how my behavior affects others."). The subscale "relationship model" relates to relationship experiences and attachment (e.g. "If you let others get too close, it can be dangerous."). The OPD-SQS showed good internal consistency (α=0.88) [29]. In the present study, the internal consistency and the total scales' consistency are as follows: total: α=0.89, self-perception: α=0.86, interpersonal contact: α=0.77 and relationship model: α=0.81.

Depression/anxiety symptoms

To assess symptoms of depression/anxiety, the Patient Health Questionnaire (PHQ-4) consisting of four items was used [30]. It comprises two items of the Generalized Anxiety Disorder Scale-2 (GAD-2) to assess anxiety symptoms and the PHQ-2 to assess depression symptoms. Response options range from 0="not at all" to 3="nearly every day," resulting in a sum score ranging from 0 to 12, with scores > 6 indicating a probable presence of a depressive or anxiety disorder and scores > 9 indicating a highly probable presence of a depressive or anxiety disorder. The PHQ-4 showed acceptable to good reliability with McDonald's omega of ω=0.85 (PHQ-2: ω=0.77, GAD-2: ω=0.78) [31]. In the present sample, the internal consistency was good with Cronbach's α=0.87.

Diabetes

Information on diabetes was obtained through the self-report questions: "Is your health currently impaired by any of the fol-

lowing health problems? Please answer all questions for the diseases below. Are you restricted in your activity as a result?" in the first survey wave and "Have you ever been diagnosed with diabetes mellitus by a doctor?" in the second survey wave. In the total sample, those answering one of the two questions with "yes" were considered as patients with diabetes.

Sensitivity analyses

To account for the unavailable separation of type 1 and type 2 diabetes in our sample, we conducted sensitivity analyses for the odd ratios as well as the mediation analyses only with participants aged ≥ 30 years. The results are reported in detail in a supplementary data article [32]. In addition, correlation analyses for all CM types, personality functioning, diabetes as well as symptoms of depression/anxiety are provided. Further, we examined whether symptoms of depression/anxiety are elevated in patients with diabetes and CM compared to patient with diabetes but no experiences of CM.

Statistical analyses

All statistical analyses were conducted in IBM SPSS Statistics version 28. Prevalences for each subtype of CM and diabetes were calculated with a weight variable, providing population representative numbers. To test the association of CM and diabetes, CM was computed into a dichotomous variable with CM being evaluated as present, when at least moderate severity was given (according to Häuser and colleagues [27]) and then, odd ratios (ORs) were calculated. To test whether personality functioning has a mediating effect in the association of CM and diabetes, mediation analyses were performed separately for each type of CM, using the PROCESS macro version 4.1 by Hayes [33] for IBM SPSS Statistics. The respective CTQ subscale sum score was entered as independent variable, the OPD-SQS sum score was entered as mediator and to control for symptoms of depression/anxiety, the PHQ-4 sum score was included as covariate. The mediation effect is evaluated by employing bootstrapped 95% confidence intervals (CI) for the indirect effect of CM on diabetes through personality functioning. Mediation emerges, when the CI for the indirect effect exclude zero [34,35]. Additionally, the proportion of the mediating effect as a proportion of the total effect, P_M, was calculated [36,37]. For all analyses, significance level was set at α=0.05.

Results

Sample characteristics

The representative population-adjusted prevalence of diabetes was 6.5%. Across all participants (N = 5,041), 20.4% (n = 1,028) reported experiencing at least one type of CM with at least moderate severity. Among patients with diabetes (n = 337), 32.0% (n = 108) and among patients without diabetes 19.4% (n = 905) reported at least one type of CM with at least moderate severity. In the total sample, the weight-adjusted prevalence of sexual abuse was 5.7%, of physical abuse 6.0%, of emotional abuse 5.8%, of physical neglect 23.5%, and of emotional neglect 12.6%. In the total sample, 7.6% screened positive for depression and 7.2% screened positive for anxiety. In patients with diabetes, 15.9% screened positive for depression and 14.2% screened positive for anxiety. In Table 1, detailed sociodemographic and psychological characteristics of the total sample and patients with and without diabetes are presented.

Association between different types of child maltreatment and diabetes in adulthood

The odds of reporting diabetes were significantly elevated for all five types of CM (sexual abuse: OR=1.9, 95% CI [1.298, 2.81]; physical abuse: OR=2.2, 95% CI [1.529, 3.143]; emotional abuse: OR=2.0, 95% CI [1.349, 2.837]; physical neglect: OR=2.1, 95% CI [1.545, 2.949], emotional neglect: OR=1.2, 95% CI [0.803, 1.889]). See also Table 2.

Mediation analyses of diabetes, personality functioning and types of child maltreatment

Mediation analyses conducted with symptoms of depression/anxiety as covariate revealed a significant indirect effect of sexual abuse on diabetes through personality functioning, b = 0.012, 95% CI [.002, .022], of physical abuse, b = 0.009, 95% CI [.001, .017], and of emotional abuse, b = 0.013, 95% CI [.002, .024]. The indirect effects of physical neglect and emotional neglect on diabetes through personality functioning were not significant, as the confidence intervals include zero (b = 0.002, 95% CI [−0.002, .006] and b = 0.003, 95% CI [−0.001, .008]). For the mediation models with a significant indirect effect, the proportion mediated (P_M) amounts to 59.8% for emotional abuse, 25.0% for sexual abuse and 12.0% for physical abuse. See also Figure 1.

Discussion

The aim of this study was to examine the association between different types of CM (sexual, physical, and emotional abuse as well as physical and emotional neglect) and diabetes in adulthood, and further, to investigate the role of personality functioning in this association.

Our results show that based on a representative sample of the German population, irrespective of the type, CM significantly elevates the odds of reporting diabetes in adulthood. We show that the highest odds of reporting diabetes persist after experiences of physical abuse or physical neglect, followed by emotional and sexual abuse. In contrast, experiences of emotional neglect showed the lowest odds of reporting diabetes. Although previous literature generally indicates an association between CM and diabetes, the findings for the more specific subtypes of CM are heterogeneous. Some studies found sexual and physical abuse being the strongest predictor for diabetes [4,38], while other evidence found the strongest association between neglect and diabetes [2]. In contrast, a recent representative prospective cohort study including N = 2,973 patients only found a significant association between emotional abuse and type 2 diabetes [39]. Methodological differences might partly explain the diverse results, as e.g. some of the mentioned studies did not investigate physical and emotional neglect separately, or the result is based on either clinical or representative samples. In addition, the measurements of the neglect construct often vary greatly, which might results in heterogeneous findings. Further, neglect can also be influenced by socioeconomic status or historical circumstances [28], i.e. individuals with a low socioeconomic status, which is related to ethnicity or nativity, have a higher probability of experiencing more financial concerns, parental stress, environmental stressors as well as barriers to (mental) healthcare. Future studies should examine the association between different types of CM and diabetes, especially physical and emotional neglect, with particular regard to methodological challenges.

To our knowledge, this is the first study considering personality functioning in the association between CM and diabetes. We performed mediation analyses examining personality functioning as a potential mediator between different subtypes of CM and diabetes,

Table 1
Demographic and clinical characteristics of the total sample and patients with and without diabetes

	Total sample (N = 5,041)*		Patients with diabetes† (n = 337)		Patients without diabetes (n = 4,660)	
Age	n	(%)	n	(%)	n	(%)
14–24	561	(11.1)	8	(2.4)	549	(11.9)
25–34	768	(15.2)	11	(3.3)	747	(16.0)
35–44	786	(15.6)	27	(8.0)	753	(16.2)
45–54	940	(18.6)	39	(11.6)	894	(19.2)
55–64	894	(17.7)	76	(22.6)	806	(17.3)
65–74	683	(13.5)	95	(28.2)	585	(12.6)
> 75	409	(8.1)	81	(24.0)	326	(7.0)
Sex						
Male	2,352	(46.7)	157	(46.6)	2,174	(46.7)
Female	2,689	(53.3)	180	(53.4)	2,486	(53.3)
Partnership status						
Married, living together	2,194	(43.7)	149	(44.2)	2,026	(43.7)
Married, living apart	123	(2.5)	12	(3.6)	110	(2.4)
Single	1,547	(30.8)	39	(11.6)	1,490	(32.1)
Divorced	715	14.2)	65	(19.3)	647	(13.9)
Widowed	441	(8.8)	72	(21.4)	366	(7.9)
Educational status						
< 10 y of education	1,560	(30.9)	166	(49.4)	1,385	(29.7)
10 – 13 y of education	2,812	(55,8)	133	(39.5)	2,654	(57.0)
> 13 y of education	499	(9.9)	35	(10.4)	455	(9.8)
Other qualification	158	(3.1)	2	(0.6)	155	(3.3)
Income‡						
1: < 1,250 €	736	(14.6)	86	(27.0)	647	(14.3)
2: 1,250 - 2,500 €	1,968	(39.0)	138	(43.4)	1,808	(40.0)
3: > 2,500 €	2,971	(43.2)	94	(29.6)	2,068	(45.7)
	M	(SD)	M	(SD)	M	(SD)
OPD-SQS§						
OPD-SQS sum score	11.13	(8.33)	13.78	(8.62)	10.96	(8.26)
OPD-SQS self-perception	1.97	(2.81)	2.50	(3.00)	1.94	(2.79)
OPD-SQS interpersonal contact	3.54	(3.14)	4.58	(3.34)	3.46	(3.10)
OPD-SQS relationship model	5.62	(3.78)	6.81	(3.77)	5.57	(3.76)
PHQ-4‖						
PHQ-4 sum score	1.47	(2.14)	2.37	(2.57)	1.41	(2.09)
PHQ-2 depression	0.78	(1.17)	1.27	(1.40)	0.74	(1.15)
GAD-2 anxiety	0.70	(1.12)	1.11	(1.35)	0.67	(1.10)
CTQ¶						
CTQ sexual abuse						
yes	11.76	(4.30)	13.18	(4.92)	11.55	(4.21)
no	5.06	(0.34)	5.06	(0.34)	5.06	(0.34)
CTQ physical abuse						
yes	13.36	(3.19)	13.66	(3.67)	13.32	(3.12)
no	5.30	(0.87)	5.57	(1.12)	5.28	(0.85)
CTQ emotional abuse						
yes	16.40	(3.40)	15.74	(3.14)	16.49	(3.46)
no	6.01	(1.71)	6.34	(2.03)	5.99	(1.69)
CTQ physical neglect						
yes	12.26	(2.21)	12.55	(2.17)	12.21	(2.21)
no	6.35	(1.51)	6.83	(1.63)	6.32	(1.50)
CTQ emotional neglect						
yes	18.38	(3.02)	19.19	(3.42)	18.33	(2.98)
no	8.13	(2.74)	8.89	(2.90)	8.09	(2.72)

* Missings: n = 44 people did not provide any information about their diabetes status.
† self-reported diabetes.
‡ equivalized household income.
§ OPD-Structure Questionnaire.
‖ Patient Health Questionnaire.
¶ Childhood Trauma Questionnaire.

while controlling for symptoms of depression/anxiety by including the PHQ-4 sum score as covariate. Prior research suggests that having experienced CM is also associated with mental disorders, such as depressive and anxiety disorders [40,41], and this association is in part mediated by personality functioning [19,20]. This is an important aspect that should not be overlooked, since symptoms of depression/anxiety are often present in patients with diabetes. Diabetes has shown to increase the risk of depressive symptomatology [42], while conversely, depressive symptomatology increases the risk of developing type 2 diabetes by 34% [43]. Further, studies have shown that for patients with diabetes the risk of developing an anxiety disorder compared to patients without diabetes is doubled, with fears of acute complications, such as hypoglycemia or subsequent diseases and complications (microvascular complications, e.g. retinopathies, and macrovascular complications), being most prevalent [44]. Controlling for the most prevalent mental health issues – namely symptoms of depression/anxiety – allowed us to focus on the distinct effect of personality functioning.

Our mediation analyses revealed a mediating effect of personality functioning in the association between sexual, physical and emotional abuse and diabetes, but not in the association between physical and emotional neglect and diabetes, emphasizing the interplay of early experiences of abuse and impaired personality functioning for patients with diabetes. Considering personal-

Table 2
Odd ratios relating various types of child maltreatment* to diabetes†

Child maltreatment	Diabetes (n = 337)		No diabetes (n = 4660)		Odd ratio	95%-CI	
	n	(%)	n	(%)		LL	UL
Sexual abuse					1.900	1.298	2.781
yes (n = 287)	33	(11.5)	254	(88.5)			
no (n = 4,687)	300	(6.4)	4,387	(93.6)			
Physical abuse					2.192	1.529	3.143
yes (n = 294)	38	(12.9)	256	(87.1)			
no (n = 4,683)	297	(6.3)	4,386	(93.7)			
Emotional abuse					1.956	1.349	2.837
yes (n = 296)	35	(11.8)	261	(88.2)			
no (n = 4,676)	300	(6.4)	4,376	(93.6)			
Physical neglect					2.135	1.545	2.949
yes (n = 545)	64	(11.7)	481	(88.3)			
no (n = 1,909)	112	(5.9)	1,797	(94.1)			
Emotional neglect					1.231	0.803	1.889
yes (n = 319)	27	(8.5)	292	(91.5)			
no (n = 2,133)	149	(7.0)	1,984	(93.0)			

* Child maltreatment (CM) was measured with the Childhood Trauma Questionnaire (CTQ), the presence of CM was assumed when severity was at least *moderate*. Of the total sample (N = 5,041), 20.4% report at least one type of CM.
† Diabetes was assessed via self-report.

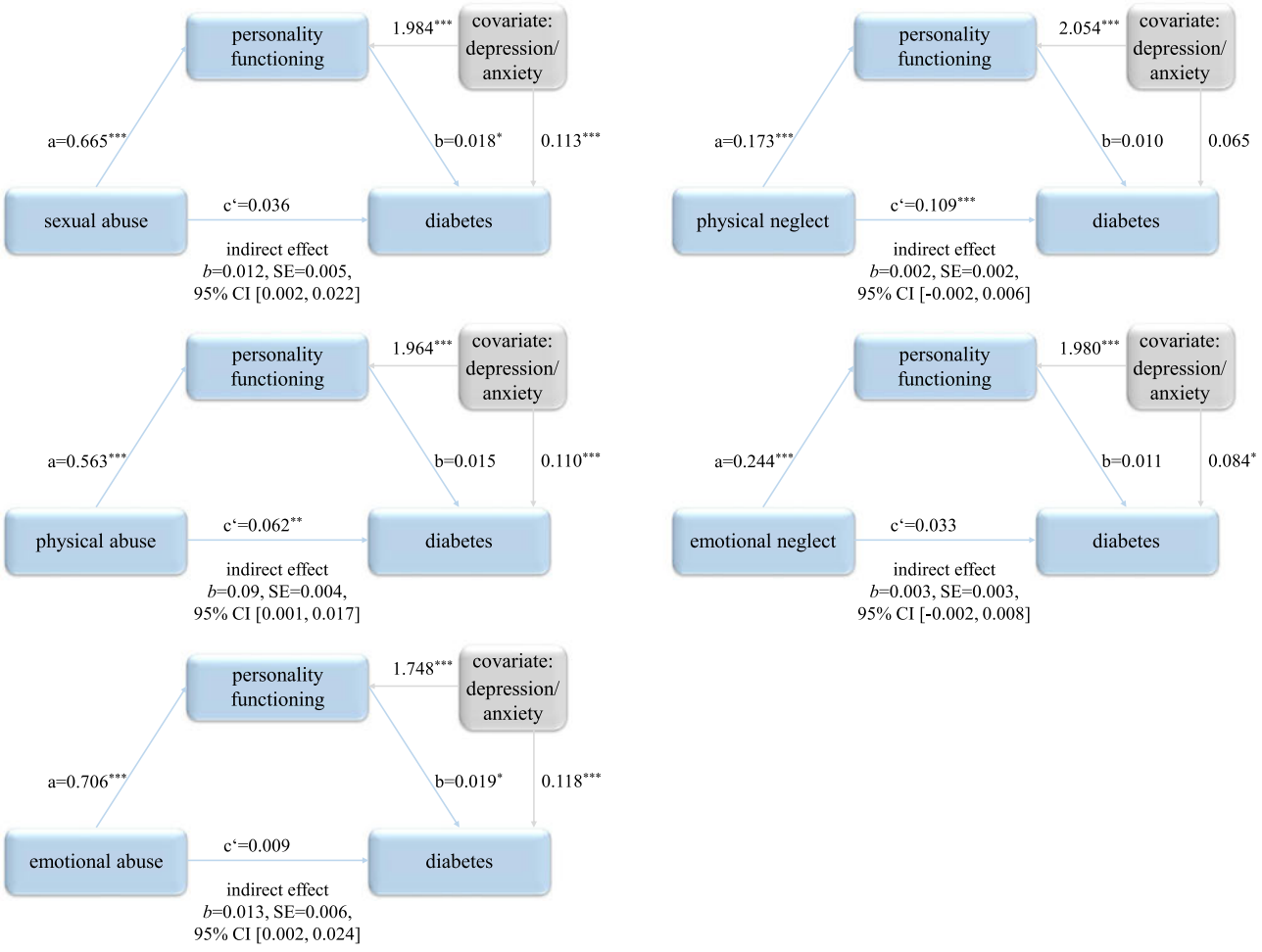


Fig. 1. Path diagrams for each mediation analysis conducted, showing the total effect (c') of the abuse or neglect type of child maltreatment (CM) on diabetes and the indirect (mediating) effect of the abuse or neglect type of CM on diabetes through personality functioning. *P*-values: * $p \leq .05$, ** $p \leq 0.01$, ***, $p \leq .001$.

ity functioning in patients with diabetes is not completely novel. However, previous research rather considered distinct constructs related to personality functioning instead of personality functioning as an overall mechanism. Personality traits [45] and emotion regulation [24] with respect to their impact on health behavior and self-management gained much attention. For example, it could be shown that high neuroticism affects medication adherence as well as self-care behavior in patients with type 2 diabetes [17]. Another study showed that in patients with type 1 diabetes, emotion dysregulation is associated with deliberate insulin restriction as a specific form of disordered eating [46]. Additionally, literature suggests that impaired emotion regulation is associated with emo-

tional eating, a sedentary lifestyle, and reduced physical activity in children [47], which can promote obesity and are well known risk factors associated with type 2 diabetes [48,49]. Based on this evidence, it might be possible that CM abuse and diabetes are associated through impaired personality functioning and its potentially inherent poor health behavior and self-management. Particularly regarding self-management, a study among patients with type 2 diabetes and poor glycemic control found that higher levels of personality functioning predicted a greater incline of $HbA1_c$-values over a 6-month period [50]. Further research is needed to investigate the direct effect of personality functioning on both health behavior and self-management in patients with CM and diabetes as well as its impact on the course of the disease.

Strengths and limitations

A major strength of the present study is the large representative sample of the German population in which the study has been conducted. We add to the evidence of studies which used broader measures for adverse childhood experiences, including e.g. growing up with a parent having a mental illness, by being able to measure CM more precisely and considering the different abuse and neglect subtypes. Further, by using a dimensional yet economical measure of personality functioning, a broad range of psychological capacities could be considered in the association between CM and diabetes. Research on personality functioning is still limited and to our knowledge, this is the first study to examine its role in the association between different types of CM and diabetes.

When interpreting results, some limitations of this study must be recognized. First, the cross-sectional design does not allow conclusions regarding cause and effect between CM, personality functioning and diabetes in adulthood. Further, diabetes in adulthood was assessed via self-report and the design of the data collection did not permit separate investigations of people with type 1 diabetes and type 2 diabetes. Therefore, our data only allow for an overview of type 1 and type 2 diabetes, disregarding the different pathomechanisms of the diabetes types. Hence, future studies should investigate CM and personality functioning for type 1 and type 2 separately. To account for this limitation to a certain degree, we conducted sensitivity analyses with a population ≥ 30 years, presumably minimizing the percentage of people with type 1 diabetes (see sensitivity analyses). In this subsample, we found comparable results. Additional indicators of health such as BMI, smoking or alcohol consumption to consider and control for in the analyses were not available. Further, sociodemographic variables which might influence the occurrence of CM, such as race, ethnicity and nativity, were not included in the dataset. Accounting for frequency and severity of CM might have provided further insights into the association between CM and diabetes.

Conclusion

Our results show that all experiences of CM significantly elevate the odds of reporting diabetes in adulthood, and thus, highlight the relevance of examining the impact of different types of CM for patients with diabetes. We demonstrate that impaired personality functioning (partly) mediates the association between CM abuse and diabetes in adulthood, implying its significance for this patient group. Alongside CM, impaired personality functioning might contribute to diabetes risk by affecting self-management and health behavior – however, future studies should explore this possible interrelationship. Since it has been shown that improving personality functioning is possible through psychotherapy [51], addressing might be beneficial for interventions aiming at improving health behavior and self-management in patients with diabetes.

Author contributions

EB designed the survey, collected the data, and obtained the ethics approval. JK, JMF, WH and CS contributed to data collection. SZ and HK participated in the research design. SZ conducted the data analyses, interpreted the data and wrote the original draft of the manuscript. HK contributed to the writing of the manuscript. HK and JK supervised the drafting of the manuscript. JK, LK, EB, JMF, WH and CS reviewed and edited the manuscript; all authors approved the final version of the manuscript.

Data statement

Data for this article are made publicly available at https://data.mendeley.com/datasets/rkw2g38rjp/1.

Acknowledgments

We would like to thank all participants of the survey. This research did not receive any specific grant from funding agencies in the public, commercial, or not-for-profit sectors.

References

[1] Witt A, Brown RC, Plener PL, Brähler E, Fegert JM. Child maltreatment in Germany: prevalence rates in the general population. Child Adolesc Psychiatry Ment Health 2017;11(1):47. doi:10.1186/s13034-017-0185-0.
[2] Huang H, Yan P, Shan Z, et al. Adverse childhood experiences and risk of type 2 diabetes: a systematic review and meta-analysis. Metabolism 2015;64(11):1408–18. doi:10.1016/j.metabol.2015.08.019.
[3] Huffhines L, Noser A, Patton SR. The link between adverse childhood experiences and diabetes. Curr Diab Rep 2016;16(6):54. doi:10.1007/s11892-016-0740-8.
[4] Shields ME, Hovdestad WE, Pelletier C, Dykxhoorn JL, O'Donnell SC, Tonmyr L. Childhood maltreatment as a risk factor for diabetes: findings from a population-based survey of Canadian adults. BMC Public Health 2016;16(1):879. doi:10.1186/s12889-016-3491-1.
[5] Bellis MA, Hughes K, Leckenby N, Hardcastle KA, Perkins C, Lowey H. Measuring mortality and the burden of adult disease associated with adverse childhood experiences in England: a national survey. J Public Health 2015;37(3):445–54. doi:10.1093/pubmed/fdu065.
[6] Campbell JA, Mosley-Johnson E, Garacci E, Walker RJ, Egede LE. The co-occurrence of diabetes and adverse childhood experiences and its impact on mortality in US adults. J Affect Disord 2019;249:20–5. doi:10.1016/j.jad.2019.02.016.
[7] Ittoop T, Jeffrey K, Cheng CI, Reddy S. The relationship between adverse childhood experiences and diabetes in central michigan adults. Endocr Pract 2020;26(12):1425–34. doi:10.4158/EP-2020-0239.
[8] Schär S, Mürner-Lavanchy I, Schmidt SJ, Koenig J, Kaess M. Child maltreatment and hypothalamic-pituitary-adrenal axis functioning: a systematic review and meta-analysis. Front Neuroendocrin 2022;66:100987. doi:10.1016/j.yfrne.2022.100987.
[9] Fagundes CP, Glaser R, Kiecolt-Glaser JK. Stressful early life experiences and immune dysregulation across the lifespan. Brain Behav Immun 2013;27:8–12. doi:10.1016/j.bbi.2012.06.014.
[10] McLaughlin KA, Sheridan MA, Alves S, Mendes WB. Child maltreatment and autonomic nervous system reactivity: identifying dysregulated stress reactivity patterns by using the biopsychosocial model of challenge and threat. Psychosom Med 2014;76(7):538–46. doi:10.1097/PSY.0000000000000098.
[11] Baumeister D, Akhtar R, Ciufolini S, Pariante CM, Mondelli V. Childhood trauma and adulthood inflammation: a meta-analysis of peripheral C-reactive protein, interleukin-6 and tumour necrosis factor-α. Mol Psychiatry 2016;21(5):642–9. doi:10.1038/mp.2015.67.
[12] Danese A, Tan M. Childhood maltreatment and obesity: systematic review and meta-analysis. Mol Psychiatry 2014;19(5):544–54. doi:10.1038/mp.2013.54.
[13] Joung KE, Park KH, Zaichenko L, et al. Early life adversity is associated with elevated levels of circulating leptin, irisin, and decreased levels of adiponectin in midlife adults. J Clin Endocr 2014;99(6):E1055–60. doi:10.1210/jc.2013-3669.
[14] Hughes K, Bellis MA, Hardcastle KA, et al. The effect of multiple adverse childhood experiences on health: a systematic review and meta-analysis. Lancet Public Health 2017;2(8):e356–66. doi:10.1016/S2468-2667(17)30118-4.
[15] Maddatu J, Anderson-Baucum E, Evans-Molina C. Smoking and the risk of type 2 diabetes. Transl Res 2017;184:101–7. doi:10.1016/j.trsl.2017.02.004.
[16] La Sala L, Pontiroli AE. Prevention of diabetes and cardiovascular disease in obesity. IJMS 2020;21(21):8178. doi:10.3390/ijms21218178.
[17] Hazrati-Meimaneh Z, Amini-Tehrani M, Pourabbasi A, et al. The impact of personality traits on medication adherence and self-care in patients with type 2 diabetes mellitus: the moderating role of gender and age. J Psychosom Res 2020;136:110178. doi:10.1016/j.jpsychores.2020.110178.

[18] Sanatkar S, Baldwin P, Clarke J, et al. The influence of personality on trajectories of distress, health and functioning in mild-to-moderately depressed adults with type 2 diabetes. Psychol Health Med 2020;25(3):296–308. doi:10.1080/13548506.2019.1668567.
[19] Krakau L, Tibubos AN, Beutel ME, Ehrenthal JC, Gieler U, Brähler E. Personality functioning as a mediator of adult mental health following child maltreatment. J. Affect. Disord. 2021;291:126–34. doi:10.1016/j.jad.2021.05.006.
[20] Freier A, Kruse J, Schmalbach B, et al. The mediation effect of personality functioning between different types of child maltreatment and the development of depression/anxiety symptoms – A German representative study. J Affect Disord 2022;299:408–15. doi:10.1016/j.jad.2021.12.020.
[21] Kampling H., Kruse J., Lampe A., et al. Epistemic trust and personality functioning as mediators for the association of adverse childhood experiences and posttraumatic as well as complex posttraumatic stress symptoms in adulthood. Front Psychiatry, in press.
[22] Morey LC, Hopwood CJ. Expert preferences for categorical, dimensional, and mixed/hybrid approaches to personality disorder diagnosis. J Pers Disord 2019:1–8. doi:10.1521/pedi_2019_33_398.
[23] Bach B, First MB. Application of the ICD-11 classification of personality disorders. BMC Psychiatry 2018;18(1):351. doi:10.1186/s12888-018-1908-3.
[24] Ehrenthal J, Benecke C. Tailored treatment planning for individuals with personality disorders. In: Case formulation for personality disorders. London: Ueli Kramer; 2019. p. 291–314. doi:10.1016/B978-0-12-813521-1.00015-1.
[25] Beebe B, Jaffe J, Markese S, et al. The origins of 12-month attachment: a microanalysis of 4-month mother–infant interaction. Attach Hum Devt 2010;12(1–2):3–141. doi:10.1080/14616730903338985.
[26] Woon LSC, Sidi HB, Ravindran A, et al. Depression, anxiety, and associated factors in patients with diabetes: evidence from the anxiety, depression, and personality traits in diabetes mellitus (ADAPT-DM) study. BMC Psychiatry 2020;20(1):227. doi:10.1186/s12888-020-02615-y.
[27] Häuser W, Schmutzer G, Brähler E, Glaesmer H. Maltreatment in childhood and adolescence. Dtsch Arzteblatt Int 2011. doi:10.3238/arztebl.2011.0287.
[28] Klinitzke G, Romppel M, Häuser W, Brähler E, Glaesmer H. Die deutsche Version des Childhood Trauma Questionnaire (CTQ) – psychometrische Eigenschaften in einer bevölkerungsrepräsentativen Stichprobe. Psychother Psych Med 2012;62(02):47–51. doi:10.1055/s-0031-1295495.
[29] Ehrenthal J, Dinger U, Schauenburg H, Horsch L, Dahlbender RW, Gierk B. Entwicklung einer Zwölf-Item-Version des OPD-Strukturfragebogens (OPD-SFK)/Development of a 12-item version of the OPD-Structure Questionnaire (OPD-SQS). Z Psychosom Med Psychother 2015;61(3):262–74. doi:10.13109/zptm.2015.61.3.262.
[30] Löwe B, Wahl I, Rose M, et al. A 4-item measure of depression and anxiety: validation and standardization of the Patient Health Questionnaire-4 (PHQ-4) in the general population. J Affect Disord 2010;122(1–2):86–95. doi:10.1016/j.jad.2009.06.019.
[31] Wicke FS, Krakau L, Löwe B, Beutel ME, Brähler E. Update of the standardization of the Patient Health Questionnaire-4 (PHQ-4) in the general population. J Affect Disord 2022;312:310–14. doi:10.1016/j.jad.2022.06.054.
[32] Zara S., Brähler E., Sachser C., et al. Supplementary data on the mediating effect of personality functioning in the association of child maltreatment and diabetes in adulthood. Data Br, in press.
[33] Hayes A. Introduction to mediation, moderation, and conditional process analysis: a regression-based approach. New York: Guilford publications; 2017.
[34] Field A. Discovering statistics using ibm spss statistics. 5th edition. Thousand Oaks, California: SAGE Publications; 2017.
[35] Preacher KJ, Hayes AF. SPSS and SAS procedures for estimating indirect effects in simple mediation models. Behav Res Meth Instrum Comput 2004;36(4):717–31. doi:10.3758/BF03206553.
[36] Pieters R. Meaningful mediation analysis: plausible causal inference and informative communication. J Consum Res 2017;44(3):692–716. doi:10.1093/jcr/ucx081.
[37] Shrout PE, Bolger N. Mediation in experimental and nonexperimental studies: new procedures and recommendations. Psychol Methods 2002;7(4):422–45. doi:10.1037/1082-989X.7.4.422.
[38] Campbell JA, Farmer GC, Nguyen-Rodriguez S, Walker R, Egede L. Relationship between individual categories of adverse childhood experience and diabetes in adulthood in a sample of US adults: does it differ by gender? J Diabetes Complicat 2018;32(2):139–43. doi:10.1016/j.jdiacomp.2017.11.005.
[39] Atasoy S, Hamimatunnisa J, Fleischer T, et al. Depression mediates the association between childhood emotional abuse and the onset of type 2 diabetes: findings from German Multi-Cohort Prospective Studies. Front Psychiatry 2022. doi:10.3389/fpsyt.2022.825678.
[40] Gardner MJ, Thomas HJ, Erskine HE. The association between five forms of child maltreatment and depressive and anxiety disorders: a systematic review and meta-analysis. Child Abuse Negl 2019;96:104082. doi:10.1016/j.chiabu.2019.104082.
[41] Li D, Arcy C, Meng X. Maltreatment in childhood substantially increases the risk of adult depression and anxiety in prospective cohort studies: systematic review, meta-analysis, and proportional attributable fractions. Psychol Med 2016;46(4):717–30. doi:10.1017/S0033291715002743.
[42] Kampling H, Kruse J. Diabetes und depressive Störungen Diabetol. Und Stoffwechsel 2020;15(03):211–24. doi:10.1055/a-0983-7416.
[43] Chireh B, Li M, D'Arcy C. Diabetes increases the risk of depression: a systematic review, meta-analysis and estimates of population attributable fractions based on prospective studies. Prev Med Rep 2019;14:100822. doi:10.1016/j.pmedr.2019.100822.
[44] Smith KJ, Deschênes SS, Schmitz N. Investigating the longitudinal association between diabetes and anxiety: a systematic review and meta-analysis. Diabet Med 2018;35(6):677–93. doi:10.1111/dme.13606.
[45] McCrae RR, Terracciano A. 78 members of the personality profiles of cultures project. universal features of personality traits from the observer's perspective: data from 50 cultures. J Pers Soc Psychol 2005;88(3):547–61. doi:10.1037/0022-3514.88.3.547.
[46] Beam AB, Wiebe DJ, Berg CA. Insulin restriction, emotion dysregulation, and depressive symptoms in late adolescents with diabetes. J Pediatr Psychol 2021;46(9):1110–18. doi:10.1093/jpepsy/jsab042.
[47] Aparicio E, Canals J, Arija V, De Henauw S, Michels N. The role of emotion regulation in childhood obesity: implications for prevention and treatment. Nutr Res Rev 2016;29(1):17–29. doi:10.1017/S0954422415000153.
[48] Twig G, Afek A, Derazne E, et al. Diabetes risk among overweight and obese metabolically healthy young adults. Dia Care 2014;37(11):2989–95. doi:10.2337/dc14-0869.
[49] Venables MC, Jeukendrup AE. Physical inactivity and obesity: links with insulin resistance and type 2 diabetes mellitus. Diabetes Metab Res Rev 2009;25(S1):S18–23. doi:10.1002/dmrr.983.
[50] Ehrenthal J, Düx A, Baie L, Burgmer M. Levels of personality functioning and not depression predict decline of plasma glucose concentration in patients with type 2 diabetes mellitus. J Diabetes Res 2019;151:106–13. doi:10.1016/j.diabres.2019.04.011.
[51] Kraus B, Dammann G, Rudaz M, Sammet I, Jeggle D. Grimmer B. Changes in the level of personality functioning in inpatient psychotherapy. Psychother Res 2021;31(1):117–31.

frontiers | Frontiers in Psychiatry

TYPE Original Research
PUBLISHED 17 July 2025
DOI 10.3389/fpsyt.2025.1608601

Check for updates

OPEN ACCESS

EDITED BY
André Kerber,
Free University of Berlin, Germany

REVIEWED BY
Larissa Vierl,
Ludwig Maximilian University of Munich Germany
Ludwig Ohse,
Medical School Berlin, Germany

*CORRESPONDENCE
Sandra Zara
sandra.zara@psycho.med.uni-giessen.de

RECEIVED 09 April 2025
ACCEPTED 24 June 2025
PUBLISHED 17 July 2025

CITATION
Zara S, Ullrich IC, Leveling AM, Saretzki FGG, Schmitz J, Eckhard M, Kruse J and Kampling H (2025) Diabetes-related distress and psychological burden in patients with type 1 and type 2 diabetes – the role of child maltreatment, personality functioning, and epistemic trust: findings from a German clinical inpatient sample.
Front. Psychiatry 16:1608601.
doi: 10.3389/fpsyt.2025.1608601

COPYRIGHT
© 2025 Zara, Ullrich, Leveling, Saretzki, Schmitz, Eckhard, Kruse and Kampling. This is an open-access article distributed under the terms of the Creative Commons Attribution License (CC BY). The use, distribution or reproduction in other forums is permitted, provided the original author(s) and the copyright owner(s) are credited and that the original publication in this journal is cited, in accordance with accepted academic practice. No use, distribution or reproduction is permitted which does not comply with these terms.

Diabetes-related distress and psychological burden in patients with type 1 and type 2 diabetes – the role of child maltreatment, personality functioning, and epistemic trust: findings from a German clinical inpatient sample

Sandra Zara[1*], Imogen Carla Ullrich[1], Anna Maria Leveling[1], Friederike Gisela Genoveva Saretzki[1], Jana Schmitz[1], Michael Eckhard[2], Johannes Kruse[1,3,4] and Hanna Kampling[1,4]

[1]Department of Psychosomatic Medicine and Psychotherapy, Justus Liebig University Gissen, Giessen, Germany, [2]GZW Diabetes-Klinik Bad Nauheim, Bad Nauheim, Germany, [3]Department for Psychosomatic Medicine and Psychotherapy, Medical Center of the Philipps University, Marburg, Germany, [4]German Center for Diabetes Research (DZD), Neuherberg, Germany

Introduction: Patients with diabetes exhibit high frequencies of psychological burden and diabetes-related distress. Child maltreatment has been independently linked to both diabetes and psychological burden. We aimed 1) to explore the association between child maltreatment and diabetes-related distress, and between child maltreatment and psychological burden, and 2) to investigate the mediating role of personality functioning (psychological abilities with regard to the self and others) in this association. We included epistemic trust (openness for social learning) and its impairments mistrust (the tendency to consider information sources as unreliable or ill-intended) and credulity (lack of vigilance and discrimination between trustworthy and untrustworthy information) as covariates.

Methods: In a sample of n=119 patients with type 1 or 2 diabetes aged 18-69, self-report questionnaires assessed diabetes-related distress (PAID-5), psychological burden (PHQ-D, PHQ-9, PHQ-15), child maltreatment (CTQ), personality functioning (OPD-SQS), and epistemic trust, mistrust, and credulity (ETMCQ). Mediation analyses assessed the role of personality functioning in the association between child maltreatment, diabetes-related distress, and psychological burden, including epistemic trust, mistrust, and credulity as covariates.

Results: Patients with child maltreatment compared to those without showed higher diabetes-related distress ($t_{(112)}$=4.033, p<.001, d=.756) and higher frequencies of major depressive syndrome ($\chi^2_{(1)}$=10.968, p<.001, φ=.310) with medium effect sizes. They showed higher frequencies of somatoform syndrome ($\chi^2_{(1)}$=8.130, p=.004, φ=.267), panic syndrome ($\chi^2_{(1)}$=6.281, p=.012, φ=.235), and other anxiety syndromes ($\chi^2_{(1)}$=8.828, p=.003, φ=.278), with small effect sizes.

Impairments in personality functioning were more severe ($t_{(100,857)}$=5.136, p<.001, d=.967), with a large effect size. Epistemic mistrust and credulity were significantly higher (mistrust: $t_{(111)}$=3.677, p<.001, d=.692; credulity: $t_{(111)}$=5.000, p<.001, d=.941), with medium and large effect sizes. No differences regarding epistemic trust were found ($t_{(111)}$=.409, p=.683, d=.077), with the effect size below the threshold for small effects. Personality functioning mediated the association between child maltreatment and diabetes-related distress (b=.03, 95%-CI [.005,.053]), depressive symptoms (b=.08, 95%-CI [.030,.129]), and somatic symptoms (b=.06, 95%-CI [.020,.122]).

Conclusions: In a clinical diabetes sample, diabetes-related distress and psychological burden are frequently reported, and personality functioning is impaired, particularly after child maltreatment. Addressing these impairments and initiating psychosomatic treatment including psychodynamic or mentalization-based interventions might offer new clinical treatment avenues.

KEYWORDS

child maltreatment, clinical sample, diabetes-related distress, epistemic trust, personality functioning, psychological burden

1 Introduction

Diabetes mellitus is a chronic non-communicable disease characterized by steadily heightened blood glucose levels, affecting up to 11% of the German population (1). It is associated with increased morbidity, mortality, and impaired quality of life, which is primarily attributable to somatic secondary diseases as well as high psychological burden (2, 3). The most common diabetes types are type 1 and type 2 diabetes. While type 1 diabetes is characterized by an autoimmune destruction of the insulin-producing β-cells in the pancreas, potentially resulting in a severe underproduction or even a complete lack of insulin (4, 5), type 2 diabetes is linked to lifestyle factors such as obesity, unfavourable diet, and lack of exercise. Type 2 diabetes accounts for around 90% of diabetes cases (6).

Diabetes-related distress and psychological burden in terms of e.g., depressive and anxiety symptoms or phenomena linked to psychological burden, such as suicidal ideation and loneliness, are highly prevalent in patients with diabetes (7–10). Studies show that diabetes-related distress and psychological burden are independently from one another associated with impaired diabetes self-management, diabetes-related complications, increased morbidity and mortality, reduced quality of life as well as increased health care costs (11–15). Further, individuals with diabetes compared to the general population are at nearly twice the risk of developing depressive and anxiety symptoms (16, 17), and approximately 22% of patients with type 1 and 36% of patients with type 2 diabetes report elevated diabetes-related distress (18, 19).

One psychosocial aspect gaining more prominence in diabetes research is adverse childhood experiences (ACEs). ACEs comprise sexual, physical and emotional abuse, physical and emotional neglect as well as household dysfunctions (e.g., loss of a parent, alcohol/drug abuse) (20, 21). While around 20% of the German general population report at least one type of ACE of at least moderate severity, among individuals with diabetes the frequency of ACEs is considerably higher with up to 32% (22). ACEs appear to be a risk factor for the onset of diabetes (23–25), and among individuals with diabetes they are also associated with higher depression and anxiety symptoms, stronger impairments in diabetes self-management, a less frequent utilization of diabetes care, higher blood sugar levels, and more frequent suicidal ideation (9, 26, 27).

With the intertwined negative implications for patients with diabetes regarding ACEs, diabetes-related distress, and psychological burden, it is necessary to better understand their underlying and shared mechanisms. While little is known regarding diabetes-related distress, other lines of research increasingly employ the transdiagnostic constructs of personality functioning and the epistemic stance comprising epistemic trust, mistrust, and credulity and its relevance in understanding the association between ACEs and psychological burden (28, 29). Both personality functioning and the epistemic stance develop in early childhood in the context of secure attachment experiences (30) and can be impaired by ACEs. Personality functioning (also called structure) as defined by the Operationalized Psychodynamic Diagnosis System (OPD), describes a person's basic psychological abilities with regard to the self, e.g., identity and self-esteem, and in relation to others, e.g., empathy and intimacy in the four domains cognition/perception, regulation, communication, and attachment (31). This allows for a differentiated and dimensional assessment of a person's psychological abilities or personality functioning respectively.

Accordingly, related – but distinct – approaches to dimensionally assess primarily personality disorders have been considered in the Alternative Model of Personality Disorders (AMPD) in the 5th edition of the Diagnostic and Statistical Manual of Mental Disorders (DSM-5) (32) as well as the ICD-11, replacing a solely categorical assessment of personality disorders by a dimensional severity rating (33, 34). Impairments in personality functioning were linked to numerous psychological burden e.g., depression and anxiety symptoms, (complex) posttraumatic stress disorder symptoms, and somatic symptom disorder (28, 29, 35). Closely related to personality functioning is the epistemic stance, with epistemic trust describing a persons' openness for social learning opportunities and trust in socially transmitted information (36). Disruptions of epistemic trust might result in epistemic mistrust, which is the tendency to judge sources of information as not credible and avoiding influence by socially mediated information, or epistemic credulity, describing the susceptibility to misinformation and vulnerability for exploitation by others (37). Epistemic trust is crucial for a healthy development of personality functioning and might be highly relevant for the patient-physician-relationship, as trusting information, especially of diabetologists, is a key element in successful diabetes treatment. Diabetes research has only recently picked up on the importance of personality functioning and demonstrated based on a representative population sample that impairments in personality functioning mediate the association between child abuse and diabetes (22). Further, impaired personality functioning rather than depressive symptoms are associated with a less steep decline of blood sugar levels during a six month standardized disease management program (38), indicating the relevance of personality functioning to better understand associated detrimental effects of ACEs and psychological burden in patients with diabetes.

Against this background, the aim of this study is a) to add evidence to the associations between ACEs and diabetes-related distress, and ACEs and psychological burden, and b) expand the knowledge on personality functioning and epistemic trust, mistrust, and credulity in a clinical sample of patients with type 1 and type 2 diabetes. Employing the construct of child maltreatment comprising sexual, physical, emotional abuse as well as physical and emotional neglect, we investigated the following research questions:

I. Do patients with diabetes and a history of child maltreatment compared to those without child maltreatment show higher diabetes-related distress and more frequent psychological burden?
II. Do patients with diabetes and a history of child maltreatment compared to those without child maltreatment show higher impairments in personality functioning and epistemic trust, mistrust, and credulity?
III. Is the association between child maltreatment and diabetes-related distress, as well as between child maltreatment and psychological burden, mediated by personality functioning, including epistemic trust, mistrust, and credulity as covariates?

2 Methods

2.1 Sample and setting

Patients with medically diagnosed diabetes mellitus type 1 or type 2 were recruited between August 2022 and October 2024 in a specialized diabetes clinic in Germany. Demographics and clinical data were obtained from routine medical records of the hospital at the point of admission. Inclusion criteria comprised an age between 18 and 69, blood sugar levels (HbA_{1c}) > 58 mmol/mol (7.5%), at least 2 years since the diabetes diagnosis, having participated in a diabetes training, and were therefore expected to be sufficiently educated and capable to deal with their diabetes. Further, sufficient German language skills and cognitive ability were required. Exclusion criteria comprised patients with a type 3 diabetes or gestation diabetes, severe comorbid illnesses, e.g., severe depressive episodes, or dementia. This investigation is part of the project "Ed-iPP: Capturing Diabetes-Related Distress and Burden From the Perspective of Patients With Type 1 or Type 2 Diabetes", which comprised qualitative assessments in phase 1) and quantitative assessments in phase 2). In phase 1) n=40 patients with type 1 and type 2 diabetes and in phase 2) n=100 patients with type 1 and type 2 diabetes were included in the study, resulting in a total of n=140. However, due to not meeting inclusion criteria or retracting consent, n=21 patients were excluded from the study, resulting in a final analyses sample of n=119 patients. The final analyses sample comprised n=57 (47.9%) patients with type 1 and n=62 (52.1%) patients with type 2 diabetes. In the total sample, the mean age was 49.4 years. With 65.0%, the percentage of males was higher than the percentage of females. The present study focuses on quantitative analyses. The study protocol can be found elsewhere (39). The Ed-iPP-study was approved by the ethics committee of the Justus Liebig University Giessen (AZ 161/21) and was conducted according to the applicable COVID-19 restrictions as well as the German General Data Protection Regulation (DSGVO) and the State and Federal Data Protection Act (LDSG and BDSG).

2.2 Assessment

2.2.1 Child maltreatment – childhood trauma questionnaire

The CTQ retrospectively assesses sexual, emotional and physical abuse as well as emotional and physical neglect with 5 items per subscale. Answers range from 1='not at all' to 5='very often', with sum scores ranging from 5 to 25 for each subscale and 25 to 125 for the total scale. The severity of each type of child maltreatment was calculated using norm data, resulting in four severity levels: 'none to minimal', 'minimal to moderate', 'moderate to severe' and 'severe to extreme' (40). Dichotomous categories of child maltreatment were created, with scores reflecting at least moderate severity indicating the presence of the respective type of child maltreatment (≥ 8 for sexual abuse, ≥ 10 for physical abuse, ≥ 13 for emotional abuse, ≥ 10 for physical neglect, and ≥ 15 for emotional neglect) (41, 42). These cut-off scores to indicate the

presence of child maltreatment are widely used in German prevalence studies (43, 44). The 5-factor structure has been confirmed for the German version, showing good validity and internal consistency for all subscales (α=.80-.89), except for physical neglect (α=.55) (40). In the present sample, internal consistency for the total scale was excellent (α=.92), and ranged between (α=.60-.95) for the subscales.

2.2.2 Diabetes-related distress – problem areas in diabetes scale (PAID-5)

The PAID-5 addresses burden regarding diabetes self-management consisting of 5 Items (45), with response options ranging from 0='no problem' to 4='big problem'. The sum score ranges between 0 and 20, a cut-off-value of ≥ 11 indicates high diabetes-related distress (46). The PAID-5 shows satisfactory sensitivity (94%) and specificity (89%). The German version has shown good internal consistency α=.83 (46). In the present sample, internal consistency for the total scale was good (α=.86).

2.2.3 Psychological burden – patient-health-questionnaire

The PHQ-D assesses numerous psychopathologies according to DSM-IV criteria and has proven to be a valid and reliable screening measure for major depressive syndrome, somatoform syndrome, panic syndrome, other anxiety syndromes, bulimia nervosa, binge-eating disorder, and alcohol syndrome (47, 48). Each psychopathology can be categorically evaluated. Moreover, depressive symptoms as well as somatic symptoms can be dimensionally assessed with the PHQ-9 and PHQ-15 respectively as part of the PHQ-D. The PHQ-9 comprises 9 items addressing depressive symptoms, with response options ranging from 0='not at all' to 3='nearly every day' (49). The sum score ranges from 0 to 27, with values from 5–9 indicating mild, values from 10–14 indicating moderate, and values from 15–27 indicating severe depressive symptoms (49). The PHQ-15 contains 15 items addressing somatic complaints with response options ranging from 0='not bothered at all' to 2='bothered a lot', as well as two items of the PHQ-9 addressing sleep quality and energy levels. The total score ranges from 0 to 30 (50). The severity of somatic symptoms can be assessed as minimal (0–4), low (5-9), medium (10-14), or high (15-30) (50). The PHQ-D has shown good validity, especially for major depressive syndrome (48). In the present sample, the internal consistency for each PHQ-D scale ranged from α=.94-.81 (PHQ-9: α=.91; PHQ-15: α=.82), with the weakest internal consistency being observed for bulimia nervosa (α=.55) and alcohol syndrome (α=.43).

2.2.4 Personality functioning – operationalized psychodynamic diagnosis–structure questionnaire short form

Personality functioning and related impairments as defined by the Operationalized Psychodynamic Diagnosis System are assessed with the OPD-SQS (31, 51, 52). It comprises three subscales (self-perception, interpersonal contact, and relationship model) with four items each. Response options range from 0='does not apply at all' to 4='fully applies', resulting in a sum score ranging from 0 to 48. Higher scores indicate more severe deficits in personality functioning. The OPD-SQS showed good factor validity, convergent validity, and internal consistency (α=.88) (52). In the present study, the internal consistency of the total scale is α=.91.

2.2.5 Epistemic trust, mistrust, and credulity – epistemic trust, mistrust and credulity questionnaire

The epistemic stance comprising epistemic trust, mistrust, and credulity is assessed with the German 12-item self-report questionnaire ETMCQ (53). Response options range from 1='strongly disagree' to 7='strongly agree', with higher scores indicating a stronger endorsement of trust, mistrust, or credulity. The subscales comprise five items for trust, three items for mistrust, and four items for credulity, with sum scores ranging from 5 to 35, 3 to 21, and 4 to 28 respectively (53). Good to acceptable internal consistency has been proposed for the German version (trust: α=.81; ω=.81; mistrust: α=.65; ω=.66; credulity: α=.81; ω=.81) (53). In the present sample, the subscales showed acceptable internal consistency with ω=.69 for epistemic trust, ω=.76 for mistrust, and ω=.79 for credulity.

2.3 Statistical analyses

In order to investigate group differences between patients with diabetes with and without child maltreatment, a dichotomous child maltreatment variable was calculated. If a patient reported at least one type of child maltreatment of at least moderate severity, child maltreatment was evaluated as present. No child maltreatment was defined as not reporting any type of child maltreatment. Differences were investigated regarding diabetes-related distress, psychological burden, personality functioning, and epistemic trust, mistrust, and credulity, and examined with *t*-tests and Chi^2-tests. Regarding effect sizes, Phi (φ) was reported for 2x2 contingency tables, Cramer's V for non 2x2 contingency tables, and Cohen's d for independent *t*-Tests. Phi and Cramer's V values of.1,.3, and.5 are considered small, medium, and large effects respectively (54). Cohen's d of.2,.5, and.8 is considered a small, medium, and large effect respectively (54). Mediation analyses tested the associations between child maltreatment, personality functioning, and diabetes-related distress as well as between child maltreatment, personality functioning, and psychological burden in terms of depressive and somatic symptoms (PHQ-9 and PHQ-15) including epistemic trust, mistrust, and credulity as covariates. We followed two steps: first, the direct association between child maltreatment and diabetes-related distress and between child maltreatment and psychological burden respectively, was examined. Next, a mediation model employing personality functioning as a mediator and epistemic trust, mistrust, and credulity as covariates was tested. Model fit was examined with adjusted R^2, interpreted as small (R^2=.02), medium (R^2=.13), or large (R^2=.26) (54). The significance of the associations was examined using bootstrapped confidence intervals (5,000 samples, 95%-confidence intervals (CI)). Mediation analyses were

conducted with the PROCESS macro (v4.2) for IBM SPSS Statistics (55). Child maltreatment (CTQ sum score) was added as independent variable, personality functioning (OPD-SQS sum score) was added as a mediator, and diabetes-related distress (PAID-5 sum score) and psychological burden (depressive symptoms: PHQ-9 sum score; somatic symptoms: PHQ-15 sum score) were added as dependent variable respectively. Epistemic trust, mistrust, and credulity (ETMCQ-12 subscale sum scores) were added as covariates. A mediating effect is present, if the CIs of the regression weight exclude zero. Significance levels were set at p <.05. All analyses were conducted in IBM SPSS Statistics v29.

3 Results

3.1 Sociodemographic and clinical characteristics

In the total sample, 32.8% (type 1: 29.8%, type 2: 35.5%) reported elevated diabetes-related distress (PAID-5 ≥ 11). Moreover, 53.8% (type 1: 52.6%, type 2: 54.8%) met the categorical self-report threshold for at least one psychopathology based on the PHQ-D, and 26.9% met the threshold for two or more types of psychopathology. The most frequently reported psychological burden was major depressive syndrome (32.8%), followed by somatoform syndrome (26.9%), anxiety syndromes (15.1%), binge-eating disorder (12.6%), panic syndrome (10.9%), alcohol syndrome (10.1%), and bulimia nervosa (2.5%). Regarding the severity of depressive and somatic symptoms (PHQ-9 and PHQ-15), 10.0% of patients reported severe depressive symptoms and 28.3% reported severe somatic symptoms. Regarding child maltreatment, 49.1% self-reported at least one type of at least moderate abuse or neglect, and 37.0% reported at least one type of severe abuse or neglect (CTQ). The most frequently self-reported type of child maltreatment was physical neglect (31.0%), closely followed by emotional neglect (30.2%), emotional abuse (23.9%), physical abuse (16.7%), and sexual abuse (8.7%).

Comparing the diabetes types showed that patients with type 2 diabetes were significantly older compared to patients with type 1 diabetes (t $(_{84,174})$=8.573, p <.001, d=1.604), with a large effect size. The percentage of male participants was higher in patients with type 2 diabetes compared to type 1 diabetes ($\chi^2_{(1)}$=6.984, p=.008, φ=.242), with a small effect size. Regarding diabetes-related distress, the frequency of any type of self-reported psychological burden, as well as the severity of depressive and somatic symptoms there were no differences. Regarding different types of child maltreatment, patients with type 2 diabetes reported significantly more often physical abuse ($\chi^2_{(1)}$=4.391, p=.036, φ=.196), and emotional neglect ($\chi^2_{(1)}$=3.929, p=.047, φ=.184), with small effect sizes. Regarding personality functioning and epistemic trust, no differences emerged. For more details, see Table 1.

TABLE 1 Sociodemographic and clinical characteristics.

	Total sample (n=119)		Type 1 diabetes[a] (n=57)		Type 2 diabetes[a] (n=62)		Test statistics	Effect size
	N	(%)	N	(%)	N	(%)		
Gender								
male	77	(65.0)	30	(52.6)	47	(75.8)	$\chi^2_{(1)}$ = 6.984, p = .008	φ = .242
female	42	(35.0)	27	(47.4)	15	(24.2)		
Psychological burden[b]								
major depressive syndrome	39	(32.8)	17	(29.8)	22	(35.5)	$\chi^2_{(1)}$ = .432, p = .511	φ = .060
somatoform syndrome	32	(26.9)	12	(21.1)	20	(32.3)	$\chi^2_{(1)}$ = 1.897, p = .168	φ = .126
panic syndrome	13	(10.9)	5	(8.8)	8	(12.9)	$\chi^2_{(1)}$ = .521, p = .470	φ = .066
other anxiety syndromes	18	(15.1)	5	(8.8)	13	(21.0)	$\chi^2_{(1)}$ = 3.441, p = .064	φ = .170
bulimia nervosa	3	(2.5)	0	(0.0)	3	(4.8)	n.a.[c]	
binge-eating disorder	15	(12.6)	8	(14.3)	7	(13.0)	$\chi^2_{(1)}$ = .041, p = .840	φ = .019
alcohol syndrome	12	(10.1)	8	(14.0)	4	(6.5)	$\chi^2_{(1)}$ = 1.884, p = .170	φ = .126
Depressive symptom severity[d]								
minimal	36	(32.7)	19	(34.5)	17	(30.9)	$\chi^2_{(4)}$ = 1.579, p = .812	Cramer's V = .120
mild	29	(26.4)	15	(27.3)	14	(25.5)		
moderate	20	(18.2)	11	(20.0)	9	(16.4)		
moderately severe	14	(12.7)	5	(9.1)	9	(16.4)		

(Continued)

TABLE 1 Continued

	Total sample (n=119)		Type 1 diabetes[a] (n=57)		Type 2 diabetes[a] (n=62)		Test statistics	Effect size
	N	(%)	N	(%)	N	(%)		
Depressive symptom severity[d]								
severe	11	(10.9)	5	(9.1)	6	(10.9)		
Somatic symptom severity[e]								
minimal	19	(20.7)	13	(26.0)	6	(14.3)	$\chi^2_{(3)} = 2.182$, $p = .535$	Cramer's V = .154
mild	31	(33.7)	15	(30.0)	16	(38.1)		
moderate	16	(17.4)	9	(18.0)	7	(16.7)		
severe	26	(28.3)	13	(26.0)	13	(31.0)		
Child maltreatment[f]								
any type	56	(49.1)	24	(43.6)	32	(54.2)	$\chi^2_{(1)} = 1.280$, $p = .258$	φ = .106
sexual abuse	10	(8.7)	5	(8.9)	5	(8.5)	n.a.[c]	
physical abuse	19	(16.7)	5	(9.1)	14	(23.7)	$\chi^2_{(1)} = 4.391$, $p = .036$	φ = .196
emotional abuse	27	(23.9)	12	(21.8)	15	(25.9)	$\chi^2_{(1)} = .254$, $p = .614$	φ = .047
physical neglect	36	(31.0)	13	(23.2)	23	(38.3)	$\chi^2_{(1)} = 3.094$, $p = .079$	φ = .163
emotional neglect	35	(30.2)	12	(21.4)	23	(38.3)	$\chi^2_{(1)} = 3.929$, $p = .047$	φ = .184
	M	(SD)	M	(SD)	M	(SD)		
age	49.4	(13.0)	40.9	(12.8)	57.2	(6.9)	$t_{(84,174)} = 8.573$, $p < .001$	d = 1.604
diabetes-related distress[g]	8.6	(5.3)	8.3	(4.9)	9.0	(5.7)	$t_{(117)} = .650$, $p = .517$	d = .119
personality functioning[h]	18.6	(11.3)	18.7	(10.7)	18.5	(11.9)	$t_{(118)} = -.092$, $p = .927$	d = .018
epistemic trust[i]	24.4	(5.4)	24.8	(5.1)	24.1	(5.7)	$t_{(116)} = -.725$, $p = .470$	d = .111
epistemic mistrust[i]	12.0	(4.4)	11.6	(3.9)	12.5	(4.9)	$t_{(111,490)} = 1.148$, $p = .254$	d = .211
epistemic credulity[i]	13.5	(5.7)	12.9	(5.0)	14.0	(6.2)	$t_{(116)} = 1.077$, $p = .284$	d = .192

[a]Medically diagnosed type 1 or type 2 diabetes. [b]Psychological burden was assessed with the German version of the Patient-Health-Questionnaire (PHQ-D). [c]Given that the expected cell frequencies were less than five, the χ^2-test could not be interpreted. [d]Depressive symptoms and their severity level were assessed with the PHQ-9 as part of the PHQ-D. Range: 0 to 27. [e]Somatic symptoms and their severity level were assessed with the PHQ-15 as part of the PHQ-D. Range: 0 to 30. [f]Different types of child maltreatment were assessed with the self-report questionnaire Childhood Trauma Questionnaire (CTQ). Multiple answers were possible. [g]Diabetes-related distress was assessed with the 5-item short form of the Problem Areas in Diabetes Scale (PAID-5). Range: 0 to 20. [h]Personality functioning was assessed with the Operationalized Psychodynamic Diagnosis – Structure Questionnaire Short Form (OPD-SQS). Range: 0 to 48. [i]Epistemic trust, epistemic mistrust, and epistemic credulity were assessed with the German 12-item version of the Epistemic Trust, Mistrust and Credulity Questionnaire (ETMCQ). Range trust: 5 to 35, range mistrust: 3 to 21, range credulity: 4 to 28. n.a.= not available.

3.2 Differences in diabetes-related distress and psychological burden according to a history of child maltreatment

In the total sample, we observed overall higher diabetes-related distress in patients with child maltreatment compared to those without child maltreatment with medium effect sizes ($t_{(112)}$=4.033, p <.001, d=.756) as well as higher frequencies of psychological burden (major depressive syndrome: $\chi^2_{(1)}$=10.968, p <.001, φ=.310, somatoform syndrome: $\chi^2_{(1)}$=8.130, p=.004, φ=.267, panic syndrome: $\chi^2_{(1)}$=6.281, p=.012, φ=.235, and other anxiety syndromes: $\chi^2_{(1)}$=8.828, p=.003, φ=.278), with a medium effect size for major depressive syndrome and small effect sizes for all other types of psychological burden. There were no differences regarding binge-eating disorder ($\chi^2_{(1)}$=.699, p=.403, φ=.081) and alcohol syndrome ($\chi^2_{(1)}$=.004, p=.949, φ=.006), with effect sizes falling below the threshold for small effects. See also Table 2.

Supplementary subgroup analyses compared patients with type 1 diabetes and child maltreatment (n=24) to patients with type 1 diabetes and no child maltreatment (n=31) as well as patients with type 2 diabetes and child maltreatment (n=32) to patients with type 2 diabetes and no child maltreatment (n=27). Patients with type 1 diabetes and child maltreatment compared to those without reported significantly higher diabetes-related distress ($t_{(54)}$=3.977, p <.001, d=1.081) with a large effect size as well as higher frequencies of major depressive syndrome ($\chi^2_{(1)}$=4.441, p=.035, φ=.284) and somatoform syndrome ($\chi^2_{(1)}$=6.139, p=.013, φ=.334), with small to medium effect sizes. See also Supplementary Table 1. In patients with type 2 diabetes, those with child maltreatment compared to those without also showed significantly higher

TABLE 2 Differences regarding diabetes-related distress, psychological burden as well as personality functioning and epistemic trust, mistrust, and credulity according to a history of child maltreatment.

Psychological burden[b]	Total sample (n=114)		Child maltreatment[a] (n=56)		No child maltreatment (n=58)		Test statistics	Effect size
	N	(%)	N	(%)	N	(%)		
major depressive syndrome	38	(33.3)	27	(48.2)	11	(19.0)	$\chi^2_{(1)} = 10.968$, $p < .001$	φ = .310
somatoform syndrome	31	(27.2)	22	(39.3)	9	(15.5)	$\chi^2_{(1)} = 8.130$, $p = .004$	φ = .267
panic syndrome	12	(10.5)	10	(17.9)	2	(3.4)	$\chi^2_{(1)} = 6.281$, $p = .012$	φ = .235
other anxiety syndromes	17	(14.9)	14	(25.0)	3	(5.2)	$\chi^2_{(1)} = 8.828$, $p = .003$	φ = .278
bulimia nervosa	2	(1.8)	0	(0.0)	2	(3.6)	n.a.[c]	
binge-eating disorder	15	(14.2)	9	(17.0)	6	(11.3)	$\chi^2_{(1)} = .699$, $p = .403$	φ = .081
alcohol syndrome	12	(10.)	6	(10.7)	6	(10.3)	$\chi^2_{(1)} = .004$, $p = .949$	φ = .006
	M	(SD)	M	(SD)	M	(SD)		
diabetes-related distress[d]	8.6	(5.1)	10.4	(5.0)	6.8	(4.7)	$t_{(112)} = 4.033$, $p < .001$	d = .756
personality functioning[e]	18.6	(11.1)	23.6	(11.4)	13.9	(8.4)	$t_{(100,857)} = 5.136$, $p < .001$	d = .967
epistemic trust[f]	24.6	(5.2)	24.8	(5.4)	24.4	(5.1)	$t_{(111)} = .409$, $p = .683$	d = .077
epistemic mistrust[f]	11.9	(4.3)	13.4	(3.8)	10.6	(4.4)	$t_{(111)} = 3.677$, $p < .001$	d = .692
epistemic credulity[f]	13.5	(5.7)	16.0	(5.6)	11.1	(4.6)	$t_{(111)} = 5.000$, $p < .001$	d = .941

[a]Different types of child maltreatment were assessed with the self-report questionnaire Childhood Trauma Questionnaire (CTQ). Multiple answers were possible. [b]Psychological burden was assessed with the German version of the Patient-Health-Questionnaire (PHQ-D). [c]Given that the expected cell frequencies were less than five, the χ^2-test could not be interpreted. [d]Diabetes-related distress was assessed with the 5-item short form of the Problem Areas in Diabetes Scale (PAID-5). Range: 0 to 20. [e]Personality functioning was assessed with the Operationalized Psychodynamic Diagnosis – Structure Questionnaire Short Form (OPD-SQS). Range: 0 to 48. [f]Epistemic trust, epistemic mistrust, and epistemic credulity were assessed with the German 12-item version of the Epistemic Trust, Mistrust and Credulity Questionnaire (ETMCQ). Range trust: 5 to 35, range mistrust: 3 to 21, range credulity: 4 to 28. n.a.= not available.

frequencies of major depressive syndrome ($\chi^2_{(1)}$=6.331, p=.012, φ=.328) and other anxiety syndromes ($\chi^2_{(1)}$=5.138, p = .023, φ=.295) with medium and small effect sizes respectively. However, there were no differences regarding diabetes-related distress ($t_{(57)}$=1.931, p = .058, d=.505), with a large effect size. See also Supplementary Table 2.

3.3 Differences in personality functioning and epistemic trust, mistrust, and credulity according to a history of child maltreatment

In the total sample, results show that impairments in personality functioning are more severe in those with child maltreatment compared to those without ($t_{(100,857)}$=5.136, p <.001, d=.967), with a large effect size. Further, epistemic mistrust and credulity as measured by the ETMCQ-12 were significantly higher in patients with diabetes and child maltreatment compared to those without (mistrust: $t_{(111)}$=3.677, p <.001, d=.692; credulity: $t_{(111)}$=5.000, p <.001, d=.941), with medium and large effect sizes respectively. We found no differences regarding epistemic trust ($t_{(111)}$=.409, p=.683, d=.077), with the effect size falling below the threshold for small effects. See also Table 2.

Subgroup analyses differentiated patients with type 1 and type 2 diabetes, and examined differences in personality functioning, epistemic trust, mistrust, and credulity in those with and without child maltreatment. In patients with type 1 diabetes, differences between those with and without child maltreatment emerged regarding personality functioning ($t_{(53)}$=3.336, p=.002, d=.907) and epistemic credulity ($t_{(53)}$=3.164, p=.003, d=.860), with large effect sizes. However, no differences regarding epistemic trust and mistrust could be observed (trust: $t_{(53)}$=.316, p=.753, d=.086; mistrust: $t_{(53)}$=1.708, p=.093, d=.464), with the effect size falling below the threshold for small effects regarding trust, and a small effect size for mistrust. See also Supplementary Table 1. In patients with type 2 diabetes, those with child maltreatment compared to those without showed higher impairments in personality functioning ($t_{(55,703)}$=4.147, p <.001, d=1.054), epistemic mistrust ($t_{(41,398)}$=3.191, p=.003, d=.868), and epistemic credulity ($t_{(56)}$=3.761, p <.001, d=.990), with large effect sizes. No differences were observed regarding epistemic trust ($t_{(56)}$=.318, p=.751, d=.084), however, the effect size falls below the threshold for small effects. See also Supplementary Table 2.

3.4 Regression and mediation analyses

To better understand the association between heightened diabetes-related distress and more frequent psychological burden in patients with diabetes and child maltreatment compared to those without, we conducted regression and mediation analyses. Correlation analyses for all variables can be found in Table 3.

In the regression analysis, a significant direct association between child maltreatment and diabetes-related distress

10.3389/fpsyt.2025.1608601

TABLE 3 Correlations with bootstrapped confidence intervals.

	CTQ sexual abuse	CTQ emotional abuse	CTQ physical abuse	CTQ emotional neglect	CTQ physical neglect	CTQ sum score	OPD-SQS	ETMCQ trust	ETMCQ mistrust	ETMCQ credulity	PHQ-9	PHQ-15
CTQ sexual abuse[a]	–											
CTQ emotional abuse[a]	.342**	–										
	[.094,.540]											
CTQ physical abuse[a]	.303**	.542**	–									
	[-.055,.643]	[.301,.731]										
CTQ emotional neglect[a]	.327**	.666**	.408**	–								
	[.122,.487]	[.531,.782]	[.224,.575]									
CTQ physical neglect[a]	.328**	.475**	.481**	.665**	–							
	[-.061,.593]	[.272,.653]	[.186,.699]	[.541,.769]								
CTQ sum score[a]	.568**	.848**	.742**	.826**	.751**	–						
	[.219,.747]	[.788,.897]	[.573,.847]	[.757,.884]	[.591,.855]							
OPD-SQS[b]	.233*	.527**	.255*	.463**	.262*	.484**	–					
	[.017,.435]	[.361,.673]	[.109,.420]	[.262,.635]	[.072,.447]	[.330,.636]						
ETMCQ trust[c]	-.123	-.003	.058	-.093	.092	-.019	-.166	–				
	[-.340,.110]	[-.225,.194]	[-.185,.281]	[-.285,.092]	[-.119,.280]	[-.237,.179]	[-.423,.100]					
ETMCQ mistrust[c]	.095	.285**	.104	.163	.136	.219*	.516**	.003	–			
	[-.039,.222]	[.067,.487]	[-.108,.346]	[-.051,.364]	[-.029,.296]	[.034,.402]	[.337,.671]	[-.258,.259]				
ETMCQ credulity[c]	.189	.429**	.289**	.344**	.318**	.428**	.555**	-.040	.562**	–		
	[.038,.319]	[.224,.600]	[.132,.439]	[.124,.537]	[.146,.474]	[.254,.588]	[.370,.708]	[-.290,.209]	[.374,.712]			
PHQ-9[d]	.126	.349**	.274*	.400**	.195	.375**	.679**	-.084	.359**	.395**	–	
	[-.048,.289]	[.157,.545]	[.042,.499]	[.223,.579]	[-.004,.400]	[.194,.572]	[.538,.788]	[-.346,.191]	[.150,.538]	[.198,.553]		
PHQ-15[e]	.150	.342**	.220*	.304**	.090	.315**	.553**	-.072	.287**	.281**	.760**	–
	[-.025,.321]	[.163,.503]	[.028,.412]	[.115,.482]	[-.109,.301]	[.137,.499]	[.363,.699]	[-.271,.123]	[.073,.475]	[.093,.454]	[.645,.846]	

(Continued)

10.3389/fpsyt.2025.1608601

TABLE 3 Continued

		CTQ sexual abuse	CTQ emotional abuse	CTQ physical abuse	CTQ emotional neglect	CTQ physical neglect	CTQ sum score	OPD-SQS	ETMCQ trust	ETMCQ mistrust	ETMCQ credulity	PHQ-9	PHQ-15
PAID-5[f]		.089	.304**	.224*	.266*	.165	.294**	.498**	-.019	.351**	.369**	.688**	.668**
		[-.121,.302]	[.135,.475]	[.019,.426]	[.084,.442]	[-.068,.381]	[.096,.490]	[.327,.650]	[-.247,.216]	[.158,.519]	[.213,.511]	[.575,.787]	[.527,.782]

[a]Different types of child maltreatment were assessed with the self-report questionnaire Childhood Trauma Questionnaire (CTQ). Multiple answers were possible. [b]Personality functioning was assessed with the Operationalized Psychodynamic Diagnosis – Structure Questionnaire Short Form (OPD-SQS). Range: 0 to 48. [c]Epistemic trust, epistemic mistrust, and epistemic credulity were assessed with the German 12-item version of the Epistemic Trust, Mistrust and Credulity Questionnaire (ETMCQ). Range trust: 5 to 35, range mistrust: 3 to 21, range credulity: 4 to 28. [d]Depressive symptoms and their severity level were assessed with the PHQ-9 as part of the PHQ-D. Range: 0 to 27. [e]Somatic symptoms and their severity level were assessed with the PHQ-15 as part of the PHQ-D. Range: 0 to 30. [f]Diabetes-related distress was assessed with the 5-item short form of the Problem Areas in Diabetes Scale (PAID-5). Range: 0 to 20. *p*-values: $^{*}p \leq .05$. $^{**}p \leq .01$. $^{***}p \leq .001$. Point-biserial correlations were computed with 95% bootstrapped confidence intervals based on 5,000 bootstrap samples. Coefficients >.1 indicate weak correlation, >.3 indicate moderate correlation, and >.5 indicate strong correlation.

emerged, showing that higher scores of child maltreatment were associated with higher diabetes-related distress (adjusted R^2=.094; b=.10, 95%-CI [.044,.153], p <.001). In the mediation analysis, the direct was not significant anymore (b=.2, 95%-CI [-.032,.081], p =.387). The overall explained variance in the model increased from 9.4% in the regression analysis to 24.3% in the mediation model. An indirect effect of personality functioning between child maltreatment and diabetes-related distress was found (b=.03, 95%-CI [.005,.053]), indicating partial mediation. Epistemic trust, mistrust, and credulity were significantly associated with personality functioning (trust: b=-.33, 95%-CI [-.619, -.032], p=.030; mistrust: b=.75, 95%-CI [.306, 1.203], p=.001; credulity: b=.61, 95%-CI [.244,.971], p=.001). However, only mistrust was associated with diabetes-related distress (mistrust: b=.37, 95%-CI [.112,.620], p=.005). There was no association between trust (b=-.07, 95%-CI [-.235,.097], p=.410) and credulity (b=.12, 95%-CI [-.089,.323], p=.262), and diabetes-related distress. See also Figure 1.

In the regression analysis, we observed a significant direct effect, showing that higher scores of child maltreatment were associated with higher depressive symptoms (adjusted R^2=.132; b=.15, 95%-CI [.080,.228], p <.001). In the mediation analysis, the direct effect was no longer significant (b=.01, 95%-CI [-.052,.077], p=.695). The overall explained variance in the model increased from 13.2% in the regression model to 52.7% in the mediation model. An indirect effect of personality functioning emerged (b=.08, 95%-CI [.030,.129]), indicating full mediation. Epistemic trust, mistrust, and credulity were significantly associated with personality functioning (trust: b=-.30, 95%-CI [-.584, -.013], p=.041; mistrust: b=.87, 95%-CI [.426, 1.316], $p \leq .001$; credulity: b=.53, 95%-CI [.165,.893], p=.005), but not with depressive symptoms (trust: b=.03, 95%-CI [-.150,.209], p=.743; mistrust: b=-.00, 95%-CI [-.298,.289], p=.977; credulity: b=.01, 95%-CI [-.241,.225], p=.946). See also Figure 2.

In the regression analysis, a significant direct association was also found between child maltreatment and somatic symptoms, showing that higher scores of child maltreatment were associated with higher somatic symptoms (adjusted R^2=.090; b=.11, 95%-CI [.041,.187], p=.003). In the mediation analysis however, the direct effect was no longer significant (b=.03, 95%-CI [-.052,.106], p=.494). The overall explained variance in the model increased from 9.0% in the regression model to 31.5% in the mediation model. An indirect effect of personality functioning emerged (b=.06, 95%-CI [.020,.122]), indicating full mediation. While epistemic trust was not significantly associated with personality functioning (b=-.29, 95%-CI [-.595,.020], p=.067), mistrust, and credulity were (mistrust: b=.76, 95%-CI [.286, 1.239], p=.002; credulity: b=.46, 95%-CI [.084,.842], p=.017). Neither epistemic trust, mistrust, nor credulity were associated with somatic symptoms (trust: b=.02, 95%-CI [-.188,.222], p=.866; mistrust: b=.04, 95%-CI [-.288,.371], p=.804; credulity: b=-.07, 95%-CI [-.329,.184], p=.575). See also Figure 3.

4 Discussion

This article shows that child maltreatment is a frequently reported phenomenon in a clinical sample of patients with type 1

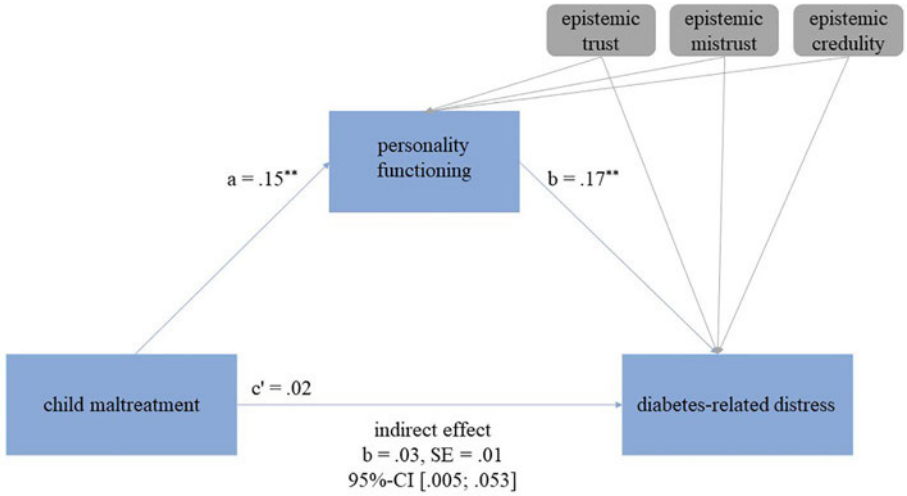


FIGURE 1
Mediation model examining the association between child maltreatment and diabetes-related distress as well as personality functioning as a mediator and epistemic trust, mistrust, and credulity as covariates. The indirect (mediating) effect is present, if the confidence intervals (CI) exclude zero. *p*-values: *$p \leq 0.05$, **$p \leq 0.01$, ***$p \leq 0.001$.

and type 2 diabetes. Comparing patients with diabetes with and without a history of child maltreatment shows that those with child maltreatment report higher diabetes-related distress and psychological burden as well as higher impairments in personality functioning, higher epistemic mistrust, and epistemic credulity.

In a clinical sample of patients with type 1 and type 2 diabetes, 32.8% reported elevated diabetes-related distress and 53.8% met the categorical self-report threshold for at least one type of psychological burden, with 26.9% meeting the threshold for two or more types of psychological burden. While data on the prevalence of diabetes-related distress especially in clinical samples is limited, our findings add evidence to the higher frequency in clinical samples compared to population-based samples (18, 19). However, our frequencies for psychological burden exceed those from a comparable German clinical sample of patients with type 1 and type 2 diabetes, showing that around 39% screen positively for a mental disorder (56). Contrary to other diabetes populations, we had higher percentages of males than females. While female patients with diabetes tend to suffer from psychosocial aspects more frequently than men (57), our findings indicate that especially male patients have difficulties regulating their blood sugar levels and show comorbid diabetes-related distress and psychological burden, and hence, seek support from a specialized diabetes clinic, which we recruited the sample of the

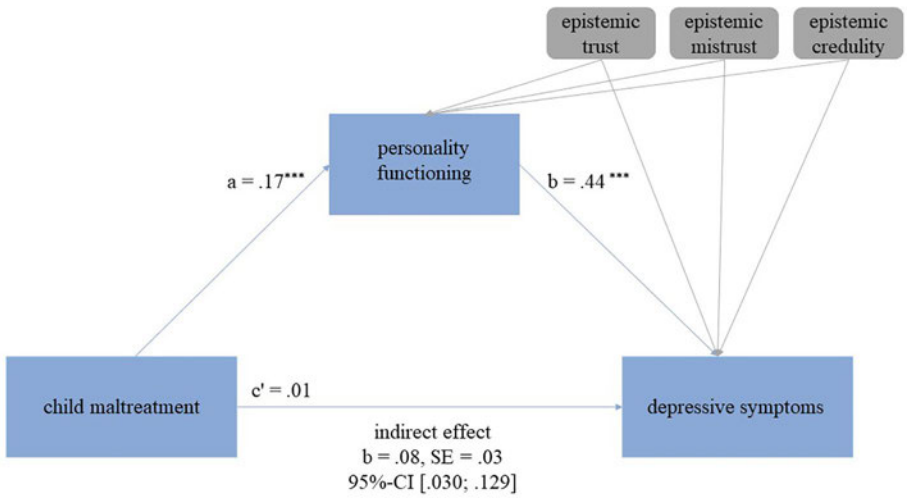


FIGURE 2
Mediation model examining the association between child maltreatment and depressive symptoms as well as personality functioning as a mediator and epistemic trust, mistrust, and credulity as covariates. The indirect (mediating) effect is present, if the confidence intervals (CI) exclude zero. *p*-values: *$p \leq 0.05$, **$p \leq 0.01$, ***$p \leq 0.001$.

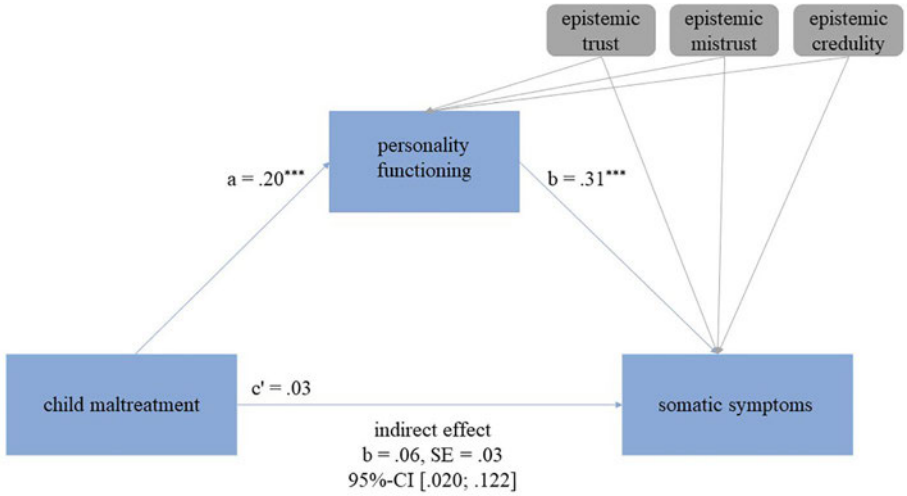


FIGURE 3
Mediation model examining the association between child maltreatment and somatic symptoms as well as personality functioning as a mediator and epistemic trust, mistrust, and credulity as covariates. The indirect (mediating) effect is present, if the confidence intervals (CI) exclude zero. *p*-values: $*p \leq 0.05$, $**p \leq 0.01$, $***p \leq 0.001$.

present investigation from. Moreover, the frequency of at least one type of self-reported child maltreatment with at least moderate severity was 49.1%, and 37.0% reported at least one type of severe child maltreatment. These frequencies are remarkably higher compared to the frequencies found in patients with diabetes from population-based samples (22). Patients with type 2 diabetes reported significantly more often physical abuse compared to patients with type 1 diabetes, even though effect sizes were small. However, this corresponds to findings that underline in particular a common occurrence of child maltreatment in type 2 diabetes (58, 59).

First, we investigated whether patients with diabetes and a history of child maltreatment compared to patients with diabetes without child maltreatment show higher diabetes-related distress as well as more frequent psychological burden. To our knowledge, the direct association between child maltreatment and diabetes-related distress has not been studied so far, and regarding psychological burden, research investigating associations between child maltreatment in samples of patients with diabetes is still limited. Studies employing e.g., population-based data have abundantly emphasized the negative impact of child maltreatment on e.g., symptoms of depression and anxiety, or somatic symptoms (29, 60). Accordingly, we show that in a clinical sample of patients with type 1 and type 2 diabetes, a history of child maltreatment is significantly associated with high psychological burden in general, and depressive and somatic symptoms in particular, with small to medium effect sizes.

We further examined if patients with diabetes and a history of child maltreatment show higher impairments in personality functioning and epistemic trust, mistrust, and credulity compared to patients with diabetes without child maltreatment. We consistently found higher impairments in personality functioning in those with a history of child maltreatment compared to those without with medium to large effect sizes. This is in line with previous studies showing the negative impact of child maltreatment on personality functioning not only in the general population, but also in patients with diabetes (22). Regarding the epistemic stance, we only found higher epistemic mistrust and credulity in those with child maltreatment compared to those without, but no differences regarding epistemic trust. Similar results were found in the association between ACEs and symptoms of posttraumatic stress disorder (PTSD), with impaired personality functioning, epistemic mistrust and credulity – but not epistemic trust – being associated with PTSD (35). This supports the conception that epistemic trust is not simply the inverse of epistemic mistrust and credulity, but rather a distinct psychological capacity, which might not necessarily be significantly reduced by e.g., child maltreatment. If the ability for epistemic trust can generally be preserved after child maltreatment, this may also pose a starting point for preventative measures. However, more research is needed to better understand how child maltreatment affects epistemic trust, mistrust, and credulity. In patients with diabetes, the epistemic stance is only scarcely researched. However, the relevance of trust in general was outlined in e.g., a multicentre study, where higher trust in physicians was associated with reduced symptoms of depression and anxiety in patients with diabetes, and further, the predictive value of trust in physicians for adherence was identified (61, 62). Hence, we provide preliminary evidence that promoting epistemic trust in patients with diabetes might pose a useful new element in diabetes treatment.

Lastly, we examined if the association between child maltreatment and diabetes-related distress, and between child maltreatment and psychological burden is mediated by personality functioning, including epistemic trust, mistrust, and credulity as covariates. We found an indirect (mediating) effect of personality functioning in the association between child maltreatment and diabetes-related distress (partial mediation), and between child maltreatment and depressive symptoms as well

as somatoform symptoms (full mediation). These findings relate to studies conducted in the general population, showing a mediating effect of personality functioning in the association between child maltreatment and e.g., symptoms of depression and anxiety, and somatic symptom burden (28, 29). To our knowledge, we are the first to investigate a mediating effect of personality functioning in the association between child maltreatment and diabetes-related distress, and between child maltreatment and psychological burden, respectively in a sample of patients with diabetes. Our findings indicate that the high diabetes-related distress and psychological burden in a clinical sample of patients with diabetes is partly conveyed by impaired personality functioning. These findings strengthen the perspective that impairments in personality functioning may also reflect the reduced abilities to meet the demands of coping with the diabetes disease, making these individuals more vulnerable for associated increased diabetes-related distress and psychological burden. However, personality functioning has shown to be improved by psychotherapy (63). Following this line of thinking, by targeting impaired personality functioning in patients with diabetes, overall psychological abilities to cope with diabetes and its demands might be strengthened. Thereby, diabetes-related distress and psychological burden might be reduced, which is of great clinical importance in the high-risk group of patients with diabetes. Despite the preliminary findings presented in this study, this notion remains to be investigated.

4.1 Strengths and limitations

The present study is based on a clinical sample of individuals with a medically diagnosed type 1 and type 2 diabetes, offering insights regarding diabetes-related distress and psychological burden in this high-risk patient group. Next to providing frequencies of at least moderate severity of self-reported child maltreatment, diabetes-related distress as well as psychological burden, we also present impairments in personality functioning as a relevant mechanism, significantly expanding existing knowledge on this topic.

However, this study has certain limitations. First, the cross-sectional data does not allow for causal interpretations of the findings. Mediation analyses are prone to several methodological and conceptual challenges, for example misspecification of the model or unmeasured confounding (64). Due to the established temporal nature of child maltreatment as well as the strong empirical evidence demonstrating the developmental impact of early adversity on mental health, sufficient plausibility for the assumed causal relationships in the mediation model is given. Second, the sample sizes for the subgroup analyses comparing patients with type 1 diabetes with and without child maltreatment and patients with type 2 diabetes with and without child maltreatment are relatively small and therefore, must be interpreted with caution. Further, the use of self-report instruments, especially regarding self-reported child maltreatment, is susceptible to bias. However, studies indicate that subjective reports of child maltreatment are associated with psychopathology, independently from objective reports (65). As one important objective of the present study was to investigate the association between child maltreatment and psychological burden, self-report measures seem to be suitable. While the CTQ that was used in the present study to retrospectively assess self-reported child maltreatment is a reliable and valid screening instrument, the cut-offs used to determine if a type of child maltreatment is present or not (at least moderate severity) are not validated. However, using the cut-off of at least moderate severity is common in German prevalence studies of child maltreatment (43, 44). Future research could consider other confounding factors regarding diabetes-related distress and psychological burden, both sociodemographic (e.g. household income, migration background, education), and diabetes-related (diabetes duration, comorbid secondary diseases, use of antidepressants), use longitudinal data to support our preliminary findings as well as conduct subgroup analyses of patients with type 1 and type 2 diabetes in larger samples.

4.2 Conclusion

In a clinical sample of patients with type 1 and type 2 diabetes, the frequency of diabetes-related distress and psychological burden, especially in terms of depressive and somatoform symptoms, is high. This is aggravated by a history of child maltreatment. Further, patients with diabetes and a history of child maltreatment compared to those without a history of child maltreatment also show higher impairments in personality functioning and increased epistemic mistrust and credulity. The association between child maltreatment and diabetes-related distress, as well as between child maltreatment and depressive symptoms, and somatic symptoms respectively is mediated by personality functioning. Hence, impairments in personality functioning in patients with diabetes might point to a reduced emotional and interpersonal ability in dealing with the disease, providing a novel underlying pathway between child maltreatment and increased diabetes-related distress and psychological burden. Screening for impairments in personality functioning in routine diabetes care could help initiating targeted interventions such as psychodynamic psychotherapy or mentalization-based psychotherapy, which focus on strengthening aspects of personality functioning, and provide a new treatment avenue for highly burdened patients with diabetes.

Data availability statement

The raw data supporting the conclusions of this article will be made available by the authors, without undue reservation.

Ethics statement

This study was approved by the local ethics committee of the faculty of medicine of the Justus Liebig University Giessen (AZ 161/21). It was was conducted in accordance with the local legislation

and institutional requirements. The participants provided their written informed consent to participate in this study.

Author contributions

SZ: Conceptualization, Writing – original draft, Formal Analysis, Methodology. IU: Data curation, Writing – review & editing. AL: Data curation, Writing – review & editing. FS: Data curation, Writing – review & editing. JS: Data curation, Writing – review & editing. ME: Writing – review & editing, Data curation. JK: Conceptualization, Supervision, Writing – review & editing. HK: Conceptualization, Supervision, Writing – review & editing.

Funding

The author(s) declare that no financial support was received for the research and/or publication of this article.

Acknowledgments

The authors would like to thank all patients participating in the study as well as all the staff from the GZW diabetes clinic Bad Nauheim for the great cooperation, with special thanks to Anja Baader for supporting the study.

Conflict of interest

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

Generative AI statement

The author(s) declare that no Generative AI was used in the creation of this manuscript.

Publisher's note

All claims expressed in this article are solely those of the authors and do not necessarily represent those of their affiliated organizations, or those of the publisher, the editors and the reviewers. Any product that may be evaluated in this article, or claim that may be made by its manufacturer, is not guaranteed or endorsed by the publisher.

Supplementary material

The Supplementary Material for this article can be found online at: https://www.frontiersin.org/articles/10.3389/fpsyt.2025.1608601/full#supplementary-material

References

1. Seidel-Jacobs E, Tönnies T, Rathmann W. Diabetes: epidemiologie, ursachen und prävention. In: *Deutscher gesundheitsbericht diabetes 2025. Die bestandsaufnahme*. edTriX GmbH, Wiesbaden (2025). p. 8–11.

2. Haak T, Gölz S, Fritsche A, Füchtenbusch M, Siegmund T, Schnellbächer E, et al. Therapie des Typ-1-Diabetes – Kurzfassung der S3-Leitlinie (AWMF-Registernummer: 057-013; 2. *Auflage). Diabetologie und Stoffwechsel*. (2020) 15:S40–50. doi: 10.1055/a-1193-3724

3. World Health Organization. *Noncommunicable diseases* (2023). Available online at: https://www.who.int/news-room/fact-sheets/detail/noncommunicable-diseases. (Accessed June 23, 2025)

4. Scherm MG, Achenbach P, Daniel C. *Deutscher gesundheitsbericht diabetes 2024: die bestandsaufnahme*. (2024). Wiesbaden, MedTriX GmbH

5. Zajec A, Trebušak Podkrajšek K, Tesovnik T, Šket R, Čugalj Kern B, Jenko Bizjan B, et al. Pathogenesis of type 1 diabetes: established facts and new insights. *Genes (Basel)*. (2022) 13:706. doi: 10.3390/genes13040706

6. Saeedi P, Petersohn I, Salpea P, Malanda B, Karuranga S, Unwin N, et al. Global and regional diabetes prevalence estimates for 2019 and projections for 2030 and 2045: Results from the International Diabetes Federation Diabetes Atlas, 9th edition. *Diabetes Res Clin Pract*. (2019) 157:107843. doi: 10.1016/j.diabres.2019.107843

7. Huang Y-C, Cho E, Kuo H-J, García AA. The influences of depression and loneliness on A1C among middle-aged and older adults with diabetes. *Psychology Health Med*. (2023) 28:1540–8. doi: 10.1080/13548506.2022.2124287

8. Lee H-Y, Hahm M-I, Lee SG. Risk of suicidal ideation in diabetes varies by diabetes regimen, diabetes duration, and HbA1c level. *J Psychosomatic Res*. (2014) 76:275–9. doi: 10.1016/j.jpsychores.2014.02.003

9. Zara S, Kruse J, Brähler E, Sachser C, Fegert JM, Ladwig K-H, et al. Suicidal ideation in patients with diabetes and childhood abuse - The mediating role of personality functioning: Results of a German representative population-based study. *Diabetes Res Clin Pract*. (2024) 210:111635. doi: 10.1016/j.diabres.2024.111635

10. Zara S, Kruse J, Brähler E, Ernst M, Fegert JM, Lampe A, et al. *Exploring loneliness in individuals with diabetes – the role of adverse childhood experiences and personality functioning: findings from a German population-based sample*. (In Review).

11. Deschênes SS, Burns RJ, Pouwer F, Schmitz N. Diabetes complications and depressive symptoms: prospective results from the montreal diabetes health and well-being study. *Psychosom Med*. (2017) 79:603–12. doi: 10.1097/PSY.0000000000000447

12. Du Y, Baumert J, Paprott R, Färber F, Nübel J, Hermanns N, et al. Diabetes-related distress and associated factors among adults with diabetes in Germany: Results of the nationwide study "Disease knowledge and information needs – Diabetes mellitus 2017. *J Psychosomatic Res*. (2023) 164:111073. doi: 10.1016/j.jpsychores.2022.111073

13. Egede LE, Bishu KG, Walker RJ, Dismuke CE. Impact of diagnosed depression on healthcare costs in adults with and without diabetes: United States, 2004–2011. *J Affect Disord*. (2016) 195:119–26. doi: 10.1016/j.jad.2016.02.011

14. Jeong J-H, Um YH, Ko S-H, Park J-H, Park J-Y, Han K, et al. Depression and mortality in people with type 2 diabetes mellitus, 2003 to 2013: A nationwide population-based cohort study. *Diabetes Metab J*. (2017) 41:296. doi: 10.4093/dmj.2017.41.4.296

15. Schmitt A, Bendig E, Baumeister H, Hermanns N, Kulzer B. Associations of depression and diabetes distress with self-management behavior and glycemic control. *Health Psychol*. (2021) 40:113–24. doi: 10.1037/hea0001037

16. Smith KJ, Béland M, Clyde M, Gariépy G, Pagé V, Badawi G, et al. Association of diabetes with anxiety: A systematic review and meta-analysis. *J Psychosomatic Res*. (2013) 74:89–99. doi: 10.1016/j.jpsychores.2012.11.013

17. Wang F, Wang S, Zong Q -Q, Zhang Q, Ng CH, Ungvari GS, et al. Prevalence of comorbid major depressive disorder in Type 2 diabetes: a meta-analysis of comparative and epidemiological studies. *Diabetes Med*. (2019) 36:961–9. doi: 10.1111/dme.14042

18. Hernar I, Cooper JG, Nilsen RM, Skinner TC, Strandberg RB, Iversen MM, et al. Diabetes distress and associations with demographic and clinical variables: A nationwide population-based registry study of 10,186 adults with type 1 diabetes in Norway. *Diabetes Care*. (2024) 47:126–31. doi: 10.2337/dc23-1001

19. Perrin NE, Davies MJ, Robertson N, Snoek FJ, Khunti K. The prevalence of diabetes-specific emotional distress in people with Type 2 diabetes: a systematic review and meta-analysis. *Diabetes Med*. (2017) 34:1508–20. doi: 10.1111/dme.13448

20. Bellis MA, Hughes K, Ford K, Ramos Rodriguez G, Sethi D, Passmore J. Life course health consequences and associated annual costs of adverse childhood experiences across Europe and North America: a systematic review and meta-analysis. *Lancet Public Health*. (2019) 4:e517–28. doi: 10.1016/S2468-2667(19)30145-8

21. Felitti VJ, Anda RF, Nordenberg D, Williamson DF, Spitz AM, Edwards V, et al. Relationship of childhood abuse and household dysfunction to many of the leading causes of death in adults. *Am J Prev Med*. (1998) 14:245–58. doi: 10.1016/S0749-3797(98)00017-8

22. Zara S, Brähler E, Sachser C, Fegert JM, Häuser W, Krakau L, et al. Associations of different types of child maltreatment and diabetes in adulthood – the mediating effect of personality functioning: Findings from a population-based representative German sample. *Ann Epidemiol*. (2023) 78:47–53. doi: 10.1016/j.annepidem.2022.12.004

23. Atasoy S, Johar H, Fleischer T, Beutel M, Binder H, Braehler E, et al. Depression mediates the association between childhood emotional abuse and the onset of type 2 diabetes: findings from german multi-cohort prospective studies. *Front Psychiatry*. (2022) 13:825678. doi: 10.3389/fpsyt.2022.825678

24. Hughes K, Bellis MA, Hardcastle KA, Sethi D, Butchart A, Mikton C, et al. The effect of multiple adverse childhood experiences on health: a systematic review and meta-analysis. *Lancet Public Health*. (2017) 2:e356–66. doi: 10.1016/S2468-2667(17)30118-4

25. Shields ME, Hovdestad WE, Pelletier C, Dykxhoorn JL, O'Donnell SC, Tonmyr L. Childhood maltreatment as a risk factor for diabetes: findings from a population-based survey of Canadian adults. *BMC Public Health*. (2016) 16:879. doi: 10.1186/s12889-016-3491-1

26. Hoadley A, Bass S, Rubin DJ. Adverse childhood event subtypes and routine diabetes care utilization among U.S. adults with Type 2 diabetes. *psychol Trauma: Theory Research Practice Policy*. (2024) 16:S10–9. doi: 10.1037/tra0001433

27. Ittoop T, Jeffrey K, Cheng C-I, Reddy S. The relationship between adverse childhood experiences and diabetes in central michigan adults. *Endocrine Pract*. (2020) 26:1425–34. doi: 10.4158/EP-2020-0239

28. Freier A, Kruse J, Schmalbach B, Zara S, Werner S, Brähler E, et al. The mediation effect of personality functioning between different types of child maltreatment and the development of depression/anxiety symptoms – A German representative study. *J Affect Disord*. (2022) 299:408–15. doi: 10.1016/j.jad.2021.12.020

29. Kampling H, Riedl D, Lampe A, Nolte T, Brähler E, Ernst M, et al. Somatic symptom disorder and the role of epistemic trust, personality functioning and child abuse: Results from a population-based representative German sample. *J Affect Disord*. (2024), 373 S0165032724020846. doi: 10.1016/j.jad.2024.12.096

30. Beebe B, Jaffe J, Markese S, Buck K, Chen H, Cohen P, et al. The origins of 12-month attachment: A microanalysis of 4-month mother–infant interaction. *Attach Hum Dev*. (2010) 12:3–141. doi: 10.1080/14616730903338985

31. Arbeitskreis zur Operationalisierung Psychodynamischer Diagnostik. OPD-3 Operationalisierte Psychodynamische Diagnostik: das Manual für Diagnostik und Therapieplanung. *2*. Bern: Hogrefe: korrigierte Auflage (2024). p. 1. doi: 10.1024/86348-000

32. American Psychiatric Association. *Diagnostic and statistical manual of mental disorders. 5th ed*. Washington, D.C.: American Psychiatric Publishing (2013).

33. Bach B, Simonsen S. How does level of personality functioning inform clinical management and treatment? Implications for ICD-11 classification of personality disorder severity. *Curr Opin Psychiatry*. (2021) 34:54–63. doi: 10.1097/YCO.0000000000000658

34. Tyrer P, Mulder R, Kim Y-R, Crawford MJ. The development of the ICD-11 classification of personality disorders: an amalgam of science, pragmatism, and politics. *Annu Rev Clin Psychol*. (2019) 15:481–502. doi: 10.1146/annurev-clinpsy-050718-095736

35. Kampling H, Kruse J, Lampe A, Nolte T, Hettich N, Brähler E, et al. Epistemic trust and personality functioning mediate the association between adverse childhood experiences and posttraumatic stress disorder and complex posttraumatic stress disorder in adulthood. *Front Psychiatry*. (2022) 13:919191. doi: 10.3389/fpsyt.2022.919191

36. Fonagy P, Campbell C, Bateman A. Mentalizing, Attachment, and Epistemic Trust in Group Therapy. *Int J Group Psychother*. (2017) 67:176–201. doi: 10.1080/00207284.2016.1263156

37. Nolte T. Epistemisches Vertrauen und therapeutische Beziehung. *Psychotherapie*. (2024) 69:201–14. doi: 10.1007/s00278-024-00722-9

38. Ehrenthal J, Düx A, Baie L, Burgmer M. Levels of personality functioning and not depression predict decline of plasma glucose concentration in patients with type 2 diabetes mellitus. *Diabetes Res Clin Pract*. (2019) 151:106–13. doi: 10.1016/j.diabres.2019.04.011

39. Zara S, Kruse J, Leveling AM, Schmitz J, Hempler I, Kampling H. Capturing diabetes-related distress and burden from the perspective of patients with type 1 or type 2 diabetes: protocol for an explorative mixed methods study. *JMIR Res Protoc*. (2022) 11:e38477. doi: 10.2196/38477

40. Klinitzke G, Romppel M, Häuser W, Brähler E, Glaesmer H. Die deutsche Version des Childhood Trauma Questionnaire (CTQ) – psychometrische Eigenschaften in einer bevölkerungsrepräsentativen Stichprobe. *Psychother Psych Med*. (2012) 62:47–51. doi: 10.1055/s-0031-1295495

41. Glaesmer H. Assessing childhood maltreatment on the population level in Germany: findings and methodological challenges. *Child Adolesc Psychiatry Ment Health*. (2016) 10:15. doi: 10.1186/s13034-016-0104-9

42. Bernstein DP, Stein JA, Newcomb MD, Walker E, Pogge D, Ahluvalia T, et al. Development and validation of a brief screening version of the Childhood Trauma Questionnaire. *Child Abuse Negl*. (2003) 27:169–90. doi: 10.1016/S0145-2134(02)00541-0

43. Witt A, Brown RC, Plener PL, Brähler E, Fegert JM. Child maltreatment in Germany: prevalence rates in the general population. *Child Adolesc Psychiatry Ment Health*. (2017) 11:47. doi: 10.1186/s13034-017-0185-0

44. Kasinger C, Schlack R, Brähler E, Fegert JM, Clemens V. Prevalence of child maltreatment in a nationwide sample of 18 to 31 year-olds in Germany. *Child Adolesc Psychiatry Ment Health*. (2024) 18:111. doi: 10.1186/s13034-024-00795-z

45. McGuire BE, Morrison TG, Hermanns N, Skovlund S, Eldrup E, Gagliardino J, et al. Short-form measures of diabetes-related emotional distress: the Problem Areas in Diabetes Scale (PAID)-5 and PAID-1. *Diabetologia*. (2010) 53:66–9. doi: 10.1007/s00125-009-1559-5

46. Ehrmann D, Hermanns N, Kulzer B, Krichbaum M, Mahr M, Haak T. Kurzform des PAID-Fragebogens zur Erfassung diabetesbezogener Belastungen. *Diabetologie und Stoffwechsel*. (2010) 5:FV14. doi: 10.1055/s-0030-1253742

47. Löwe B, Spitzer RL, Zipfel S, Herzog W. Gesundheitsfragebogen für patienten (PHQ-D). In: *Manual undTestunterlagen*, *2nd ed*. Pfizer (2002).

48. Gräfe K, Zipfel S, Herzog W, Löwe B. Screening psychischer Störungen mit dem "Gesundheitsfragebogen für Patienten (PHQ-D). *Diagnostica*. (2004) 50:171–81. doi: 10.1026/0012-1924.50.4.171

49. Kroenke K, Spitzer RL, Williams JBW. The PHQ-9: Validity of a brief depression severity measure. *J Gen Intern Med*. (2001) 16:606–13. doi: 10.1046/j.1525-1497.2001.016009606.x

50. Kroenke K, Spitzer RL, Williams JBW. The PHQ-15: validity of a new measure for evaluating the severity of somatic symptoms. *Psychosomatic Med*. (2002) 64:258–66. doi: 10.1097/00006842-200203000-00008

51. Ehrenthal J, Dinger U, Schauenburg H, Horsch L, Dahlbender RW, Gierk B. Entwicklung einer Zwölf-Item-Version des OPD-Strukturfragebogens (OPD-SFK)/Development of a 12-item version of the OPD-Structure Questionnaire (OPD-SQS). *Z Psychosom Med Psychother*. (2015) 61:262–74. doi: 10.13109/zptm.2015.61.3.262

52. Ehrenthal J, Kruse J, Schmalbach B, Dinger U, Werner S, Schauenburg H, et al. Measuring personality functioning with the 12-item version of the OPD-Structure Questionnaire (OPD-SQS): reliability, factor structure, validity, and measurement invariance in the general population. *Front Psychol*. (2023) 14:1248992. doi: 10.3389/fpsyg.2023.1248992

53. Nolte T. *Epistemic trust, mistrust and credulity questionnaire (ETMC*. (In Review).

54. Cohen J. *Statistical power analysis for the behavioral sciences. 2. edition*. New York, NY: Taylor & Francis (1988). p. 567.

55. Hayes A. Introduction to mediation, moderation, and conditional process analysis: A regression-based approach. New York: *Guilford publications*. (2017).

56. Röhrig B, Petrak F, Bartel A, Hagena V, Dieris-Hirche J, Meier JM, et al. Patienten mit Diabetes mellitus und komorbider psychischer Störung – besteht eine psychotherapeutische Unterversorgung? – Ergebnisse der DiMPS-Studie. *Psychother Psychosom Med Psychol*. (2024) 74:446–53. doi: 10.1055/a-2401-5152

57. Kautzky-Willer A, Leutner M, Harreiter J. Sex differences in type 2 diabetes. *Diabetologia*. (2023) 66:986–1002. doi: 10.1007/s00125-023-05891-x

58. Huang H, Yan P, Shan Z, Chen S, Li M, Luo C, et al. Adverse childhood experiences and risk of type 2 diabetes: A systematic review and meta-analysis. *Metabolism*. (2015) 64:1408–18. doi: 10.1016/j.metabol.2015.08.019

59. Huffhines L, Noser A, Patton SR. The link between adverse childhood experiences and diabetes. *Curr Diabetes Rep*. (2016) 16:54. doi: 10.1007/s11892-016-0740-8

60. Humphreys KL, LeMoult J, Wear JG, Piersiak HA, Lee A, Gotlib IH. Child maltreatment and depression: A meta-analysis of studies using the Childhood Trauma Questionnaire. *Child Abuse Negl*. (2020) 102:104361. doi: 10.1016/j.chiabu.2020.104361

61. AlRuthia Y, Alwhaibi M, Almalag H, Almosabhi L, Almuhaya M, Sales I, et al. The relationship between trust in primary healthcare providers among patients with diabetes and levels of depression and anxiety. *PloS One*. (2020) 15:e0239035. doi: 10.1371/journal.pone.0239035

62. Pereira MG, Pedras S, Ferreira G, MaChado JC. Differences, predictors, and moderators of therapeutic adherence in patients recently diagnosed with type 2 diabetes. *J Health Psychol*. (2020) 25:1871–81. doi: 10.1177/1359105318780505

63. Kraus B, Dammann G, Rudaz M, Sammet I, Jeggle D, Grimmer B. Changes in the level of personality functioning in inpatient psychotherapy. *Psychother Res*. (2021) 31:117–31. doi: 10.1080/10503307.2020.1763493

64. Schuler MS, Coffman DL, Stuart EA, Nguyen TQ, Vegetabile B, McCaffrey DF. Practical challenges in mediation analysis: a guide for applied researchers. *Health Serv Outcomes Res Method*. (2025) 25:57–84. doi: 10.1007/s10742-024-00327-4

65. Danese A, Widom CS. Objective and subjective experiences of child maltreatment and their relationships with psychopathology. *Nat Hum Behav*. (2020) 4:811–8. doi: 10.1038/s41562-020-0880-3

diabetesresearchandclinicalpractice 210 (2024) 111635

Contents lists available at ScienceDirect

Diabetes Research and Clinical Practice

journal homepage: www.journals.elsevier.com/diabetes-research-and-clinical-practice

Suicidal ideation in patients with diabetes and childhood abuse – The mediating role of personality functioning: Results of a German representative population-based study

Sandra Zara [a,*], Johannes Kruse [a,b,c], Elmar Brähler [d,e], Cedric Sachser [f,g], Jörg M. Fegert [f,g], Karl-Heinz Ladwig [c,h], Mareike Ernst [i], Hanna Kampling [a]

[a] Department of Psychosomatic Medicine and Psychotherapy, Justus Liebig University Giessen, Germany
[b] Department for Psychosomatic Medicine and Psychotherapy, Medical Center of the Philipps University Marburg, Baldingerstrasse, 35043 Marburg, Germany
[c] German Center for Diabetes Research (DZD), München 85764, Neuherberg, Germany
[d] Department of Psychosomatic Medicine and Psychotherapy, Johannes Gutenberg University, Mainz, Germany
[e] Integrated Research and Treatment Center for Adiposity Diseases, Behavioral Medicine Research Unit, University Medical Center Leipzig, Germany
[f] Department of Child and Adolescent Psychiatry/Psychotherapy, University of Ulm, Ulm, Germany
[g] German Center for Mental Health (DZPG), partner site Ulm, Germany
[h] Department of Psychosomatic Medicine and Psychotherapy, Klinikum Rechts der Isar, Technische Universität München, Munich, Germany
[i] Department of Clinical Psychology, Psychotherapy and Psychoanalysis, Department of Psychology, University of Klagenfurt, Klagenfurt am Wörthersee, Austria

ARTICLE INFO

Keywords:
Emotional abuse
Child maltreatment
Diabetes mellitus
Mediator
Personality functioning
Suicidal ideation

ABSTRACT

Aims: Suicidal ideation (SID) in patients with diabetes mellitus is increasingly acknowledged. Still, the underlying mechanisms are unclear. We examined SID prevalences in patients with diabetes, its association with different types of abuse, and a mediating effect of personality functioning.
Methods: In a representative population sample (N = 2,515), diabetes, SID, abuse (ICAST-R), personality functioning (OPD-SQS), and depression/anxiety (PHQ-4) were assessed by self-report. Statistical analyses comprised Chi^2-Tests, logistic regression and mediation analyses.
Results: The prevalence of SID (21.8 %) was three fold higher in patients with diabetes compared to the general population. Abuse further increased the likelihood to report SID in diabetes patients (sexual: 48.1 % vs. 18.2 %; $\chi^2_{(1)} = 12.233$, $p < .001$; emotional: 35.7 % vs. 15.7 %; $\chi^2_{(1)} = 10.892$, $p < .001$). A dose–response relationship between the number of abuse experiences and SID was observed (one abuse experience: OR = 1.138, 95 %-CI [0.433, 2.990], $p = .793$, >2 abuse experiences: OR = 2.693, 95 %-CI [1.278, 5.675], $p = .009$). Impaired personality functioning had an indirect effect on the association between emotional abuse and SID (b = 0.25, 95 %-CI [0.037, 0.551]).
Conclusions: Diabetes patients experience increased SID prevalences, especially those with emotional or sexual abuse. In individuals with a history of emotional abuse, impaired personality functioning partly explained SID and should therefore be considered and addressed in this patient group.

1. Introduction

With suicidal ideation and suicidal behavior being a known phenomenon in individuals experiencing multimorbidity, research on its associated factors has been an object of increasing interest [1,2]. Accordingly, research on suicidal crises in patients with diabetes has substantially expanded [3]. Evidence pointed out that suicidal ideation – contemplations and wishes regarding death and suicide – as well as suicide attempts or completed suicide are prevalent in this patient group. Meta-analytic evidence of cross-sectional studies shows a prevalence of suicidal ideation among patients with diabetes of 16.2 % and a significantly higher risk for suicide attempts with an odds ratio of 1.45 (95 % CI: 1.07–1.96) [4]. Research focusing on risk factors for these increased suicidal crises has pointed to the role of e.g., diabetes

* Corresponding author at: Department of Psychosomatic Medicine and Psychotherapy, Justus Liebig University Giessen, Ludwigstraße 76, D-35392 Giessen, Germany.
E-mail address: sandra.zara@psycho.med.uni-giessen.de (S. Zara).

https://doi.org/10.1016/j.diabres.2024.111635
Received 4 October 2023; Received in revised form 16 March 2024; Accepted 20 March 2024
Available online 21 March 2024
0168-8227/© 2024 The Author(s). Published by Elsevier B.V. This is an open access article under the CC BY license (http://creativecommons.org/licenses/by/4.0/).

duration, $HbA1_c$ levels and depressive symptoms [5,6].

Another line of research promotes adverse childhood experiences (ACEs) as a risk factor for impairments in mental and physical health as well as suicidal ideation and behavior in different populations [7]. ACEs comprise experiences of abuse, neglect, or other household adversities [8]. In the context of managing a chronic condition such as diabetes, ACEs also implicate a lack of self-care, as evidenced by poor health behaviors and medical adherence [9]. This in turn is in itself a risk factor for the development, maintenance, and exacerbation of both physical and mental illness [10,11]. Still, little is known about the role of ACEs regarding suicidal ideation in patients with diabetes as well as its underlying mechanisms.

Persons with a history of childhood abuse might have suffered from experiences of sexual, physical or emotional abuse, often resulting in disruptions of a child's physical or psychological health and development [8]. This, especially if experienced repeatedly, often results in impaired personality functioning [12,13]. Personality functioning is a dimensional conception of a person's ability in e.g., emotion regulation, cognition/perception, communication or building interpersonal relationships [14]. Both the DSM-5 as well as the ICD-11 incorporated this more dimensional assessment of personality functioning for the diagnosis of personality disorders [15,16]. Evidence indicates that personality functioning enhances our understanding of the link between ACEs and adult psychopathology and physical health such as depression and anxiety, posttraumatic stress disorder and diabetes [17–20]. Further, a representative population-based study in the German population found a mediating effect of personality functioning in the association between childhood abuse and neglect and self-harm [21], pointing to its relevance for understanding the underlying pathways between ACEs and suicidal ideation or self-harm. Extending respective models to individuals with chronic illness could inform prevention and intervention efforts as they could highlight potentially modifiable, proximal risk factors implicated in suicidal crises. Notably, experts have stated that the links between chronic illness and suicidality are likely indirect and shaped by psychological factors that have so far been insufficiently addressed by empirical research [22].

To enhance our understanding of suicidal ideation in patients with diabetes the aims of this study were to examine 1) the prevalence of suicidal ideation in patients with diabetes and childhood abuse compared to no childhood abuse, 2) the association between different types of abuse and suicidal ideation, and 3) the underlying mechanisms between childhood abuse and suicidal ideation by considering personality functioning as a mediator.

2. Subjects, materials and methods

2.1. Sample

Data of $N = 2{,}515$ participants were collected in a representative survey of the German population conducted by the independent research institute USUMA GmbH Berlin. Between July and October 2021, households within 258 predefined regions were selected by a random route procedure, and in households with multiple persons, the person to be interviewed was randomly selected using the Kish-Selection-Grid [23]. Inclusion criteria were sufficient German language skills, an age > 16 and informed consent before taking part in the study. The study was conducted in accordance with the Declaration of Helsinki and fulfilled the ethical guidelines of the International Code of Marketing and Social Research Practice of the International Chamber of Commerce and the European Society of Opinion and Marketing Research. Ethical approval was obtained by the Ethics Committee of the Medical Faculty of the University of Leipzig (no. 298/21-ek).

2.2. ICAST-R

The self-report questionnaire ISPAN Child Abuse Screening Tools-Retrospective (ICAST-R) was used to assess childhood abuse retrospectively. It consists of 36 items, covering the areas of sexual, physical and emotional child abuse with response options of either yes or no. The ICAST-R has been used in numerous studies internationally and showed moderate to good reliability, with Cronbach's $\alpha = 0.82$ for sexual abuse, 0.61 for physical abuse and 0.63 for emotional abuse [24]. In the present study, Cronbach's α was acceptable with $\alpha = 0.79$ for sexual abuse, $\alpha = 0.74$ for physical abuse and $\alpha = 0.72$ for emotional abuse.

2.3. OPD-SQS

The Operationalized psychodynamic diagnosis structure questionnaire-short form (OPD-SQS) is a self-report questionnaire to screen for impairments in personality functioning. It comprises the three subscales 1) self-perception, 2) interpersonal contact, and 3) relationship model, with four items each. Response options range from 0 = 'does not apply at all' to 4 = 'fully applies', resulting in a sum score ranging from 0 to 48, with higher scores indicating more severe deficits in personality functioning. The OPD-SQS showed good internal consistency ($\alpha = 0.88$) [25]. In the present study, Cronbach's alpha was good for both the total scale and the subscales (total: $\alpha = 0.91$, self-perception: $\alpha = 0.86$, interpersonal contact: $\alpha = 0.84$ and relationship model: $\alpha = 0.83$).

2.4. PHQ-4

To assess symptoms of depression and anxiety, the Patient Health Questionnaire (PHQ-4) consisting of four items was used [26]. It comprises two items of the Generalized Anxiety Disorder Scale-2 (GAD-2) to assess anxiety symptoms and two items of the PHQ-2 to assess depression symptoms. Response options range from 0 ='not at all' to 3 ='nearly every day', resulting in a sum score between 0 and 12, with scores ≥ 6 indicating a probable presence of a depressive or anxiety disorder and scores ≥ 9 indicating a highly probable presence of a depressive or anxiety disorder. The PHQ-4 showed good reliability with a McDonald's omega of $\omega = 0.85$ [27]. In the present sample, the internal consistency was good with a McDonald's omega of $\omega = 0.86$.

2.5. Diabetes

Diabetes was assessed through self-report. All participants who answered the question of a diabetes diagnosis with 'yes' were included as patients with diabetes.

2.6. Suicidal ideation

Using a single item of the 9-item version of the Patient Health Questionnaire (PHQ-9) [28], participants were asked how often over the last two weeks they felt bothered by thoughts that they would be better off dead or hurting themselves in some way. Response options ranged from 0 = 'not at all' to 3 = 'nearly every day'. In line with previous research, participants answering with at least 1 = 'several days' were classified as reporting suicidal ideation [29]. This item has previously shown predictive validity.

2.7. Statistical analyses

Population-representative prevalences of suicidal ideation in patients with diabetes were calculated with a weight variable, adjusting for age, sex, and region. Subgroup analyses employing Chi^2-Tests examined differences in the frequency of suicidal ideation in patients with diabetes and childhood abuse and without childhood abuse. The effect size was examined with φ as appropriate for a 2×2 contingency table. A value of 0.1 is considered a small effect, 0.3 a medium effect and 0.5 a large effect.

A logistic regression analyses was employed to investigate a possible dose–response relationship between the number of abuse experiences

and the likelihood of suicidal ideation. A categorical variable was computed classifying 0 abuse experiences, 1 abuse experience and more than 2 abuse experiences. The explained variance is indicated with Nagelkerke's R^2 with $R^2 > 0.2$ considered a small effect, >0.4 a medium effect and >0.5 a large effect. Odds ratios (ORs) indicate the probability of the occurrence or non-occurrence of suicidal ideation. Sex and age were entered as covariates.

Separate mediation analyses for sexual, emotional and physical abuse were performed to investigate a possible mediating effect of personality functioning in the association between childhood abuse and suicidal ideation in individuals with diabetes. Using the PROCESS macro version 4.1 by Hayes [30] for IBM SPSS Statistics, the respective dichotomous abuse variable was entered as the independent variable, the OPD-SQS sum score as the mediator, the dichotomous variable for suicidal ideation as the dependent variable and to control for symptoms of depression and anxiety, the PHQ-4 sum score was included as a covariate. The mediation effect is evaluated by employing bootstrapped 95 % confidence intervals (CI) for the indirect effect of childhood abuse on suicidal ideation through personality functioning. A relevant mediation effect is indicated when the CI for the indirect effect exclude zero. All statistical analyses were conducted in SPSS version 28.

3. Results

The total sample comprised $N = 2{,}496$ participants. Fig. 1 displays details on the inclusion and exclusion criteria. Male and female participants were distributed almost equally (48.3 % and 51.7 %) and n = 213 individuals reported having diabetes (8.5 %). Table 1 shows detailed sociodemographic characteristics of the total sample as well as patients with and without diabetes.

The adjusted population-representative prevalence of suicidal ideation at least on'several days' was 8.2 % (n = 208) in the total sample and 21.8 % (n = 48) in patients with diabetes. Subgroup analyses revealed that patients with diabetes and any type of childhood abuse were significantly more likely to report suicidal ideation than patients with diabetes but no childhood abuse (n = 28, 30.0 % vs. n = 20, 15.7 %; $\chi^2_{(1)} = 6.470$, $p = .011$, $\varphi = 0.171$). More specifically, this association emerged for patients with diabetes and sexual abuse (n = 13, 48.1 % vs. n = 35, 18.2 %; $\chi^2_{(1)} = 12.233$, $p < .001$, $\varphi = 0.235$) or emotional abuse (n = 24, 35.7 % vs. n = 24, 15.7 %; $\chi^2_{(1)} = 10.892$, $p < .001$, $\varphi = 0.222$), but not for patients with diabetes and physical abuse (n = 19, 29.2 % vs. n = 29, 18.5 %; $\chi^2_{(1)} = 3.133$, $p = .077$, $\varphi = 0.119$). For details, see also Table 2.

The logistic regression model to examine the effect of multiple abuse experiences on suicidal ideation in diabetes patients was adjusted for age and sex and explained a small but statistically significant amount of variance ($\chi^2_{(4)} = 11.570$, $p = .021$, $R^2 = 0.082$). A dose–response relationship between the number of abuse experiences and suicidal ideation was observed, as with more than two abuse experiences the odds of suicidal ideation significantly increased compared to no abuse (one abuse experience: OR = 1.138, 95 % CI [0.433, 2.990], $p = .793$, more than two abuse experiences: OR = 2.693, 95 % CI [1.278, 5.675], $p = .009$). While age was not a significant predictor for suicidal ideation ($p = .796$), gender differences were observed. Women were significantly more likely to report suicidal ideation than men (OR = 2.000, 95 % CI [1.012, 3.955], $p = .046$).

The model that tested whether the association between emotional abuse and suicidal ideation was mediated through personality functioning was statistically significant ($p < .001$) and explained 49.6 % of the variance in suicidal ideation. A significant indirect effect (mediating effect) of personality functioning emerged ($b = 0.25$, 95 % CI [0.037, 0.551]). The mediation models for the association between physical abuse or sexual abuse and suicidal ideation, mediated through personality functioning, were statistically significant ($p < .001$) and explained 49.1 % and 51.3 % of the variance in suicidal ideation. In these models, no significant indirect effect of personality functioning between physical abuse ($b = 0.15$, 95 % CI [-0.029, 0.377]) and sexual abuse ($b = 0.10$, 95 %-CI [-0.175, 0.378]) and suicidal ideation emerged. For details, see also Fig. 2.

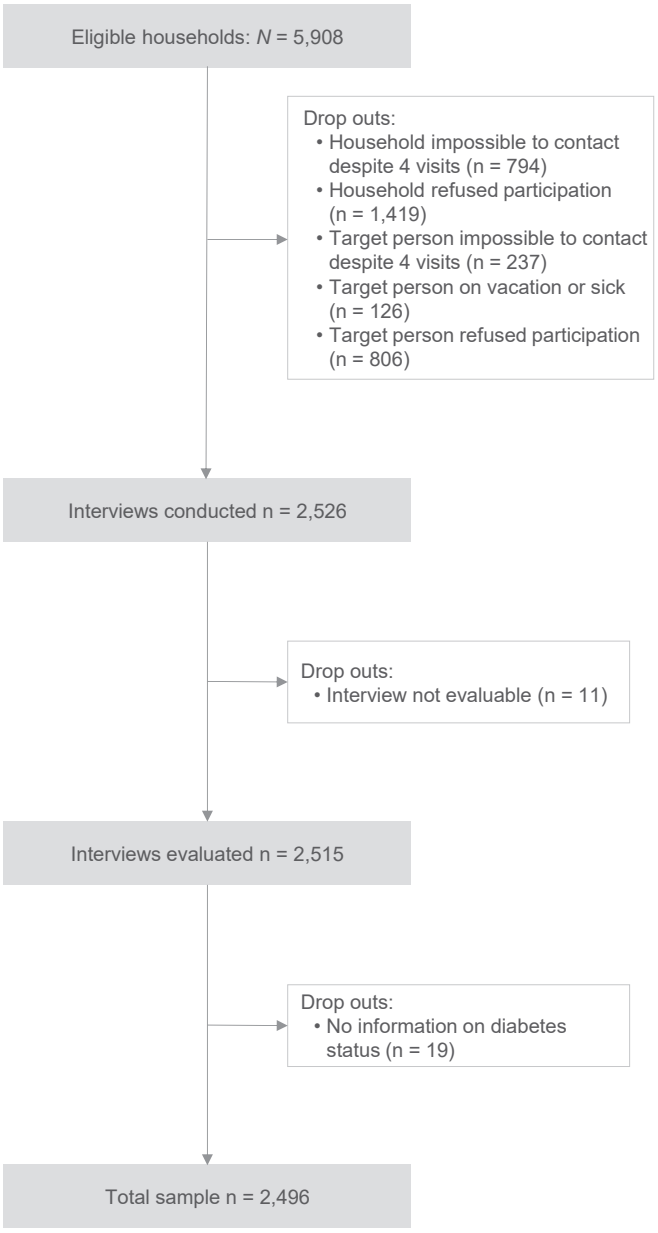


Fig. 1. Overview of eligible households, conducted interviews and evaluated interviews.

4. Discussion

The key finding of this study is the impact of different abuse types on suicidal ideation in patients with diabetes as well as the mediating effect of impaired personality functioning in the association between emotional abuse and suicidal ideation.

Our study shows that with 21.8 % the prevalence of suicidal ideation in patients with diabetes is three times higher compared to 8.2 % in the general population. These findings are in line with previous studies, presenting a prevalence of suicidal ideation of 16 % in patients with diabetes and 8 % in the general German population respectively [4,31]. Hence, we add to the evidence showing that patients with diabetes are a high-risk group that experiences increased psychological burden in terms of suicidal ideation. Different aspects regarding the increased

Table 1
Demographic characteristics of the total sample and patients with and without diabetes.

	total sample* (N = 2,496)		patients with diabetes† (n = 213)		patients without diabetes (n = 2,283)		χ^2-Test/*t*-test
	M	(SD)	M	(SD)	M	(SD)	
age	50.1	(18.0)	67.5	(12.9)	48.5	(17.6)	$t_{(291,180)} = 19.768$, $p < .001$ Cohen's d = 1.098, 95 % CI [0.954, 1.241]
	n	(%)	n	(%)	n	(%)	
sex							
male	1,204	(48.3)	112	(52.8)	1,092	(47.8)	$\chi^2_{(1)} = 1.941$, $p = .164$
female	1,291	(51.7)	100	(47.2)	1,191	(52.2)	Cramer's V = 0.028, 95 % CI [0.001, 0.066]
partnership status‡							
single	790	(31.7)	22	(10.3)	768	(33.7)	$\chi^2_{(2)} = 76.827$, $p < .001$
married	1,039	(41.7)	87	(40.8)	952	(41.8)	Cramer's V = 0.176, 95 % CI [0.140, 0.213]
divorced/widowed	663	(26.6)	104	(48.8)	559	(24.5)	
educational years§							
<10	767	(30.8)	121	(56.8)	646	(28.3)	$\chi^2_{(2)} = 74.849$, $p < .001$
10–13	1,474	(59.1)	82	(38.5)	1,392	(61.1)	Cramer's V = 0.173, 95 % CI [0.133, 0.213]
>13	252	(10.1)	10	(4.7)	242	(10.6)	
monthly income‖							
<1,250 €	310	(12.6)	59	(28.1)	251	(11.2)	$\chi^2_{(2)} = 72.457$, $p < .001$
1,250–2,500 €	1,009	(41.2)	102	(48.6)	907	(40.5)	Cramer's V = 0.172, 95 % CI [0.133, 0.219]
>2,500 €	1,133	(46.2)	49	(23.3)	1,084	(48.3)	

notes. *Missings: n = 19 people did not provide any information about their diabetes status and were excluded from all analyses. †Diabetes (yes/no) was assessed via self-report (n = 221). ‡Married comprises married people living together and married people living apart. Single comprises people who are neither married, nor divorced. §< 10 years of education comprise people without any school-leaving qualification, students, or people with between 8 and 10 years of school. More than 13 years of education comprises people with a university qualification. ‖equivalized monthly household income.

Table 2
Association between different types of childhood abuse* and suicidal ideation† in patients with and without diabetes‡.

		patients with diabetes (n = 221)			patients without diabetes (n = 2,275)		
		suicidal ideation		χ^2-Test	suicidal ideation		χ^2-Test
		yes	no		yes	no	
childhood abuse – any type	yes	28 (30.0)	66 (70.0)	$\chi^2_{(1)} = 6.470$, $p = .011$, $\varphi = 0.171$	109 (15.2)	607 (84.8)	$\chi^2_{(1)} = 108.468$, $p < .001$, $\varphi = 0.218$
	no	20 (15.7)	107 (84.3)		50 (3.2)	1,509 (96.8)	
sexual abuse	yes	13 (48.1)	14 (51.9)	$\chi^2_{(1)} = 12.233$, $p < .001$, $\varphi = 0.235$	53 (27.7)	138 (72.3)	$\chi^2_{(1)} = 138.182$, $p < .001$, $\varphi = 0.246$
	no	35 (18.2)	159 (81.8)		106 (5.1)	1,978 (94.9)	
physical abuse	yes	19 (29.2)	47 (70.8)	$\chi^2_{(1)} = 3.133$, $p = .077$, $\varphi = 0.119$	78 (17.5)	367 (82.5)	$\chi^2_{(1)} = 93.076$, $p < .001$, $\varphi = 0.202$
	no	29 (18.5)	126 (81.5)		81 (4.5)	1,749 (95.5)	
emotional abuse	yes	24 (35.7)	43 (64.3)	$\chi^2_{(1)} = 10.892$, $p < .001$, $\varphi = 0.222$	87 (17.6)	408 (82.4)	$\chi^2_{(1)} = 110.596$, $p < .001$, $\varphi = 0.220$
	no	24 (15.7)	129 (84.3)		72 (4.0)	1,708 (96.0)	

notes. *Different types of childhood abuse were assessed with the self-report questionnaire ISPAN Child Abuse Screening Tools-Retrospective (ICAST-R). †Suicidal ideation was assessed via a single item from the 9-item version of the Patient Health Questionnaire (PHQ-9). ‡Diabetes (yes/no) was assessed via self-report.

prevalence in patients with diabetes have been discussed. For example, due to the often required medication with insulin, patients with diabetes have a readily available means to overdose. Having access to lethal means is one of the strongest risk factors for suicide attempts and deaths [32]. Indeed, dying by suicide by insulin overdose is well documented in the literature [33]. Further, sexual and emotional abuse in childhood were also important risk factors in previous investigations, for instance, in psychiatric patients [34,35]. In population-based representative studies, emotional abuse showed the strongest association with self-harm – which can have a suicidal intent [21]. Given the diverse detrimental effects of childhood abuse, it is not surprising that our results also revealed that patients with diabetes and any kind of childhood abuse had almost twice the prevalence of suicidal ideation compared to patients with diabetes but without childhood abuse (30.0 % vs. 15.7 %). More precisely, we found an association between emotional as well as sexual abuse in patients with diabetes. Corresponding to previous findings [21,34], experiences of physical abuse, however, did not have an impact on suicidal ideation in patients with diabetes. As studies pointed to the protective effect of social support [29], considering the current psychosocial situation beyond adverse childhood experiences could further help understand differences in suicidal ideation in the present. We further demonstrated that more frequent experiences of childhood abuse were linked to higher odds of suicidal ideation, indicating a dose–response relationship and that the odds of reporting suicidal ideation were higher for women than for men. These gender differences add to previous evidence [29] and correspond to findings from a large population-based study investigating the clinical picture and gender differences of people reporting suicidal ideation. The authors report that in women suicidal ideation was associated with e.g. experiences of somatic complaints, while in men it was more associated with manifest somatic diseases such as myocardial infarction [36]. This emphasizes the differential impact of health-related factors associated with suicidal ideation in men and women and helps to develop an individual perspective on people at risk. However, research has demonstrated that

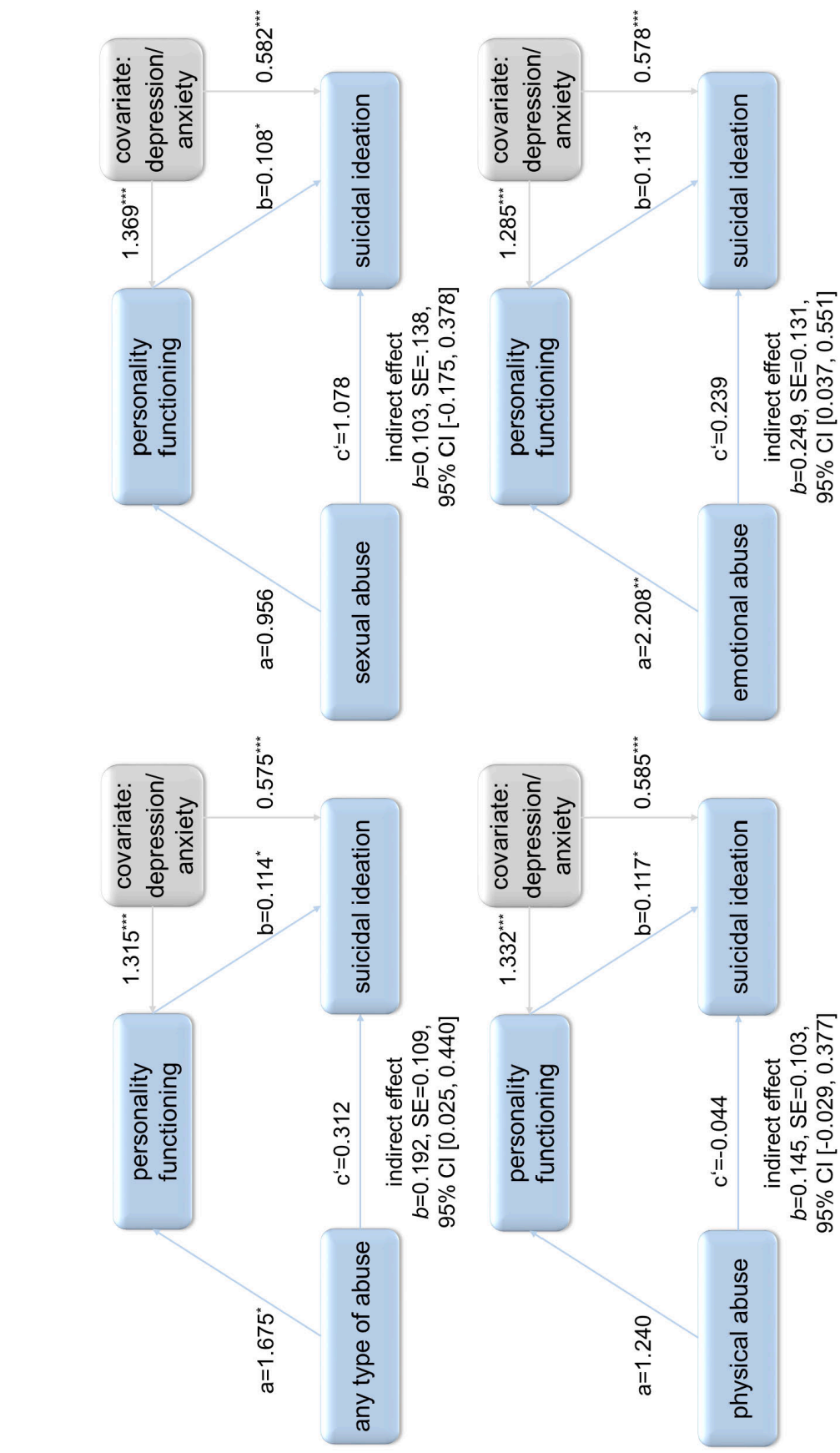


Fig. 2. Path diagrams for each mediation analysis conducted, showing the total effect (c') of the abuse type on suicidal ideation and the indirect (mediating) effect of the abuse type on suicidal ideation through personality functioning in patients with diabetes. p-values: * $p \leq 0.05$, ** $p \leq 0.01$, *** $p \leq 0.001$.

risk factors for suicidal thoughts and behaviors are distinct [37]. From a prevention perspective, it is important to study both and to intervene in the suicidal process at the earliest possible time. Still, little is known about the underlying mechanisms that lead to the increased development of suicidal ideation in patients with diabetes.

To better understand our initially assumed association between emotional as well as sexual abuse and suicidal ideation, our analyses included personality functioning as a mediator. Emotional abuse and personality functioning explained nearly 50 % of the variance in suicidal ideation. Our results indicated a substantial mediating effect of personality functioning in the association between emotional abuse and suicidal ideation in patients with diabetes. This corresponds to recent research showing that difficulties in emotion regulation – which are a crucial part of personality functioning – are associated with higher levels of suicidal ideation in both clinical and population samples [38]. Still, the present study indicates a more specific association of experiences of abuse and suicidal ideation later in life that goes beyond general mental distress (which the mediation model controlled for). Hence, our results question if the chronic illness itself, the associated quality of life deficits or the potential availability of lethal means are the sole reason for the overall increased risk for suicide in this population. We rather suggest equally considering the increased history of emotional abuse [20,39] and the resulting impairments in personality functioning [17]. Following this line of thinking, dealing with a chronic and non-communicable disease like diabetes alongside a history of emotional abuse and corresponding impairments in personality functioning might make suicide prevention even more challenging. However, it also helps us to better understand the contributing factors and devise targeted support offers. The resulting psychological burden stemming from a history of childhood abuse and impaired personality functioning alongside known factors such as the continuous challenges of diabetes self-management and coping with a chronic disease might contribute to the elevated prevalence of suicidal ideation. Moreover, diabetes must also be conceptualized as a potential consequence of child maltreatment whose effects are likely shaped by difficulties in emotion regulation and health risk behavior alike [9,10].

While both of these potential pathways to suicide risk require further research, our findings emphasize the importance to consider a bio-psychosocial model of health and illness. On the one hand, it has to be seen to what degree and in which way diabetes specific characteristics like diabetes symptoms, psychopathologies and diabetes- related treatments contribute to suicidal ideation. On the other hand, our findings highlight the role of social and psychological factors by interconnecting emotional abuse as well as impaired personality functioning with suicidal ideation in patients with diabetes. While both themselves pose to be risk factors, knowing about the importance of personality functioning as a modifiable factor in this association might offer a new treatment angle for patients with diabetes, e.g. through psychotherapeutic interventions.

5. Strengths and Limitations

To our knowledge, there are no studies reporting prevalences of suicidal ideation in patients with diabetes specifically for the German population. We addressed this research gap by presenting representative numbers based on a large population sample. Regarding childhood abuse, we broaden the evidence by investigating a dose–response relationship as well as the association between different abuse types and suicidal ideation, giving differential insights into the detrimental and far-reaching effects of childhood abuse. By employing the trans-diagnostic concept of personality functioning as a dimensional measure for psychological capacities, we expand recent research on its importance for numerous mental and physical health issues. Another factor that is associated with both diabetes and suicidal ideation are depressive symptoms. To account for their confounding influence we controlled for symptoms of depression and anxiety in our analyses.

Still, some limitations of this study have to be considered when interpreting the results. The cross-sectional design of the present study does not allow any conclusions regarding cause and effect between childhood abuse, personality functioning and suicidal ideation. In addition, diabetes was assessed via self-report which limits the validity of the diabetes prevalence to some degree, even though there is evidence supporting the utility of self-reported diabetes for clinical studies [40]. Further, the study design did not allow for a separate collection of data on type 1 and type 2 diabetes, which might yield different results regarding suicidal ideation due to the different pathomechanisms. However, only three people with diabetes were under the age of 30, pointing to a probably low proportion of type 1 diabetes in our study sample. As for the influence of other factors on suicidal ideation, such as socioeconomic status, it is important to note that 28 % of patients with diabetes reported a monthly income of less than 1,250 €, which is close to the existential minimum for a married couple living in one household in Germany. Future studies should investigate the association between childhood abuse and neglect and suicidal ideation for type 1 and type 2 diabetes separately and consider further confounding factors, such as socioeconomic status, migration background, levels of social support, insulin treatment, diabetes duration, or comorbid diabetes-related secondary diseases.

6. Conclusion

Patients with diabetes are a high-risk group with nearly 3-fold heightened prevalences of suicidal ideation compared to the general population. Emotional and sexual abuse were associated with a substantially increased risk of suicidal ideation, highlighting the detrimental and far-reaching effects of childhood abuse. In patients with diabetes and a history of emotional abuse, impaired personality functioning partly explained the increased prevalences of suicidal ideation and should therefore be considered and addressed when dealing with this patient group. Hence, knowledge about a history of emotional abuse and resulting impaired personality functioning in patients with diabetes and suicidal ideation provides relevant information on both the development of adequate prevention as well as psychotherapeutic treatment measures.

CRediT authorship contribution statement

Sandra Zara: Conceptualization, Methodology, Writing – original draft. **Johannes Kruse:** Conceptualization, Data curation, Supervision, Writing – review & editing. **Elmar Brähler:** Data curation, Writing – review & editing. **Cedric Sachser:** Data curation, Writing – review & editing. **Jörg M. Fegert:** Data curation, Writing – review & editing. **Karl-Heinz Ladwig:** Writing – review & editing. **Mareike Ernst:** Writing – review & editing. **Hanna Kampling:** Conceptualization, Supervision, Writing – review & editing.

Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Acknowledgements

This research did not receive any specific grant from funding agencies in the public, commercial, or not-for-profit sectors.

References

[1] Kavalidou K, Smith DJ, Der G, O'Connor RC. The role of physical and mental multimorbidity in suicidal thoughts and behaviours in a Scottish population cohort study. BMC Psychiatry 2019;19(1):38. https://doi.org/10.1186/s12888-019-2032-8.

[2] Smith L, Shin JI, Lee S, Oh JW, López Sánchez GF, Kostev K, et al. The association of physical multimorbidity with suicidal ideation and suicide attempts in England: a mediation analysis of influential factors. Int J Soc Psychiatry 2023;69(3):523–31. https://doi.org/10.1177/00207640221137993.

[3] Wang B, An X, Shi X, Zhang JA. Management of Endocrine Disease: suicide risk in patients with diabetes: a systematic review and meta-analysis. Eur J Endocrinol 2017;177(4):R169–81. https://doi.org/10.1530/EJE-16-0952.

[4] Elamoshy R, Bird Y, Thorpe L, Moraros J. Risk of depression and suicidality among diabetic patients: a systematic review and meta-analysis. J Clin Med 2018;7(11): 445. https://doi.org/10.3390/jcm7110445.

[5] Lee HY, Hahm MI, Lee SG. Risk of suicidal ideation in diabetes varies by diabetes regimen, diabetes duration, and HbA1c level. J Psychosom Res 2014;76(4):275–9. https://doi.org/10.1016/j.jpsychores.2014.02.003.

[6] Kim YC, Um YH, Kim SM, Kim TW, Seo HJ, Hong SC, Jeong JH. Suicide Risk in Patients With Diabetes Varies by the Duration of Diabetes: The Korea National Health and Nutrition Examination Survey (2019). Psychiatry Investig. 2022;19(4): 326–32. 10.30773/pi.2021.0396.

[7] Angelakis I, Gillespie EL, Panagioti M. Childhood maltreatment and adult suicidality: a comprehensive systematic review with meta-analysis. Psychol Med 2019;49(07):1057–78. https://doi.org/10.1017/S0033291718003823.

[8] Kalmakis KA, Chandler GE. Adverse childhood experiences: towards a clear conceptual meaning. J Adv Nurs 2014;70(7):1489–501. https://doi.org/10.1111/jan.12329.

[9] Ittoop T, Jeffrey K, Cheng CI, Reddy S. The relationship between adverse childhood experiences and diabetes in central Michigan adults. Endocr Pract 2020;26(12): 1425–34. https://doi.org/10.4158/EP-2020-0239.

[10] Hughes K, Bellis MA, Hardcastle KA, Sethi D, Butchart A, Mikton C, et al. The effect of multiple adverse childhood experiences on health: a systematic review and meta-analysis. Lancet Public Health 2017;2(8):e356–66. https://doi.org/10.1016/S2468-2667(17)30118-4.

[11] Kalmakis KA, Chandler GE. Health consequences of adverse childhood experiences: a systematic review. J Am Assoc Nurse Pract 2015;27(8):457–65. https://doi.org/10.1002/2327-6924.12215.

[12] Beebe B, Jaffe J, Markese S, Buck K, Chen H, Cohen P, et al. The origins of 12-month attachment: a microanalysis of 4-month mother–infant interaction. Attach Hum Dev 2010;12(1–2):3–141. https://doi.org/10.1080/14616730903338985.

[13] Dagnino P, Ugarte MJ, Morales F, González S, Saralegui D, Ehrenthal JC. Risk factors for adult depression: adverse childhood experiences and personality functioning. Front Psychol 2020;11:594698. https://doi.org/10.3389/fpsyg.2020.594698.

[14] Ehrenthal JC, Benecke C. Tailored treatment planning for individuals with personality disorders: the OPD approach. In: Kramer U, editor. Case Formulation for Personality Disorders: Tailoring Psychotherapy to the Individual Client. Cambridge, MA: Elsevier; 2019. p. 291–314.

[15] Morey LC, Hopwood CJ. Expert preferences for categorical, dimensional, and mixed/hybrid approaches to personality disorder diagnosis. J Pers Disord 2019; 1–8. https://doi.org/10.1521/pedi_2019_33_398.

[16] Mulder RT. ICD-11 personality disorders: utility and implications of the new model. Front Psychiatry 2021;12:655548. https://doi.org/10.3389/fpsyt.2021.655548.

[17] Freier A, Kruse J, Schmalbach B, Zara S, Werner S, Brähler E, et al. The mediation effect of personality functioning between different types of child maltreatment and the development of depression/anxiety symptoms – a German representative study. J Affect Disord 2022;299:408–15. https://doi.org/10.1016/j.jad.2021.12.020.

[18] Kampling H, Kruse J, Lampe A, Nolte T, Hettich N, Brähler E, et al. Epistemic trust and personality functioning mediate the association between adverse childhood experiences and posttraumatic stress disorder and complex posttraumatic stress disorder in adulthood. Front Psychiatry 2022;13:919191. https://doi.org/10.3389/fpsyt.2022.919191.

[19] Krakau L, Tibubos AN, Beutel ME, Ehrenthal JC, Gieler U, Brähler E. Personality functioning as a mediator of adult mental health following child maltreatment. J Affect Disord 2021;291:126–34. https://doi.org/10.1016/j.jad.2021.05.006.

[20] Zara S, Brähler E, Sachser C, Fegert JM, Häuser W, Krakau L, et al. Associations of different types of child maltreatment and diabetes in adulthood – the mediating effect of personality functioning: findings from a population-based representative German sample. Ann Epidemiol 2023;78:47–53. https://doi.org/10.1016/j.annepidem.2022.12.004.

[21] Ernst M, Brähler E, Kampling H, Kruse J, Fegert JM, Plener PL, et al. Is the end in the beginning? child maltreatment increases the risk of non-suicidal self-injury and suicide attempts through impaired personality functioning. Child Abuse Negl 2022; 133:105870. https://doi.org/10.1016/j.chiabu.2022.105870.

[22] Rogers ML, Joiner TE, Shahar G. Suicidality in chronic illness: an overview of cognitive-affective and interpersonal factors. J Clin Psychol Med Settings 2021;28 (1):137–48. https://doi.org/10.1007/s10880-020-09749-x.

[23] Kish L. A procedure for objective respondent selection within the household. J Am Stat Assoc 1949;44(247):380–7.

[24] Dunne MP, Zolotor AJ, Runyan DK, Andreva-Miller I, Choo WY, Dunne SK, et al. ISPCAN child abuse screening tools retrospective version (ICAST-R): Delphi study and field testing in seven countries. Child Abuse Negl 2009;33(11):815–25. https://doi.org/10.1016/j.chiabu.2009.09.005.

[25] Ehrenthal J, Dinger U, Schauenburg H, Horsch L, Dahlbender RW, Gierk B. Entwicklung einer Zwölf-Item-Version des OPD-Strukturfragebogens (OPD-SFK)/ Development of a 12-item version of the OPD-Structure Questionnaire (OPD-SQS). Z Psychosom Med Psychother. 2015;61(3):262–74. 10.13109/zptm.2015.61.3.262.

[26] Löwe B, Wahl I, Rose M, Spitzer C, Glaesmer H, Wingenfeld K, et al. A 4-item measure of depression and anxiety: validation and standardization of the patient health Questionnaire-4 (PHQ-4) in the general population. J Affect Disord 2010; 122(1–2):86–95. https://doi.org/10.1016/j.jad.2009.06.019.

[27] Wicke FS, Krakau L, Löwe B, Beutel ME, Brähler E. Update of the standardization of the patient health Questionnaire-4 (PHQ-4) in the general population. J Affect Disord 2022;312:310–4. https://doi.org/10.1016/j.jad.2022.06.054.

[28] Kocalevent RD, Hinz A, Brähler E. Standardization of the depression screener patient health questionnaire (PHQ-9) in the general population. Gen Hosp Psychiatry 2013;35(5):551–5. https://doi.org/10.1016/j.genhosppsych.2013.04.006.

[29] Otten D, Ernst M, Tibubos AN, Brähler E, Fleischer T, Schomerus G, et al. Does social support prevent suicidal ideation in women and men? gender-sensitive analyses of an important protective factor within prospective community cohorts. J Affect Disord 2022;306:157–66. https://doi.org/10.1016/j.jad.2022.03.031.

[30] Hayes A. Introduction to mediation, moderation, and conditional process analysis: a regression-based approach. Guilford publications 2017.

[31] Forkmann T, Brähler E, Gauggel S, Glaesmer H. Prevalence of suicidal ideation and related risk factors in the german general population. J Nerv Ment Dis 2012;200 (5):401–5. https://doi.org/10.1097/NMD.0b013e31825322cf.

[32] Hawton K. Restricting access to methods of suicide: rationale and evaluation of this approach to suicide prevention. Crisis 2007;28(S1):4–9. https://doi.org/10.1027/0227-5910.28.S1.4.

[33] Pitman A, Tham SG, Hunt IM, Webb RT, Appleby L, Kapur N. Access to means of lethal overdose among psychiatric patients with co-morbid physical health problems: analysis of national suicide case series data from the United Kingdom. J Affect Disord 2019;257:173–9. https://doi.org/10.1016/j.jad.2019.06.027.

[34] Berardelli I, Sarubbi S, Rogante E, Erbuto D, Giuliani C, Lamis DA, et al. Association between childhood maltreatment and suicidal ideation: a path analysis study. J Clin Med 2022;11(8):2179. https://doi.org/10.3390/jcm11082179.

[35] Schönfelder A, Hallensleben N, Spangenberg L, Forkmann T, Rath D, Glaesmer H. The role of childhood abuse for suicidality in the context of the interpersonal theory of suicide: an investigation in german psychiatric inpatients with depression. J Affect Disord 2019;245:788–97. https://doi.org/10.1016/j.jad.2018.11.063.

[36] Ladwig KH, Klupsch D, Meisinger C, Baumert J, Erazo N, Schneider A, et al. Gender differences in risk assessment of death wishes and suicidal ideation in the community: results from the KORA Augsburg F3 study with 3079 men and women, 35 to 84 Years of age. J Nerv Ment Dis 2010;198(1):52–8. https://doi.org/10.1097/NMD.0b013e3181c81f92.

[37] May AM, Klonsky ED. What distinguishes suicide attempters from suicide ideators? a meta-analysis of potential factors. Clin Psychol: Sci Pract 2016;23(1):5–20. https://doi.org/10.1037/h0101735.

[38] Colmenero-Navarrete L, García-Sancho E, Salguero JM. Relationship between emotion regulation and suicide ideation and attempt in adults and adolescents: a systematic review. Arch Suicide Res 2022;26(4):1702–35. https://doi.org/10.1080/13811118.2021.1999872.

[39] Atasoy S, Johar H, Fleischer T, Beutel ME, Binder H, Brähler E, et al. Depression mediates the association between childhood emotional abuse and the onset of type 2 diabetes: findings from German multi-cohort prospective studies. Front Psychiatry 2022;13:825678. https://doi.org/10.3389/fpsyt.2022.825678.

[40] Jackson JM, DeFor TA, Crain AL, Kerby T, Strayer L, Lewis CE, et al. Self-reported diabetes is a valid outcome in pragmatic clinical trials and observational studies. J Clin Epidemiol 2013;66(3):349–50. https://doi.org/10.1016/j.jclinepi.2012.01.013.

Journal of Psychosomatic Research 198 (2025) 112390

Contents lists available at ScienceDirect

Journal of Psychosomatic Research

journal homepage: www.elsevier.com/locate/jpsychores

Exploring loneliness in individuals with diabetes – The role of childhood abuse and neglect, and personality functioning: Findings from a German population-based sample

Sandra Zara [a,*], Johannes Kruse [a,b,c], Elmar Brähler [d,e], Mareike Ernst [f], Jörg M. Fegert [g,h], Astrid Lampe [i,j], Tobias Nolte [k,l], Miriam Rassenhofer [g,h], David Riedl [i,m], Hanna Kampling [a,c]

[a] Department of Psychosomatic Medicine and Psychotherapy, Justus Liebig University Giessen, Germany
[b] Department for Psychosomatic Medicine and Psychotherapy, Medical Center of the Philipps University Marburg, Germany
[c] German Center for Diabetes Research (DZD), München, 85764 Neuherberg, Germany
[d] Department of Psychosomatic Medicine and Psychotherapy, University Medical Center of the Johannes Gutenberg University Mainz, Mainz, Germany
[e] Integrated Research and Treatment Center for Adiposity Diseases, Behavioral Medicine Research Unit, University Medical Center Leipzig, Leipzig, Germany
[f] Department of Clinical Psychology, Psychotherapy and Psychoanalysis, Department of Psychology, University of Klagenfurt, Klagenfurt am Wörthersee, Austria
[g] Department of Child and Adolescent Psychiatry/Psychotherapy, University of Ulm, Ulm, Germany
[h] German Center for Mental Health (DZPG), Partner site Ulm, Germany
[i] Ludwig Boltzmann Institute for Rehabilitation Research, Vienna, Austria
[j] VAMED Rehabilitation Center, Schruns, Austria
[k] Anna Freud National Centre for Children and Families, London, United Kingdom
[l] Research Department of Clinical, Educational and Health Psychology, UCL, London, United Kingdom
[m] Department of Psychiatry, Psychotherapy, Psychosomatics and Medical Psychology, Medical University of Innsbruck, Innsbruck, Austria

ARTICLE INFO

Keywords:
Loneliness
Abuse and neglect
OPD
Personality functioning
Diabetes
Epistemic trust, mistrust, and credulity

ABSTRACT

Background: This study examines 1) loneliness frequency in individuals with diabetes, 2) associated factors, and 3) personality functioning and the epistemic stance as underlying mechanisms linking childhood abuse and neglect, and loneliness.

Methods: Using representative population data ($N = 2428$), loneliness (UCLA-LS) was assessed in individuals with self-reported diabetes ($n = 206$) and compared to those without. Regression analyses tested age, sex, relationship status, childhood abuse and neglect (ICAST-R), depression and anxiety (PHQ-4), personality functioning (OPD-SQS), and the epistemic stance (ETMCQ-12) as predictors. Structural equation modeling (SEM) investigated personality functioning and the epistemic stance as mediators between childhood abuse and neglect, and loneliness.

Results: In the total sample, 12.4 % reported loneliness, and loneliness was more frequent in individuals with diabetes (24.8 %) than those without (11.3 %). Higher loneliness was linked to being single, greater depression and anxiety symptoms, and impaired personality functioning. While childhood abuse and neglect were initially associated with loneliness, this became nonsignificant when personality functioning was included as a mediator, increasing the explained variance from 3.4 % to 42.0 %.

Conclusions: Nearly a quarter of individuals with diabetes experience loneliness, particularly linked to emotional abuse. Impaired personality functioning, associated with interpersonal difficulties, appears as a shared mechanism for diabetes and loneliness. Considering loneliness and impairments in personality functioning might be highly important in research and clinical practice.

* Corresponding author at: Department of Psychosomatic Medicine and Psychotherapy, Justus Liebig University Giessen, Ludwigstraße 76, D-35392 Giessen, Germany.
E-mail address: sandra.zara@psycho.med.uni-giessen.de (S. Zara).

https://doi.org/10.1016/j.jpsychores.2025.112390
Received 17 March 2025; Received in revised form 18 September 2025; Accepted 19 September 2025
Available online 24 September 2025
0022-3999/© 2025 The Authors. Published by Elsevier Inc. This is an open access article under the CC BY license (http://creativecommons.org/licenses/by/4.0/).

1. Introduction

Loneliness is a common phenomenon all around the globe [1], with approximately 15 % of the German population feeling lonely at least sometimes [2]. Especially during the recent COVID-19 pandemic, this public health issue has been further exacerbated [3]. While loneliness itself is normal and to a certain extent adaptive as it usually motivates the individual to seek connections with other people [4], some individuals suffer from ongoing and distressing subjective feelings of being socially isolated, disconnected from others, and of not belonging, independent from their quantity and/or quality of social engagements. Particularly chronic loneliness is suggested to have a negative impact on physical and mental health, quality of life, and premature mortality [5,6]. While loneliness has been observed across different populations and demographic groups [7], especially patients with chronic illnesses have shown to be a high-risk group for loneliness and the negative impacts on the onset and the course of their disease have been established [5,6].

Recent research has started to focus on loneliness in patients with diabetes, showing that loneliness elevates the risk of diabetes by around 22 % [8] as well as pointing to a dose-response relationship [9]. However, little is known about the prevalence of loneliness in patients with diabetes. Still, it has been shown that loneliness in patients with diabetes is linked to an increased risk for diabetes-related complications [10] and higher blood sugar levels [11], emphasizing its relevance for the onset as well as the course of the disease. While loneliness itself appears to be a risk factor for developing diabetes in the first place, other factors may contribute to the development of loneliness in patients with diabetes. A recent review based on a small number of studies focusing on older individuals with diabetes suggests certain risk factors like sociodemographic characteristics, diabetes-associated aspects, and psychological burden in the form of e.g. depressive symptoms as key factors associated with loneliness [12]. Nevertheless, it still remains unclear which factors contribute to loneliness in general and, more specifically, in patients with diabetes.

A risk factor for the development of loneliness has been shown to be a history of child maltreatment (CM). A recent multilevel meta-analysis demonstrated that individuals with CM, especially emotional abuse or neglect, are more vulnerable to loneliness across the lifespan [13]. In patients with diabetes, CM has also shown to be associated with impaired diabetes care, higher blood glucose levels, and higher psychological burden, e.g. depression and anxiety symptoms [14,15].

However, knowledge on CM as a risk factor for elevated loneliness in patients with diabetes as well as the underlying mechanisms connecting CM, loneliness, and diabetes, is still limited. One mechanism that has been suggested to underpin the associations between both CM and loneliness as well as CM and diabetes are aspects of personality and personality functioning [16,17]. It has been proposed that impairments in personality functioning attributable to a history of CM might predispose to loneliness [17]. Personality functioning describes a person's basic psychological abilities with regard to the self, e.g. identity and self-esteem, and in relation to others, e.g. empathy and intimacy in the domains communication and attachment [18]. Moreover, closely associated with CM and impaired personality functioning are disruptions of epistemic trust (a person's ability to trust in socially communicated knowledge), resulting in epistemic mistrust (a tendency to treat information as unreliable and avoid being influenced by others), and epistemic credulity (a person's lack of clarity about their own position and indiscriminate or excessive trust which can lead to vulnerability to misinformation and exploitation) [24]. Personality functioning and the epistemic stance present important intra- and interpersonal abilities which shape how we feel and interact with other people. Not only do we need sufficient personality functioning to form and maintain close relationships, but we also need epistemic trust to accept other people's relationship offers, which is why loneliness might also be a consequence of impairments in personality functioning and the epistemic stance.

The outlined negative associations between loneliness and diabetes (onset, diabetes-associated complications), diabetes being already a high-risk group for psychopathology as well as the importance of (epistemic) trust in their treating health care physicians emphasize why understanding the interplay between CM, personality functioning, the epistemic stance, and loneliness can be beneficial in the treatment of individuals with diabetes. Further, loneliness can also inform psychosocial and clinical interventions and offer starting points beyond somatically focused approaches.

Against this background, the present study aims to investigate the associations between childhood abuse and neglect, impaired personality functioning, and the epistemic stance, as well as loneliness in individuals with diabetes. We hypothesize that childhood abuse and neglect and loneliness are more frequent in individuals with diabetes compared to individuals without diabetes. Further, we hypothesize that childhood abuse and neglect, personality functioning, and the epistemic stance are associated with loneliness in individuals with diabetes, and that personality functioning mediates the association between childhood abuse and neglect and loneliness in individuals with diabetes.

2. Subjects, materials and methods

2.1. Sample

The data collection took place from July 28th to October 1st 2021, conducted by the independent research institute USUMA GmbH Berlin. A representative sample of the population was surveyed using a random route procedure. Households within 258 predefined regions were randomly selected, and in households with multiple residents, the Kish-Selection-Grid [30] was applied. Inclusion criteria required participants to have sufficient language skills, be over the age of 16, and provide informed consent. The dataset comprised $N = 2515$ eligible interviews. The study adhered to the Declaration of Helsinki and met the ethical guidelines of the International Code of Marketing and Social Research Practice of the International Chamber of Commerce and the European Society of Opinion and Marketing Research. Ethical approval was granted by the Ethics Committee of the Medical Faculty of the University of Leipzig (no. 298/21-ek).

2.2. Diabetes

Diabetes was assessed via self-report using the item "Do you have one of the following two chronic physical illnesses: Heart attack or diabetes?". Individuals answering this question with 'Diabetes' were included as individuals with diabetes. Assessing diabetes via self-report has proven to be valid in numerous populations with positive predictive values of around 95 % [19].

2.3. Loneliness

Loneliness was assessed with the German version of the UCLA 3-item loneliness scale [20], with response options ranging from 0 = 'never' to 4 = 'very often'. The sum score ranges from 0 to 12, with higher scores indicating more loneliness [20]. To measure the frequency of loneliness, we followed the procedure of the German loneliness barometer, computing an averaged sum scale and dichotomizing it, with values >2 indicating loneliness [21]. The German version showed satisfactory internal consistency ($\alpha = 0.85$) [22]. In the present study, reliability was excellent ($\omega = 0.90$).

2.4. Childhood abuse and neglect

Childhood abuse and neglect were retrospectively assessed using the self-report ISPAN Child Abuse Screening Tools-Retrospective (ICAST-R) questionnaire [23]. It comprises 36 items addressing experiences of sexual, physical, and emotional abuse, and neglect, with binary response

options (yes/no). The ICAST-R is a valid epidemiological screening instrument, demonstrating adequate to good reliability (sexual abuse: McDonald's ω = 0.75, physical abuse ω = 0.61, emotional abuse: ω = 0.67, neglect: ω = 0.69) [23]. In the present sample, the internal consistency was acceptable with a McDonald's omega of ω = 0.79 for sexual abuse, ω = 0.76 for physical abuse, ω = 0.74 for emotional abuse, and ω = 0.70 for neglect.

2.5. Personality functioning

Personality functioning was assessed with the self-report questionnaire Operationalized Psychodynamic Diagnosis – Structure Questionnaire Short Form (OPD-SQS) [18]. Four items on each of the three subscales self-perception, interpersonal contact, and relationship model are answered from 0 = 'does not apply at all' to 4 = 'fully applies', resulting in a sum score ranging from 0 to 48, with higher scores indicating more severe deficits in personality functioning. The OPD-SQS showed good internal consistency (α = 0.88) [18]. In the present study, the internal consistency of the total scales was excellent (ω = 0.91).

2.6. Epistemic stance

The epistemic stance comprises epistemic trust, mistrust, and credulity. The three independent subscales can be assessed via self-report with the Epistemic Trust, Mistrust and Credulity Questionnaire (ETMCQ) [24]. The German version comprises 12 items, with response options ranging from 1 = 'strongly disagree' to 7 = 'strongly agree', resulting in a sum score from 12 to 84 [25]. Good to acceptable internal consistency has been proposed (trust: ω = 0.81; mistrust: ω = 0.66; credulity: ω = 0.81) [25]. In the present sample, the subscales showed good internal consistency with ω = 0.83 for epistemic trust, ω = 0.70 for mistrust, and ω = 0.82 for credulity.

2.7. Symptoms of depression and anxiety

The 4-item self-report measure Patient Health Questionnaire (PHQ-4) was used to assess symptoms of depression and anxiety [26]. With two items of the Generalized Anxiety Disorder Scale-2 (GAD-2) and two items of the PHQ-2, anxiety and depression symptoms can be assessed separately and as a total measure. Response options range from 0 = 'not at all' to 3 = 'nearly every day', resulting in a sum score between 0 and 12. The PHQ-4 showed good reliability with a McDonald's omega of ω = 0.85 [27]. In the present sample, the internal consistency was good with a McDonald's omega of ω = 0.86.

2.8. Statistical analyses

To assess and compare the frequency of loneliness in individuals with diabetes to individuals without and explore differences Chi^2-tests and independent *t*-tests were conducted. When considering age, individuals with diabetes under and above the mean age of 68 years were compared, to consider the already high age of the diabetes sample. Preliminary to the regression analyses, point-biserial correlations among loneliness, childhood abuse and neglect, symptoms of depression and anxiety, personality functioning, epistemic trust, mistrust, and credulity were conducted (>0.1 weak, >0.3 moderate, and > 0.5 strong correlation [28]). Based on these results, all significant variables additionally to age, sex, and relationship status were selected for the regression analyses. The explained variance in the regression analysis is indicated with adjusted R^2 (small effect: $R^2 > 0.02$, medium effect: $R^2 > 0.13$, large effect: $R^2 > 0.26$).

Employing a structural equation model (SEM), the associations between childhood abuse and neglect (dichotomous variable any type), personality functioning (OPD-SQS sum score), and loneliness (UCLA-LS sum score) were investigated in individuals with diabetes (see also Fig. 1). The epistemic stance (ETMCQ-12 sum scores for each subscale) was included as a predictor for personality functioning in the model as it closely associated with its development and has been proven to be a predictor of personality functioning rather than acting as a mediator. The significance was examined using bootstrapped confidence intervals (5000 samples, 95 %-CI). The model's goodness of fit was determined using Pearson's Chi^2-test, the comparative fit index (CFI, values >0.90), the Tucker-Lewis Index (TLI, values >0.90), and root mean square error of approximation (RMSEA, values <0.08) with lower and higher bounds of the 95 %-CI. To evaluate whether the empirical data closely fit the theoretical model, the *p*-value of Close Fit (PCLOSE) was calculated based on the RMSEA values, with values of $p > .05$ indicating close fit [29]. Further, the Bollen-Stine bootstrapping procedure tested the correctness of the model hypothesis ($p > .05$) [30]. In all other instances *p*-values < .05 (two-sided) were considered statistically significant. Regarding confounders, evidence regarding personality functioning and the epistemic stance is limited. For instance, Ehrenthal and colleagues [18] showed that personality functioning is independent of age and sex. Moreover, due to the complexity of the model, the SEM focused on the main theoretical constructs rather than including confounding variables, hence, preserving statistical stability of the model. Statistical analyses were performed with IBM SPSS and SPSS AMOS (v29.0).

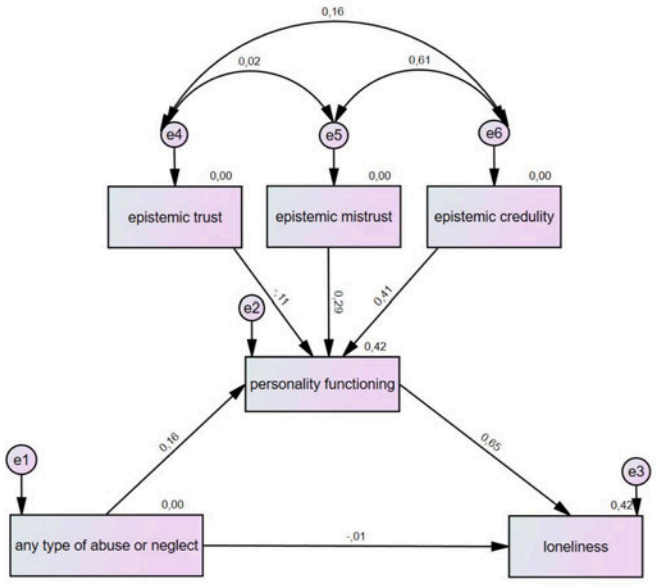


Fig. 1. Structural equation model examining the association between any type of childhood abuse and neglect (X) and loneliness (Y) mediated by personality functioning (M1), which is predicted by epistemic trust, epistemic mistrust, and epistemic credulity. Rectangles represent variables and circles represent error terms (e). Numbers next to arrows in the model represent standardized estimates, numbers next to factors represent the R^2, i.e. the explained variance.

3. Results

3.1. Sociodemographic and clinical characteristics

A total of $N = 2515$ people were eligible for the study, $n = 87$ people were excluded due to insufficient data (diabetes status or questionnaires). The final analysis sample comprised $n = 2428$ individuals. No differences between those in the analysis sample and those excluded due to insufficient data were found regarding age ($t_{(89,878)} = -1252$, $p = .214$, $d = 0.170$), marital status ($\chi^2_{(2)} = 1.354$, $p < .508$, $\varphi = 0.023$), and education ($\chi^2_{(2)} = 5.279$, $p < .071$, Cramer's V = 0.046). However, more insufficient data was found in men compared to women ($\chi^2_{(1)} = 6.733$, $p < .009$, $\varphi = 0.052$).

The frequency of self-reported diabetes was 8.5 % ($n = 206$). While

sex proportions did not differ between individuals with and without diabetes, individuals with diabetes were significantly older ($p < .001$, $d = 1.100$), more often not in a relationship ($p = .022$, $\varphi = -0.047$), and had more often less than 10 years of education ($p < .001$, Cramer's V = 0.182). Regarding clinical characteristics, individuals with diabetes compared to individuals without showed higher symptoms of depression and anxiety ($p < .001$, $d = 0.610$) as well as higher impairments in personality functioning ($p < .001$, $d = 0.529$). While the groups were comparable regarding epistemic trust, mistrust, and credulity were higher in individuals with diabetes compared to individuals without (mistrust: $p < .001$, $d = 0.355$; credulity: $p < .001$, $d = 0.342$). In the total sample, the frequency of at least one type of childhood abuse and neglect was 35.8 %. Individuals with diabetes compared to individuals without showed significantly higher frequencies of childhood abuse and neglect ($p < .001$, $\varphi = 0.065$), with emotional abuse being the most frequent (30.6 %), followed by physical abuse (30.1 %), neglect (25.7 %), and sexual abuse (13.1 %). See also Table 1.

3.2. Frequency of loneliness

In the total sample, the frequency of loneliness above the cut-off was 12.4 %. It was significantly higher in individuals with diabetes compared to individuals without (24.8 % vs. 11.3 %, $p < .001$, $\varphi = 0.114$). They reported significantly more frequent missing the company of others ($p < .001$, $\varphi = 0.103$), feeling left out ($p < .001$, $\varphi = 0.109$), and feeling socially isolated ($p < .001$, $\varphi = 0.086$). For details, see Table 1.

In exploratory analyses, we further calculated the frequency of loneliness accounting for age, sex, and relationship status. In individuals with diabetes, no differences regarding loneliness frequency between those under vs. over the mean age of 68 could be observed (23.3 % vs. 25.8 %, $\chi^2_{(1)} = 0.179$, $p = .673$). However, women felt more often lonely compared to men (31.6 % vs. 18.7 %, $\chi^2_{(1)} = 3.584$, $p = .032$), and those not being in a relationship felt more often lonely than those in a relationship (34.2 % vs. 12.8 %, $\chi^2_{(1)} = 12.720$, $p < .001$). See also supplementary Tables 1 to 3.

3.3. Comparing individuals with diabetes reporting loneliness to individuals with diabetes not reporting loneliness

Individuals with diabetes reporting loneliness compared to individuals with diabetes who were not lonely showed significantly higher symptoms of depression and anxiety ($t_{(203)} = 10.123$, $p < .001$, $d = 1.646$), higher impairments in personality functioning ($t_{(204)} = 9.217$, $p < .001$, $d = 1.488$), higher mistrust ($t_{(104,080)} = 5.368$, $p < .001$, $d = 0.780$), and higher credulity ($t_{(204)} = 5.529$, $p < .001$, $d = 0.893$). Regarding epistemic trust, no differences in lonely diabetes individuals compared to those who were not lonely emerged ($t_{(71,350)} = -1.439$, $p = .154$, $d = -0.262$). Moreover, lonely diabetes individuals had significantly more often a history of childhood abuse and neglect (60.8 % vs. 41.3 %, $\chi^2_{(1)} = 5.868$, $p = .015$, $\varphi = 0.169$), and more specifically, of emotional abuse (45.1 % vs. 25.8 %, $\chi^2_{(1)} = 6.727$, $p = .009$, $\varphi = 0.181$). For individuals without diabetes, similar tendencies could be observed.

Table 1
Sociodemographic and clinical characteristics including loneliness of the total sample, individuals with diabetes, and individuals without diabetes.

	total sample (n = 2428)		diabetes[a] (*n* = 206)		no diabetes (*n* = 2222)		test statistics	effect size
	N	(%)	N	(%)	N	(%)		
sex								
male	1163	(47.9)	107	(52.2)	1056	(47.5)	$\chi^2_{(1)} = 1.640$, $p = .200$	$\varphi = -0.026$
female	1264	(52.1)	98	(47.8)	1166	(52.5)		
not in a relationship[b]	1116	(46.5)	111	(54.1)	1005	(45.8)	**$\chi^2_{(1)} = 5.268$, $p = .022$**	$\varphi = -0.047$
years of education								
< 10 years	739	(30.5)	121	(56.8)	646	(28.3)		
10–13 years	1441	(59.4)	82	(38.5)	1392	(61.1)	**$\chi^2_{(2)} = 80.472$, $p < .001$**	Cramer's V = 0.182
> 13 years	245	(10.1)	10	(4.7)	242	(10.6)		
abuse and neglect[c]								
any type	870	(35.8)	95	(46.1)	775	(34.9)	**$\chi^2_{(2)} = 10.355$, $p < .001$**	$\varphi = 0.065$
sexual abuse	225	(9.3)	27	(13.1)	198	(8.9)	**$\chi^2_{(2)} = 3.947$, $p = .047$**	$\varphi = 0.040$
physical abuse	499	(20.6)	62	(30.1)	437	(19.7)	**$\chi^2_{(2)} = 12.560$, $p < .001$**	$\varphi = 0.072$
emotional abuse	541	(22.3)	63	(30.6)	478	(21.5)	**$\chi^2_{(2)} = 8.957$, $p = .003$**	$\varphi = 0.061$
neglect	389	(16.0)	53	(25.7)	336	(15.1)	**$\chi^2_{(2)} = 15.763$, $p < .001$**	$\varphi = 0.081$
loneliness[d]	302	(12.4)	51	(24.8)	254	(11.3)	**$\chi^2_{(1)} = 31.366$ $p < .001$**	$\varphi = 0.114$
missing the company of others	340	(14.0)	53	(25.7)	287	(12.9)	**$\chi^2_{(1)} = 25.697$ $p < .001$**	$\varphi = 0.103$
feeling left out	206	(8.5)	38	(18.4)	168	(7.6)	**$\chi^2_{(1)} = 28.772$ $p < .001$**	$\varphi = 0.109$
feeling socially isolated	192	(7.9)	32	(15.5)	160	(7.2)	**$\chi^2_{(1)} = 17.977$ $p < .001$**	$\varphi = 0.086$
	M	**(SD)**	**M**	**(SD)**	**M**	**(SD)**		
age	50.5	(17.9)	67.5	(12.9)	48.5	(17.6)	**$t_{(279,226)} = 19.321$, $p < .001$**	$d = 1.100$
symptoms of depression and anxiety[e]	1.6	(2.1)	2.7	(2.4)	1.5	(2.0)	**$t_{(231,254)} = 7.225$, $p < .001$**	$d = 0.610$
personality functioning[f]	9.6	(8.5)	13.6	(9.1)	9.2	(8.4)	**$t_{(2426)} = 7.265$, $p < .001$**	$d = 0.529$
epistemic trust[g]	23.7	(5.8)	23.0	(6.2)	23.8	(5.7)	$t_{(2425)} = -1.874$, $p = .061$	$d = -0.136$
epistemic mistrust[g]	9.9	(3.8)	11.1	(3.8)	9.7	(3.7)	**$t_{(2425)} = 4.868$, $p < .001$**	$d = 0.355$
epistemic credulity[g]	11.1	(4.9)	12.6	(5.4)	10.9	(4.9)	**$t_{(236,675)} = 4.293$, $p < .001$**	$d = 0.342$

Notes. [a] Diabetes diagnosis was assessed via self-report. [b] Being in a relationship comprised all individuals either married living with the spouse or being in a relationship, not being in a relationship comprised individuals married but not living with the spouse, being single, divorced, or widowed. [c] Childhood abuse and neglect were assessed with the self-report ISPAN Child Abuse Screening Tools-Retrospective (ICAST-R) questionnaire. [d] Loneliness was assessed with the UCLA-LS 3-item loneliness scale. To measure the frequency of loneliness, we computed an averaged sum scale and dichotomized it, with values >2 indicating loneliness. [e] Symptoms of depression and anxiety were assessed with the Patient Health Questionnaire 4-item version (PHQ-4). [f] Personality functioning was assessed with the Operationalized Psychodynamic Diagnosis – Structure Questionnaire Short Form (OPD-SQS). [g] Epistemic trust, epistemic mistrust and epistemic credulity were assessed with the German 12-item version of the Epistemic Trust, Mistrust and Credulity Questionnaire (ETMCQ).

See also Table 2.

3.4. Factors associated with loneliness in individuals with diabetes

Preceding the regression analyses, correlation analyses were conducted. Next to age, sex, and relationship status, only variables correlating significantly with loneliness were included in the regression model (see supplementary Table 4). With an explained variance of 58.1 % ($p < .001$), model 4 was the best in predicting loneliness in individuals with diabetes. Loneliness was associated with not being in a relationship ($b = -1.23$, 95 %-CI [−1.888, −0.565], $p < .001$), higher symptoms of depression and anxiety ($b = 0.61$, 95 %-CI [0.443, 0.773], $p < .001$), as well as higher impairments in personality functioning ($b = 0.13$, 95 %-CI [0.084, 0.170], $p < .001$). Sex, childhood abuse, and the epistemic stance did not prove to be significantly associated with loneliness. For details, see Table 3.

3.5. Mediation with SEM in individuals with diabetes

We assumed an indirect effect of childhood abuse and neglect on loneliness through personality functioning. We examined childhood abuse and neglect (any type), loneliness (UCLA-LS sum score), personality functioning (OPD-SQS sum score) and the epistemic stance (ETMCQ-12 sub scale sum scores) in a SEM in individuals with diabetes. The direct association between childhood abuse and neglect and loneliness was tested beforehand and significant (β = 0.19, 95 %-CI [0.049, 0.315], $p = .011$) and childhood abuse and neglect explained 3.4 % of the variance. In the SEM, the direct association between childhood

Table 2
Symptoms of depression and anxiety, personality functioning, epistemic trust, epistemic mistrust, and epistemic credulity as well as frequencies of childhood abuse and neglect in individuals with loneliness compared to individuals without loneliness for the total sample, individuals with diabetes, and individuals without diabetes.

	total sample (n = 2428)				test statistics	diabetes[a] (n = 206)				test statistics	no diabetes (n = 2222)				test statistics
	loneliness[b]					loneliness					loneliness				
	yes		no			yes		no			yes		no		
	M	(SD)	M	(SD)		M	(SD)	M	(SD)		M	(SD)	M	(SD)	
symptoms of depression and anxiety[c]	4.19	(2.7)	1.2	(1.7)	$t_{(337,163)} =$ **18.985, $p < .001$, $d =$ 1.597**	5.2	(2.4)	1.9	(1.9)	$t_{(203)} =$ **10.123, $p < .001$, $d =$ 1.646**	4.0	(2.7)	1.1	(1.7)	$t_{(276,792)} =$ **16.471, $p < .001$, $d =$ 1.543**
personality functioning[d]	19.7	(9.2)	8.1	(7.4)	$t_{(357,549)} =$ **20.939, $p < .001$, $d =$ 1.523**	22.2	(6.9)	10.8	(7.9)	$t_{(204)} =$ **9.217, $p < .001$, $d =$ 1.488**	19.2	(9.6)	8.0	(7.3)	$t_{(288,135)} =$ **18.095, $p < .001$, $d =$ 1.494**
epistemic trust[e]	22.3	(5.9)	23.9	(5.7)	$t_{(2426)} =$ **−4.626, $p < .001$, $d =$ −0.284**	21.8	(7.3)	23.4	(5.8)	$t_{(71,350)} =$ −1.439, $p = .154$, $d = -0.262$	22.4	(5.5)	23.9	(5.7)	$t_{(2220)} =$ **−4.112, $p < .001$, $d =$ −0.276**
epistemic mistrust[e]	12.8	(3.5)	9.4	(3.6)	$t_{(2425)} =$ **15.136, $p < .001$, $d =$ 0.931**	13.2	(3.1)	10.4	(3.8)	$t_{(104,080)} =$ **5.368, $p < .001$, $d =$ 0.780**	12.7	(3.6)	9.4	(3.6)	$t_{(2219)} =$ **13.883, $p < .001$, $d =$ 0.930**
epistemic credulity[e]	15.4	(5.0)	10.4	(4.6)	$t_{(2425)} =$ **17.306, $p < .001$, $d =$ 1.064**	16.0	(5.3)	11.5	(5.9)	$t_{(204)} =$ **5.529, $p < .001$, $d =$ 0.893**	15.3	(4.9)	10.4	(4.6)	$t_{(2219)} =$ **15.911, $p < .001$, $d =$ 1.066**
	N	**(%)**	**N**	**(%)**		**N**	**(%)**	**N**	**(%)**		**N**	**(%)**	**N**	**(%)**	
any type of abuse or neglect[f]	174	(57.6)	696	(32.7)	$\chi^2_{(1)} =$ **71.183, $p < .001$, $\varphi =$ 0.171**	31	(60.8)	64	(41.3)	$\chi^2_{(1)} =$ **5.868, $p = .015$, $\varphi =$ 0.169**	143	(57.0)	632	(32.1)	$\chi^2_{(1)} =$ **60.811, $p < .001$, $\varphi =$ 0.165**
sexual abuse	60	(19.9)	165	(7.8)	$\chi^2_{(1)} =$ **40.096, $p < .001$, $\varphi =$ 0.138**	8	(15.7)	19	(12.3)	$\chi^2_{(1)} = 0.369$, $p = .529$, $\varphi = 0.044$	52	(20.7)	146	(7.4)	$\chi^2_{(1)} =$ **48.592, $p < .001$, $\varphi =$ 0.148**
physical abuse	110	(36.4)	389	(18.3)	$\chi^2_{(1)} =$ **53.213, $p < .001$, $\varphi =$ 0.148**	17	(33.3)	45	(29.0)	$\chi^2_{(1)} = 0.337$, $p = .561$, $\varphi = 0.040$	93	(37.1)	344	(17.5)	$\chi^2_{(1)} =$ **54.130, $p < .001$, $\varphi =$ 0.156**
emotional abuse	135	(44.7)	406	(19.1)	$\chi^2_{(1)} =$ **100.116, $p < .001$, $\varphi =$ 0.203**	23	(45.1)	40	(25.8)	$\chi^2_{(1)} =$ **6.727, $p = .009$, $\varphi =$ 0.181**	112	(44.6)	366	(18.6)	$\chi^2_{(1)} =$ **89.500, $p < .001$, $\varphi =$ 0.201**
neglect	93	(30.8)	296	(13.9)	$\chi^2_{(1)} =$ **55.947, $p < .001$, $\varphi =$ 0.152**	17	(33.3)	36	(23.2)	$\chi^2_{(1)} = 2.052$, $p = .152$, $\varphi = 0.100$	76	(30.3)	260	(13.2)	$\chi^2_{(1)} =$ **50.651, $p < .001$, $\varphi =$ 0.151**

Notes. [a] Diabetes diagnosis was assessed via self-report. [b] Loneliness was assessed with the UCLA-LS 3-item loneliness scale. To measure the frequency of loneliness, we computed an averaged sum scale and dichotomized it, with values >2 indicating loneliness. Multiple answers were possible. [c] Symptoms of depression and anxiety were assessed with the Patient Health Questionnaire 4-item version (PHQ-4). [d] Personality functioning was assessed with the Operationalized Psychodynamic Diagnosis – Structure Questionnaire Short Form (OPD-SQS). [e] Epistemic trust, epistemic mistrust and epistemic credulity were assessed with the German 12-item version of the Epistemic Trust, Mistrust and Credulity Questionnaire (ETMCQ). [f] Childhood abuse and neglect were assessed with the self-report ISPAN Child Abuse Screening Tools-Retrospective (ICAST-R) questionnaire.

Table 3
Regression analysis to assess factors associated with loneliness[a] in individuals with diabetes.

regression model of loneliness in individuals with diabetes[b] (n = 203)						
model step	R	R^2	adjusted R^2	*SE*	change in R^2	*p*
1	0.366	0.134	0.121	3.131	0.134	**< 0.001**
2	0.442	0.196	0.171	3.040	0.062	**0.002**
3	0.727	0.528	0.511	2.335	0.332	**< 0.001**
4	0.773	0.597	0.581	2.163	0.069	**< 0.001**
5	0.775	0.601	0.580	2.165	0.003	0.452

variables in model 4	B	SE B	β	*t*	95 %-CI	*p*
constant	4.90	1.06		4.610	[2.802, 6.991]	**<0.001**
age	0.00	0.01	0.00	−0.008	[−0.024, 0.024]	0.993
sex	−0.28	0.33	−0.04	−0.855	[−0.932, 0.368]	0.393
relationship status[c]	−1.23	0.34	−0.18	−3.655	[−1.888, −565]	**<0.001**
sexual abuse[d]	0.26	0.47	0.03	0.554	[−0.672, 1.97]	0.580
physical abuse[d]	−0.35	0.41	−0.05	−0.858	[−1.166, 459]	0.392
emotional abuse[d]	0.24	0.42	0.03	0.571	[−0.595, 1.081]	0.568
symptoms of depression and anxiety[e]	0.61	0.08	0.44	7.263	[0.443, 0.773]	**<0.001**
personality functioning[f]	0.13	0.02	0.35	5.775	[0.084, 0.170]	**<0.001**

Notes. [a] Loneliness was assessed with the UCLA-LS 3-item loneliness scale. To measure the frequency of loneliness, we computed an averaged sum scale and dichotomized it, with values >2 indicating loneliness. Multiple answers were possible. [b] Diabetes diagnosis was assessed via self-report. [c] Being in a relationship comprised all individuals either married living with the spouse or being in a relationship, not being in a relationship comprised individuals married but not living with the spouse, being single, divorced, or widowed. [d] Childhood abuse and neglect were assessed with the self-report ISPAN Child Abuse Screening Tools-Retrospective (ICAST-R) questionnaire. [e] Symptoms of depression and anxiety were assessed with the Patient Health Questionnaire 4-item version (PHQ-4). [f] Personality functioning was assessed with the Operationalized Psychodynamic Diagnosis – Structure Questionnaire Short Form (OPD-SQS).

abuse and neglect and loneliness was no longer significant (β = −0.01, 95 %-CI [−0.119, 0.104], p = .857). There was a significant association between childhood abuse and neglect and personality functioning (β = 0.16, 95 %-CI [0.048, 0.277], p = .006) as well as personality functioning and loneliness (β = 0.65, 95 %-CI [0.553, 0.727], p = .001). Epistemic trust, mistrust, and credulity were significantly associated with personality functioning (trust: β = −0.11, 95 %-CI [−0.222, −0.007], p = .034; mistrust: β = 0.29, 95 %-CI [0.127, 0.429], p = .001; credulity: β = −0.41, 95 %-CI [0.265, 0.561], p < .001). The overall explained variance of loneliness was 42.0 %, with acceptable model fit ($\chi^2_{(6)}$ = 15.757, p = .015; CMIN/DF = 2.626; CFI = 0.97; TLI = 0.93; RMSEA = 0.09, 95 %-CI [0.036, 0.144]; PCLOSE = 0.099, Bollen-Stine: p = .023). See also Fig. 1.

Regarding the subtypes of childhood abuse and neglect, the analyses were performed in the same manner. The direct association between sexual abuse and loneliness, and between neglect and loneliness was not significant. In the SEM with emotional abuse as predictor and physical abuse as predictor respectively, with 42 % the explained variance was similar to the general abuse and neglect model. While the SEM with physical abuse as predictor performed relatively poor ($\chi^2_{(6)}$ = 9.376, p = .154; CMIN/DF = 1.563; CFI = 0.99; TLI = 0.98; RMSEA = 0.05, 95 %-CI [0.000, 0.114]; PCLOSE = 0.408, Bollen-Stine: p = .189), the SEM with emotional abuse showed quite similar results to the general model with any type of childhood abuse and neglect as predictor ($\chi^2_{(6)}$ = 13.611, p = .034; CMIN/DF = 2.269; CFI = 0.98; TLI = 0.94; RMSEA = 0.08, 95 %-CI [0.020, 0.135]; PCLOSE = 0.167, Bollen-Stine: p = .049). See also supplementary Figs. 1 and 2.

4. Discussion

This study shows that with approximately 25 % loneliness is a highly frequent phenomenon in individuals with diabetes. Associated factors comprise not being in a relationship, higher symptoms of depression and anxiety, and impaired personality functioning. Impaired personality functioning mediates the association between childhood abuse and neglect and loneliness in individuals with diabetes.

Our first hypothesis was that the frequency of loneliness in individuals with diabetes was significantly higher compared to individuals without. We show that 24.8 % of individuals with diabetes compared to 11.3 % of individuals without diabetes feel lonely often or very often. Findings from a longitudinal survey conducted in individuals with chronic illness report comparable frequencies, with 21 % of individuals experiencing higher degrees of loneliness [31]. In the current study, individuals with diabetes and loneliness showed higher symptoms of depression and anxiety, impairments in personality functioning, epistemic mistrust and credulity with large effect sizes. Moreover, they report more frequently a history of childhood abuse and neglect, specifically emotional abuse with a small effect size. These findings align with previous studies conducted in different populations, linking loneliness to symptoms of depression and anxiety, impairments in personality functioning as well as childhood abuse and neglect [32–34]. Since the pathways for the maintenance of loneliness remain elusive in individuals with diabetes, we provide preliminary findings broadening the research field.

To deepen our understanding of factors associated with loneliness in individuals with diabetes, we tested sociodemographic characteristics, childhood abuse and neglect, symptoms of depression and anxiety, personality functioning, and epistemic trust, mistrust, and credulity as predictors of loneliness in a regression model. With an explained variance of 58.1 % we found that not being in a relationship (single, divorced, widowed, not living with the spouse), higher symptoms of depression and anxiety, and impaired personality functioning were significantly associated with loneliness, only partly aligning with our second hypothesis. Research on factors associated with loneliness in individuals with diabetes is limited. Sociodemographic characteristics as well as diabetes-related complications, diabetes-related distress, and depressive symptoms have been suggested so far [12]. However, these findings refer to older patients with diabetes, limiting their generalizability. Our findings emphasize psychological burden next to sociodemographic factors contributing to loneliness. Further, we add to the evidence based on population representative data demonstrating an association between impaired personality functioning and stronger loneliness [34], expanding to the high-risk group of individuals with diabetes. Childhood abuse and neglect, and epistemic trust, mistrust, and credulity were not associated with loneliness in individuals with diabetes, even though we could show that individuals with diabetes who felt lonely had a higher frequency of childhood abuse and neglect. This amplifies the notion that not the abuse itself is relevant, but it rather adds to the psychological burden in the form of loneliness in individuals already challenged by their disease. We observed heightened mistrust and credulity in individuals with diabetes. However, neither mistrust, nor credulity were associated with loneliness. It has been outlined that in patients with diabetes various sources of distress (e.g. a new type 1 diabetes diagnosis) can be linked to impairments in emotion regulation and reduce mentalizing capacities (understanding and representing inner mental states in oneself and others), which are closely linked to personality functioning and the epistemic stance, increasing the vulnerability for psychopathology [35]. Hence, loneliness in individuals

with diabetes might be facilitated by impairments in epistemic trust and related mentalization and personality functioning.

Finally, we hypothesized personality functioning to be an underlying mechanism in the association between childhood abuse and neglect, and loneliness in individuals with diabetes. With the direct association between childhood abuse and neglect, and loneliness no longer being significant, we found a significant mediating effect of personality functioning in the association between childhood abuse and neglect, and loneliness. The explained variance increased considerably from 3.4 % to 42.0 %. Studies on the role of personality functioning show that it acts as a mediator between childhood abuse and neglect, and psychological and somatic burden [36,37]. This lends support to the notion that not the abuse itself is at the core of psychological and somatic burden, but it rather impairs personality functioning, which is an important ability in coping with social and emotional demands, e.g. empathy, intimacy, and attachment. Hence, impaired personality functioning might enhance loneliness through those reduced abilities in understanding oneself and others, and forming as well as maintaining meaningful connections, which promotes withdrawal from relationships and hence, promotes to loneliness. A line of thinking which has received support in other studies [34]. On the other hand, especially in individuals with diabetes, impaired personality functioning might further increase difficulties in coping with the demands of the disease, which could reduce capacities for social and emotionally fulfilling relationships, promoting loneliness. However, this line of thinking requires further research.

Given the negative relationship with loneliness in individuals with diabetes, a better understanding of the drivers and maintaining factors of loneliness can be a central part of improving diabetes care, which aims at enhancing the quality of life and reducing overall psychological burden. Moreover, loneliness has shown to be a risk factor for psychopathology later in life, which can be addressed by better understanding this phenomenon in individuals with diabetes. The presented findings allow insights into the high frequency of loneliness in individuals with diabetes compared to those without and further, point to impairments of personality functioning as an underlying mechanism between childhood abuse and neglect, and loneliness, broadening the evidence on individuals with diabetes. Childhood abuse and neglect seem to be a shared risk factor for diabetes itself, affecting diabetes self-management, as well as the highly prevalent phenomenon of loneliness. Understanding the underlying shared mechanisms can inform the development of targeted preventive measures, but also effective treatment offers. Targeted improvements in personality functioning can address the negative effects of loneliness and complement psychosocial care for individuals with diabetes beyond somatic or clinical psychological symptoms. Moreover, various studies could demonstrate that psychotherapy can improve overall psychopathology (e.g. depressive symptoms) in patients with diabetes [38]. So far, one study demonstrated that applying psychodynamically oriented psychotherapeutic approaches targeting personality functioning alongside diabetes-related distress in patients with diabetes could significantly improve depressive symptoms, diabetes-related distress as well as diabetes outcomes such as blood glucose levels ($HbA1_c$) [39]. This suggests that addressing the underlying mechanisms (here personality functioning) might prove to be beneficial regarding the overall detrimental effects of childhood abuse and neglect, including loneliness.

4.1. Strengths and limitations

The present study is based on representative population data, facilitating the generalizability of the findings. Next to providing frequencies for loneliness, we further employed the transdiagnostic constructs personality functioning and the epistemic stance, broadening the knowledge in individuals with diabetes and loneliness. Additionally, we provide preliminary evidence on epistemic trust, mistrust, and credulity in this population. We present impairments in personality functioning as a relevant mechanism in the association between childhood abuse and neglect and loneliness, significantly expanding existing knowledge on this topic. However, this study has certain limitations. Regarding the frequency of loneliness, it must be noted that the used cut-off score is not validated, hence, prevalences could not be provided. The cross-sectional data does not allow for causal interpretations of the findings. Further, diabetes was assessed via self-report and the data did not permit separate analyses for patients with type 1 and type 2 diabetes, which considering the different pathogenesis and treatment of the diabetes types might produce different results regarding loneliness. Childhood abuse and neglect were assessed retrospectively via self-report questionnaires as well, which may be prone to bias. However, evidence suggests that both retrospectively and prospectively assessed abuse and neglect increase the risk of psychopathology to a comparable extent [40]. Moreover, a recent study demonstrated that the risk for psychopathology associated with subjective reports of abuse and neglect remains high, regardless of their consistency with objective measures [41]. Consequently, the impact of potential biases appears to be minimal. The focused analyses regarding the mediating role of personality functioning and the epistemic stance in the association between childhood abuse and neglect and loneliness in individuals with diabetes resulted in a limited sample size for this analysis. Given the limited knowledge on confounding variables regarding personality functioning and the epistemic stance and the complexity of the employed SEM, adding further adjusting variables was omitted in order to maintain statistical stability. Hence, further analyses are needed to replicate our findings including confounding variables such as depressive and anxiety symptoms, or diabetes-associated characteristics. Areas for future research could be a differential examination of loneliness in diabetes types, as well as considering further sociodemographic (e.g. household income, migration background, education) and diabetes-related (diabetes duration, comorbid secondary diseases) confounding factors.

5. Conclusion

Nearly a quarter of individuals with diabetes report loneliness and emotional abuse is especially frequent. We emphasize psychological aspects in terms of symptoms of depression and anxiety and impaired personality functioning next to sociodemographic aspects to be associated with loneliness in individuals with diabetes. Further, impaired personality functioning mediated the association between childhood abuse and neglect, and loneliness. Hence, we lend support to the notion that loneliness is linked to individual emotional and social abilities. With aiming to address impaired personality functioning in individuals with diabetes, there might be an avenue for clinical psychosocial intervention to potentially reduce the occurrence of loneliness.

CRediT authorship contribution statement

Sandra Zara: Writing – original draft, Methodology, Formal analysis, Conceptualization. **Johannes Kruse:** Writing – review & editing, Supervision, Data curation, Conceptualization. **Elmar Brähler:** Writing – review & editing, Data curation. **Mareike Ernst:** Writing – review & editing. **Jörg M. Fegert:** Writing – review & editing, Data curation. **Astrid Lampe:** Writing – review & editing, Data curation. **Tobias Nolte:** Writing – review & editing, Data curation. **Miriam Rassenhofer:** Writing – review & editing, Data curation. **David Riedl:** Writing – review & editing, Data curation. **Hanna Kampling:** Writing – review & editing, Supervision, Conceptualization.

Funding

This research did not receive any specific grant from funding agencies in the public, commercial, or not-for-profit sectors.

Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Appendix A. Supplementary data

Supplementary data to this article can be found online at https://doi.org/10.1016/j.jpsychores.2025.112390.

References

[1] D.L. Surkalim, M. Luo, R. Eres, K. Gebel, J. Van Buskirk, A. Bauman, D. Ding, The prevalence of loneliness across 113 countries: systematic review and meta-analysis, BMJ (2022) e067068, https://doi.org/10.1136/bmj-2021-067068.

[2] T. Entringer, Epidemiologie von Einsamkeit in Deutschland, 2022.

[3] M. Ernst, D. Niederer, A.M. Werner, S.J. Czaja, C. Mikton, A.D. Ong, T. Rosen, E. Brähler, M.E. Beutel, Loneliness before and during the COVID-19 pandemic: a systematic review with meta-analysis, Am. Psychol. 77 (2022) 660–677, https://doi.org/10.1037/amp0001005.

[4] L.C. Hawkley, J.T. Cacioppo, Loneliness matters: a theoretical and empirical review of consequences and mechanisms, Ann. Behav. Med. 40 (2010) 218–227, https://doi.org/10.1007/s12160-010-9210-8.

[5] N. Morina, A. Kip, T.H. Hoppen, S. Priebe, T. Meyer, Potential impact of physical distancing on physical and mental health: a rapid narrative umbrella review of meta-analyses on the link between social connection and health, BMJ Open 11 (2021) e042335, https://doi.org/10.1136/bmjopen-2020-042335.

[6] T. Petitte, J. Mallow, E. Barnes, A. Petrone, T. Barr, L. Theeke, A systematic review of Loneliness and common chronic physical conditions in adults, Open Psychol. J. 8 (2015) 113–132, https://doi.org/10.2174/1874350101508010113.

[7] T. Matthews, A. Danese, A. Caspi, H.L. Fisher, S. Goldman-Mellor, A. Kepa, T. E. Moffitt, C.L. Odgers, L. Arseneault, Lonely young adults in modern Britain: findings from an epidemiological cohort study, Psychol. Med. 49 (2019) 268–277, https://doi.org/10.1017/S0033291718000788.

[8] Y. Song, C. Zhu, B. Shi, C. Song, K. Cui, Z. Chang, G. Gao, L. Jia, R. Fu, Q. Dong, L. Feng, C. Zhu, D. Yin, J.E. Manson, K. Dou, Social isolation, loneliness, and incident type 2 diabetes mellitus: results from two large prospective cohorts in Europe and East Asia and mendelian randomization, eClinicalMedicine 64 (2023) 102236, https://doi.org/10.1016/j.eclinm.2023.102236.

[9] S. Rosenkilde, S.H. Hoffmann, A.B. Thorsted, T.A. Horsbøl, K.R. Madsen, S.F. Lehn, A. Kofoed-Enevoldsen, P.B. Iversen, M.S. Grønkjær, L.C. Thygesen, Loneliness and the risk of type 2 diabetes, BMJ Open Diabetes Res. Care 12 (2024) e003934, https://doi.org/10.1136/bmjdrc-2023-003934.

[10] X. Wang, H. Ma, X. Li, Y. Heianza, V. Fonseca, L. Qi, Joint association of loneliness and traditional risk factor control and incident cardiovascular disease in diabetes patients, Eur. Heart J. 44 (2023) 2583–2591, https://doi.org/10.1093/eurheartj/ehad306.

[11] Y.-C. Huang, E. Cho, H.-J. Kuo, A.A. García, The influences of depression and loneliness on A1C among middle-aged and older adults with diabetes, Psychol, Health Med. 28 (2023) 1540–1548, https://doi.org/10.1080/13548506.2022.2124287.

[12] E. Cho, J. Kim, S. Bang, Loneliness in older adults with diabetes mellitus: a scoping review, Psychol, Health Med. 29 (2024) 1548–1563, https://doi.org/10.1080/13548506.2023.2299665.

[13] C. De Heer, S. Bi, C. Finkenauer, L. Alink, M. Maes, The association between child maltreatment and Loneliness across the lifespan: a systematic review and multilevel Meta-analysis, Child Maltreat. 29 (2024) 388–404, https://doi.org/10.1177/10775595221103420.

[14] A. Hoadley, S. Bass, D.J. Rubin, Adverse childhood event subtypes and routine diabetes care utilization among U.S. adults with type 2 diabetes, Psychol. Trauma Theory Res. Pract. Policy 16 (2024) S10–S19, https://doi.org/10.1037/tra0001433.

[15] T. Ittoop, K. Jeffrey, C.-I. Cheng, S. Reddy, The relationship between adverse childhood experiences and diabetes in Central Michigan adults, Endocr. Pract. 26 (2020) 1425–1434, https://doi.org/10.4158/EP-2020-0239.

[16] S. Zara, E. Brähler, C. Sachser, J.M. Fegert, W. Häuser, L. Krakau, H. Kampling, J. Kruse, Associations of different types of child maltreatment and diabetes in adulthood – the mediating effect of personality functioning: findings from a population-based representative German sample, Ann. Epidemiol. 78 (2023) 47–53, https://doi.org/10.1016/j.annepidem.2022.12.004.

[17] M.A. Reinhard, T. Nenov-Matt, F. Padberg, Loneliness in personality disorders, Curr. Psychiatry Rep. 24 (2022) 603–612, https://doi.org/10.1007/s11920-022-01368-7.

[18] J. Ehrenthal, J. Kruse, B. Schmalbach, U. Dinger, S. Werner, H. Schauenburg, E. Brähler, H. Kampling, Measuring personality functioning with the 12-item version of the OPD-structure questionnaire (OPD-SQS): reliability, factor structure, validity, and measurement invariance in the general population, Front. Psychol. 14 (2023) 1248992.

[19] S. Pastorino, M. Richards, R. Hardy, J. Abington, A. Wills, D. Kuh, M. Pierce, Validation of self-reported diagnosis of diabetes in the 1946 British birth cohort, Prim. Care Diabetes 9 (2015) 397–400, https://doi.org/10.1016/j.pcd.2014.05.003.

[20] M. Luhmann, J. Schupp, Loneliness Scale-SOEP. Psychologische und sozialwissenschaftliche Kurzskalen: Standardisierte Erhebungsinstrumente für Wissenschaft und Praxis, Medizinisch Wissenschaftliche Verlagsgesellschaft, Berlin, 2014.

[21] J. Schobin, C. Arriagada, M. Gibson-Kunze, Einsamkeitsbarometer 2024. Langzeitentwicklung von Einsamkeit in Deutschland: Statistischer Anhang., Berlin. www.bmfsfj.de, 2024.

[22] D. Richter, M. Weinhardt, LS-S: Loneliness Scale-SOEP. Psychologische und sozialwissenschaftliche Kurzskalen: Standardisierte Erhebungsinstrumente für Wissenschaft und Praxis, 1st ed, Mwv Medizinisch Wissenschaftliche Verlagsges, Berlin, 2013.

[23] M. Jarczok, S. Lange, F. Meinck, A. Witt, V. Clemens, J.M. Fegert, A. Jud, Widening epidemiological data on the prevalence of child maltreatment: validation of the German ICAST-R in a student sample and national household survey, Child Abuse Negl. 137 (2023) 106038, https://doi.org/10.1016/j.chiabu.2023.106038.

[24] C. Campbell, M. Tanzer, R. Saunders, T. Booker, E. Allison, E. Li, C. O'Dowda, P. Luyten, P. Fonagy, Development and validation of a self-report measure of epistemic trust, PLoS One 16 (2021) e0250264, https://doi.org/10.1371/journal.pone.0250264.

[25] T. Nolte, Epistemic Trust, Mistrust and Credulity Questionnaire (ETMCQ) (under review), 2025.

[26] B. Löwe, I. Wahl, M. Rose, C. Spitzer, H. Glaesmer, K. Wingenfeld, A. Schneider, E. Brähler, A 4-item measure of depression and anxiety: validation and standardization of the patient health Questionnaire-4 (PHQ-4) in the general population, J. Affect. Disord. 122 (2010) 86–95, https://doi.org/10.1016/j.jad.2009.06.019.

[27] F.S. Wicke, L. Krakau, B. Löwe, M.E. Beutel, E. Brähler, Update of the standardization of the patient health Questionnaire-4 (PHQ-4) in the general population, J. Affect. Disord. 312 (2022) 310–314, https://doi.org/10.1016/j.jad.2022.06.054.

[28] J. Cohen, A power primer, in: A.E. Kazdin (Ed.), Methodol. Issues Strateg. Clin. Res, 4th Ed, American Psychological Association, Washington, 2016, pp. 279–284, https://doi.org/10.1037/14805-018.

[29] L. Hu, P.M. Bentler, Cutoff criteria for fit indexes in covariance structure analysis: conventional criteria versus new alternatives, Struct. Equ. Model. Multidiscip. J. 6 (1999) 1–55, https://doi.org/10.1080/10705519909540118.

[30] K.A. Bollen, R.A. Stine, Bootstrapping goodness-of-fit measures in structural equation models, Sociol. Methods Res. 21 (1992) 205–229, https://doi.org/10.1177/0049124192021002004.

[31] M.H. Lim, K.E. Manera, K.B. Owen, P. Phongsavan, B.J. Smith, The prevalence of chronic and episodic loneliness and social isolation from a longitudinal survey, Sci. Rep. 13 (2023) 12453, https://doi.org/10.1038/s41598-023-39289-x.

[32] J.T. Cacioppo, M.E. Hughes, L.J. Waite, L.C. Hawkley, R.A. Thisted, Loneliness as a specific risk factor for depressive symptoms: cross-sectional and longitudinal analyses, Psychol. Aging 21 (2006) 140–151, https://doi.org/10.1037/0882-7974.21.1.140.

[33] T. Nenov-Matt, B.B. Barton, J. Dewald-Kaufmann, S. Goerigk, S. Rek, K. Zentz, R. Musil, A. Jobst, F. Padberg, M.A. Reinhard, Loneliness, social isolation and their difference: a cross-diagnostic study in persistent depressive disorder and borderline personality disorder, Front. Psychol. 11 (2020) 608476, https://doi.org/10.3389/fpsyt.2020.608476.

[34] M. Ernst, E. Brähler, J. Kruse, H. Kampling, M.E. Beutel, Does loneliness lie within? Personality functioning shapes loneliness and mental distress in a representative population sample, J. Affect. Disord. Rep. 12 (2023) 100486, https://doi.org/10.1016/j.jadr.2023.100486.

[35] C.J. Garrett, K. Ismail, P. Fonagy, Understanding developmental psychopathology in type 1 diabetes through attachment, mentalisation and diabetes distress, Clin. Child Psychol. Psychiatry 26 (2021) 682–694, https://doi.org/10.1177/1359104521994640.

[36] H. Kampling, J. Kruse, A. Lampe, T. Nolte, N. Hettich, E. Brähler, C. Sachser, J. M. Fegert, S. Gingelmaier, P. Fonagy, L. Krakau, S. Zara, D. Riedl, Epistemic trust and personality functioning mediate the association between adverse childhood experiences and posttraumatic stress disorder and complex posttraumatic stress disorder in adulthood, Front. Psychol. 13 (2022) 919191, https://doi.org/10.3389/fpsyt.2022.919191.

[37] H. Kampling, D. Riedl, A. Lampe, T. Nolte, E. Brähler, M. Ernst, J.M. Fegert, T. Geisel, N. Hettich-Damm, A. Jud, S. Zara, J. Kruse, Somatic symptom disorder and the role of epistemic trust, personality functioning and child abuse: results from a population-based representative German sample, J. Affect. Disord. (2024), https://doi.org/10.1016/j.jad.2024.12.096. S0165032724020846.

[38] F. Petrak, S. Herpertz, C. Albus, N. Hermanns, C. Hiemke, W. Hiller, K. Kronfeld, J. Kruse, B. Kulzer, C. Ruckes, D. Zahn, M.J. Müller, Cognitive Behavioral therapy versus sertraline in patients with depression and poorly controlled diabetes: the diabetes and depression (DAD) study: a randomized controlled Multicenter trial, Diabetes Care 38 (2015) 767–775, https://doi.org/10.2337/dc14-1599.

[39] H. Kampling, B. Köhler, I. Germerott, B. Haastert, A. Icks, B. Kulzer, B. Nowotny, N. Hermanns, J. Kruse, An integrated psychosomatic treatment program for people

with diabetes (psy-PAD), Dtsch. Ärztebl. Int. (2022), https://doi.org/10.3238/arztebl.m2022.0094.
[40] K.M. Scott, K.A. McLaughlin, D.A.R. Smith, P.M. Ellis, Childhood maltreatment and DSM-IV adult mental disorders: comparison of prospective and retrospective findings, Br. J. Psychiatry 200 (2012) 469–475, https://doi.org/10.1192/bjp.bp.111.103267.
[41] A. Danese, C.S. Widom, Objective and subjective experiences of child maltreatment and their relationships with psychopathology, Nat. Hum. Behav. 4 (2020) 811–818, https://doi.org/10.1038/s41562-020-0880-3.

DISCUSSION

4. GENERAL DISCUSSION

The aim of this dissertation was to investigate the role of *ACEs* for the occurrence of *diabetes* itself, as well as regarding *psychological burden* and *diabetes-related distress* in patients with diabetes. In addition, the field of research was expanded to include broader phenomena such as *suicidal ideation* and *loneliness*, which have both shown to be highly burdensome by themselves, and to be associated with psychopathology. Within this context, the role of *personality functioning* describing basic psychological capacities regarding the self and others (communication, identity, attachment) was examined. Moreover, the relatively novel constructs of *epistemic trust, mistrust, and credulity* – which are closely associated with personality functioning – were explored.

Based on representative population data as well as data from a high-burden clinical diabetes sample with inadequate glycemic control, the findings of this dissertation demonstrate the high prevalence of ACEs in people with diabetes. Further, ACEs are suggested to be a risk factor for diabetes itself and for psychological burden in the form of depressive, anxiety, somatic, and suicidal symptoms in people with diabetes. Moreover, ACEs are linked to higher diabetes-related distress (the emotional burden of living with diabetes) as well as the psychosocial phenomenon of loneliness. Regarding these associations, impairments in personality functioning have shown to be a key underlying factor. This dissertation is one of the first to highlight the role of impairments in personality functioning for the occurrence of the chronic somatic disease of diabetes. Previously, personality functioning was primarily addressed in the context of psychopathologies, especially personality disorders, while somatic diseases have received very limited attention.

Additionally, in relation to psychopathology, the key role of impairments in personality functioning for their development has been expanded to people with diabetes, showing that impairments in personality functioning convey the association between ACEs and psychological burden (depressive, anxiety, somatic, and suicidal symptoms). For the first time, associations between ACEs, impairments in personality functioning, and diabetes-related distress could be demonstrated. Additionally, the research field is broadened by considering phenomena closely associated with psychopathology, with impairments in personality functioning also presenting as a key mechanism in the association between ACEs and loneliness.

Another novel aspect of this dissertation is the consideration of the only recently introduced constructs of epistemic trust, mistrust, and credulity, which are closely linked to personality functioning. Epistemic trust describes a persons' ability to trust in socially transmitted information and take opportunities for social learning. Similarly to personality functioning, its healthy development can be disrupted by ACEs. Disruptions of epistemic trust in the form of epistemic mistrust and epistemic credulity serve as predictors for impairments in personality functioning, which in turn play a significant role in the occurrence of diabetes and numerous psychological complaints as well as psychosocial burden in people with diabetes. The findings of this dissertation will be discussed in more detail in the following chapters.

4.1. Part I – ACEs as a risk factor

4.1.1. ACEs and diabetes

This dissertation demonstrates that ACEs occur more frequently in individuals with diabetes compared to the general population. Nearly a third (32%) of individuals with diabetes reported at least one type of ACE of at least moderate severity compared to 19.4% in the general population (**Zara** et al., 2023). Moreover, individuals with ACEs were more than twice as likely to report diabetes in adulthood (**Zara** et al., 2023). Based on representative population data, these findings suggest that ACEs may increase the risk for developing diabetes. This aligns with previous studies showing that childhood stressors are associated with an elevated risk of diabetes in adulthood (Deschênes et al., 2018; H. Huang et al., 2015; Huffhines et al., 2016; Klinger-König et al., 2024; Shields et al., 2016).

Regarding specific ACE types, the present work found the highest odds of diabetes in individuals with histories of physical abuse and physical neglect (**Zara** et al., 2023). Other studies, however, identified sexual, physical, and emotional abuse as the strongest predictors for diabetes (Atasoy et al., 2022; J. A. Campbell et al., 2018; Shields et al., 2016), while at the same time there is evidence that neglect is the most relevant (H. Huang et al., 2015). In sum, while the literature consistently indicates a link between ACEs and diabetes, findings differ on which type has the strongest influence. These heterogeneous findings might be partly explained by methodological variations, such as whether physical and emotional neglect were examined separately, or the results are based on either clinical or representative samples. Beyond the type of ACE, other ACE characteristics appear relevant. Research has emphasized the role of e.g., a dose-response relationship, in which the risk for diabetes increases accordingly to the number of ACEs (Barman et al., 2024; Clemens et al., 2018; Schüssler-Fiorenza Rose et al., 2022). Further, the timing and duration of ACEs have shown to be important risk factors for physical multimorbidity, including diabetes (Otten et al., 2025). These findings suggest that, rather than specific ACE types alone, broader mechanisms underlie the ACE and diabetes link. Investigating the underlying mechanism was one important aim of the present work.

4.1.2. ACEs and psychological burden, diabetes-related distress, and diabetes self-management

Psychological burden is highly prevalent in individuals with diabetes, with approximately two-fold higher frequencies of e.g., depressive and anxiety disorders compared to the general population (Smith et al., 2013; F. Wang et al., 2019). The present findings are in line with this evidence. Based on representative population data, depressive and anxiety symptoms were more than twice as frequent in individuals with diabetes compared to the general population (depressive symptoms: 15.9% vs. 7.6%; anxiety symptoms: 14.2% vs. 7.2%) (**Zara** et al., 2023). In a clinical diabetes sample with poor $HbA1_c$, prevalences were even higher, with more than half of patients with diabetes reporting at least one type of psychological burden. The most frequent were depressive (32.8%), somatic (26.9%), and anxiety symptoms (15.1%) (**Zara**, Ullrich, et al., 2025). In addition, suicidal ideation, a highly common symptom associated with depressive symptoms, was approximately three times higher among individuals with diabetes compared to the general population (21.8% vs. 8.2%) (**Zara** et al., 2024). These high prevalence rates of psychological burden including suicidal ideation raise the question of why individuals with diabetes are so frequently affected. Diabetes research has long investigated this issue, establishing bidirectional associations between depressive symptoms and diabetes as well as anxiety symptoms and diabetes (see also chapter 2.4.1). Biological aspects (e.g., inflammation, oxidative stress), diabetes-associated aspects (e.g., diabetes duration, $HbA1_c$), as well as socioeconomic aspects (e.g., income inequality, education level) have been identified as risk factors for increased psychological burden and suicidal ideation in individuals with diabetes (Albai et al., 2024; Handley et al., 2016; Lee et al., 2014; Y. Liu et al., 2024). However, psychosocial stressors have gained more attention. All around the globe, ACEs as highly prevalent psychosocial stressors have been repeatedly linked to psychopathology (see also chapter 2.5). In line with this, the present findings suggest that ACEs might help in part explain the high frequency of depressive, anxiety, somatic, and suicidal symptoms in individuals with diabetes. In a clinical diabetes sample with poor $HbA1_c$, up to 50% report at least one type of ACE (**Zara**, Ullrich, et al., 2025), surpassing the frequency of ACEs in the general population by far (32%) (**Zara** et al., 2023). Individuals with diabetes, inadequate glycemic control and a history of ACEs compared to those without ACEs report around twice as often e.g., depressive symptoms (48.2% vs. 19%) or somatic symptoms (27.2% vs. 15.5%) (**Zara**, Ullrich, et al., 2025), and were significantly more likely to report suicidal ideation (**Zara** et al., 2024). These findings are

in line with evidence showing that individuals with diabetes and ACEs compared to those without ACEs have e.g., an approximately 29% and 37% increased prevalence of depression and anxiety, respectively (Ittoop et al., 2020). Further, the present work expands the evidence on the link between emotional abuse and increased psychological burden as well as suicidal ideation (**Zara** et al., 2024; **Zara**, Ullrich, et al., 2025), underpinning the point of view that ACEs are a risk factor for increased psychological burden in patients with diabetes.

Accordingly, a similar pattern could be observed regarding diabetes-related distress: in a clinical diabetes sample with poor $HbA1_c$, those with ACEs compared to those without ACEs reported more pronounced diabetes-related distress (**Zara**, Ullrich, et al., 2025). This indicates that ACEs not only increase general psychological symptoms such as depression, anxiety, somatization, and suicidal ideation but also amplify the emotional burden of living with diabetes. To address diabetes-related distress by itself is important, as it has shown to negatively affect diabetes self-management and blood sugar control (Asuzu et al., 2017; Schmitt et al., 2021). The high frequency of ACEs in a clinical diabetes sample with poor $HbA1_c$, where patients with diabetes are treated for severe challenges in regulating blood sugar levels or managing diabetes-associated complications, supports the hypothesis that ACEs may pose a risk factor for impaired diabetes self-management. This notion is further sustained by evidence linking ACE exposure to increased diabetes-associated complications, reduced diabetes care (e.g., annual physical exams and blood glucose checkups) as well as increased blood glucose levels (Ittoop et al., 2020; Schüssler-Fiorenza Rose et al., 2022).

4.1.3. ACEs and broader phenomena: loneliness

Against the background of the increasingly pressing phenomenon of loneliness, especially during the COVID-19 pandemic (Ernst, Niederer, et al., 2022), research on loneliness and its negative implications particularly for mental health has expanded (Entringer, 2022; Ernst et al., 2023; Hoffart et al., 2020). Hence, loneliness has been recognized as a significant public health concern, stimulating new mitigation initiatives (Bundesministerium für Familie, Senioren, Frauen und Jugend., 2023; World Health Organization, 2024). Especially patients with chronic illnesses have shown to be a high-risk group for loneliness, with negative impacts on the onset and the course of their disease (Morina et al., 2021; Petitte et al., 2015). Regarding diabetes, evidence is accumulating for an independent association between loneliness and type 2 diabetes

(Christiansen et al., 2021; Rosenkilde et al., 2024; Song et al., 2023). However, evidence on the prevalence of loneliness in individuals with diabetes is so far hardly available. The present work contributes to this research gap. Based on representative population data, nearly 25% of individuals with diabetes report loneliness including missing the company of others, feeling left out, and feeling socially isolated, compared to 11.3% of the general population (**Zara**, Kruse, Brähler, et al., 2025). Hence, loneliness is identified as a highly prevalent type of psychosocial burden in individuals with diabetes. These high frequencies in connection to the severe negative associations between loneliness and the course of the disease (diabetes-related complications, high blood sugar levels) (Y.-C. Huang et al., 2023; X. Wang et al., 2023) emphasize the need to expand the knowledge on factors contributing to loneliness. A recent review based on a limited amount of studies and focusing on older individuals with diabetes suggests sociodemographic characteristics, diabetes-associated as well as psychological burden as relevant factors for loneliness (Cho et al., 2024). In the general population, recent research identified ACEs as a risk factor for loneliness (De Heer et al., 2024). This corresponds to the present findings, showing that individuals with diabetes feeling lonely had significantly more often a history of ACEs compared to individuals with diabetes not feeling lonely (**Zara**, Kruse, Brähler, et al., 2025). However, when taking a closer look at these associations by performing prediction models, ACEs did not emerge as a predictor of loneliness in individuals with diabetes (**Zara**, Kruse, Brähler, et al., 2025). This points to the notion that not ACEs themselves are the root of loneliness in individuals with diabetes, but rather underlying mechanisms may contribute to loneliness in this patient group.

4.1.4. Part I – Conclusion

So far, the following key findings have been contributed to the research field:

1. Individuals with a history of ACEs had approximately twice the odds of reporting diabetes in adulthood.
2. Among individuals with diabetes, those with ACEs compared to those without ACEs exhibited substantially higher psychological burden comprising depressive, anxiety, somatic, and suicidal symptoms.
3. In individuals with diabetes, a history of ACEs was associated not only with greater diabetes-related distress, but also with broader psychosocial phenomena such as loneliness.

Consequently, ACEs may constitute a risk factor for elevated psychological burden, including suicidal ideation as well as for diabetes-related distress, and loneliness. Understanding the underlying mechanisms of this association was a main research objective of the present dissertation.

4.2. Part II – Underlying mechanisms

4.2.1. Diabetes

In addition to providing insights on the associations between ACEs and diabetes, it was an important aim of the present work to examine the role of personality functioning as an underlying mechanism in this regard. Personality functioning is a transdiagnostic construct which allows for a dimensional description of basic psychological capacities regarding the self and others in the domains cognition/perception, regulation, communication, and attachment (OPD Task Force, 2008). It is assumed to develop in early childhood in the context of secure attachment experiences with caregivers (Beebe et al., 2010a). Disruptions of this process in the form of e.g., ACEs might result in impaired personality functioning (Fonagy, Campbell, et al., 2017; Fonagy, Luyten, et al., 2017; Luyten et al., 2020; Maercker et al., 2021), which goes along with difficulties in building and maintaining relationships, having an instable identity and sense of self-worth, and inadequately perceiving, regulating, and communicating emotions. These aspects of impairment have been linked to psychopathology, such as symptoms of depression and anxiety, somatization, and eating disorders (Freier … **Zara** et al., 2022; Kerber et al., 2023; Klein et al., 2022), and moreover, phenomena related to psychopathology, such as suicidal ideation and loneliness (Boone et al., 2025; Ernst et al., 2023).

In the context of diabetes, rather isolated aspects of personality functioning such as emotion dysregulation have been investigated, showing connections to increased diabetes-related distress as well as decreased diabetes treatment adherence and self-care behavior (Hazrati-Meimaneh et al., 2020; Sanatkar et al., 2020; Woon et al., 2020). However, the role of impairments of personality functioning regarding somatic illnesses has only recently been addressed (Spitzer et al., 2022). The present dissertation adds to the evidence by showing that impairments in personality functioning mediate up to 60% of the association between ACEs and diabetes, with the strongest effects observed regarding emotional abuse. To date, this is the first work to investigate this association. Hence, given the limited number of studies on this research objective, the present findings have to be interpreted drawing from related research, which often only addresses specific aspects of personality functioning. For example, negative affectivity as well as poor reflective functioning (the capacity to understand behaviors in the context of our own mental states and those of other people, and therefore a core capacity of personality

functioning) have shown to be significant predictors of chronic physical multimorbidity (Šimunović Filipčić et al., 2024). Especially in populations with high somatic burden and chronic illness, difficulties in emotion identification, description and regulation are higher compared to healthy controls, and also greater impairments in personality functioning compared to those without somatic complaints have been observed (Berens et al., 2021), implying its high relevance for diabetes as well (Schnabel et al., 2022; Wierenga et al., 2017). While this corresponds to the present findings, suggesting a close interconnection between difficulties in emotion regulation as part of impairments in personality functioning and the presence of physical symptoms as an expression of these impairments, the present dissertation takes a broader perspective and implies that impairments in personality functioning may constitute an important aspect for the occurrence of diabetes.

Research on ACEs often additionally considers the range of ACE subtypes and their diverse impacts. Subtypes of ACEs comprise among others sexual, emotional and physical abuse as well as emotional and physical neglect (Kalmakis & Chandler, 2014). The mediating role of impairments in personality functioning in the association between ACEs and diabetes could be observed rather for abuse than for neglect. While the present work found the highest odds of diabetes in individuals with histories of physical abuse and physical neglect (**Zara** et al., 2023) – pointing to potentially more direct associations between physical ACE types and diabetes – the strongest mediation effects of impairments in personality functioning were found in the association between emotional abuse and diabetes (**Zara** et al., 2023). It could therefore be assumed that abuse, and emotional abuse in particular, is associated with impairments of personality functioning, compromising adequate health behavior in diabetes. Instead, maladaptive behaviors such as emotional eating, unhealthy diet, and less exercise may be adapted, which are established risk factors for diabetes, may emerge. This notion is supported by studies linking emotion dysregulation to a number of unfavorable health behaviors (Aparicio et al., 2016; J. Liu et al., 2022; Tsenkova et al., 2013; Twig et al., 2014; Venables & Jeukendrup, 2009; Wierenga et al., 2017).

Taken together, the present findings emphasize personality functioning as a pathway linking ACEs to diabetes. Moreover, impairments in personality functioning have also been shown to contribute to a number of psychopathologies and thus may mediate the association between ACEs and psychological burden.

4.2.2. Psychological burden, diabetes-related distress, and diabetes self-management

The present findings suggest that ACEs play an important role in the occurrence of psychological burden in individuals with diabetes. However, it remains an open question which mechanisms underlie this association. Hence, the role of impairments in personality functioning was explored in this regard, also considering the related constructs epistemic trust, mistrust, and credulity as important aspects for the healthy development of personality functioning.

Impairments in personality functioning and disruptions in epistemic trust have been repeatedly linked to psychopathology, such as symptoms of depression and anxiety, somatization, and eating disorders (Freier … **Zara** et al., 2022; Kerber et al., 2023; Klein et al., 2022), as well as phenomena closely related to psychopathology, such as loneliness, and suicidal ideation (Boone et al., 2025; Ernst et al., 2023). Further, impaired personality functioning and disruptions in epistemic trust have shown to also convey the association between ACEs and numerous psychological symptoms, e.g., depressive and anxiety symptoms (Dagnino et al., 2020; Freier…**Zara**…et al., 2022; Kampling…**Zara**…et al., 2024; Kampling, Kruse,…**Zara**…et al., 2022; Krakau et al., 2021).

However, intensive research on personality functioning and epistemic trust is a relatively recent development gaining momentum, with limited evidence in diabetes populations. Against this background, the present work extends the research field and shows that in a sample of patients with diabetes and inadequate glycemic control impairments in personality functioning present as a substantial mediating factor in the association between ACEs and psychological burden. This includes depressive, somatic, and suicidal symptoms with explained variances ranging between 30 and 50%, highlighting its substantial contribution in understanding these associations (**Zara** et al., 2024; **Zara**, Ullrich, et al., 2025). Especially strong associations could be found between emotional abuse and increased psychological burden as well as suicidal ideation (**Zara** et al., 2024; **Zara**, Ullrich, et al., 2025). This implies that emotional types of ACEs may play a particularly detrimental role for impairments of personality functioning and disruptions of epistemic trust in patients with diabetes, which in turn convey a substantial proportion of psychological burden. The present findings add to evidence accumulating in other populations and increasingly emphasizing the importance of emotional abuse and emotional neglect for the occurrence of mental health issues. For example, emotional abuse has shown to significantly increase the risk of developing a personality disorder

(Broekhof et al., 2024), and both emotional abuse and emotional neglect are associated with impairments in personality functioning, thereby mediating the association with mental health problems (d'Huart et al., 2022). Moreover, population-based studies extend these findings, indicating that impairments in personality functioning mediate the association between emotional abuse and self-harm (which can have suicidal intent), supporting the present findings which link ACEs, personality functioning, and suicidal ideation in individuals with diabetes on a broader level (Ernst, Brähler, et al., 2022). Taken together, the present findings suggest that ACEs are closely linked to impairments in personality functioning and disruptions of epistemic trust, which undermine the capacity to regulate internal states and emotions, manage stress, self-management, and maintain supportive relationships, thereby increasing the vulnerability to depressive, somatic, and suicidal symptoms in individuals with diabetes.

Next to psychological burden, individuals with diabetes are also challenged by the emotional distress tied to diabetes itself. These results illustrate the entanglement of impaired personality functioning and psychological burden, both of them frequently occurring in individuals with diabetes. Given that psychological burden, especially depressive symptoms, also has a negative impact on diabetes self-management, linked to worse diabetes self-management and higher $HbA1_c$ values (Schmitt et al., 2021) as well as the emotional distress associated with the disease, it is not surprising that these phenomena often overlap: almost 40% of those who exhibit depressive symptoms also suffer from increased diabetes-related distress (Du et al., 2023). Linking personality functioning and diabetes-related distress, the present findings show for the first time in a population of patients with diabetes and inadequate glycemic control that impaired personality functioning and disruptions of epistemic trust are not only closely linked to psychological burden but also to diabetes-associated outcomes, including somatic symptoms and diabetes-related distress. Impaired personality functioning and disruptions of epistemic trust account for between 25 and 30% of the variance in the relationship between ACEs and diabetes-related distress and somatic symptoms, respectively (**Zara**, Ullrich, et al., 2025). Hence, impairments in personality functioning and disruptions of epistemic trust might be another key factor regarding disease management in patients with diabetes facing extensive challenges with their blood sugar control. This notion is supported by a study conducted in patients with type 2 diabetes, where personality functioning instead of depressive symptoms was associated with a decline in $HbA1_c$ during the first six months of a disease management program (Ehrenthal et al., 2019).

These findings indicate that beyond depressive symptoms, personality functioning itself may play a key role regarding metabolic outcomes, highlighting its potential as a therapeutic target. Moreover, it emphasizes that in individuals with diabetes not only psychological outcomes are linked to impairments of personality functioning but also (somatic) diabetes outcomes. Elaborating on this preliminary evidence, impairments in personality functioning and disruptions in epistemic trust may pose a significant treatment target for individuals with inadequate glycemic control. However, impaired personality functioning and disruptions of epistemic trust are critical challenges for professionals involved in the treatment of diabetes. While epistemic trust is an important prerequisite for the healthy development of personality functioning, it is also crucial for interpersonal relationships (Fonagy & Nolte, 2023; Nolte, 2024). In the context of diabetes, these interpersonal relationships include the patient, the treating physician as well as other health care professionals involved in the diabetes treatment. Individuals with diabetes and pronounced epistemic mistrust may be critical regarding treatment information, question treatment recommendations, and alternate between compliance and withdrawal, which can further complicate successful diabetes treatment. Hence, disruptions of epistemic trust in the form of epistemic mistrust alongside impaired personality functioning may prevent the patient from understanding and applying important information for their diabetes treatment and hamper effective patient-physician collaboration.

While there is only limited research regarding disruptions of epistemic trust in patients with diabetes, evidence based on population samples is accumulating that elevated epistemic mistrust and credulity are associated for example with somatic symptom burden and psychopathology (Kampling,…**Zara** et al., 2024; Kampling, Kruse, … **Zara** et al., 2022). The present dissertation is one of the first works to explore the epistemic stance in individuals with diabetes. It could be demonstrated that patients with diabetes and poor $HbA1_c$ show impairments in personality functioning, which was associated with epistemic mistrust and credulity (**Zara**, Ullrich, et al., 2025). Drawing from these findings it can be assumed that disruptions of epistemic trust may be highly relevant for impairments in personality functioning and also related psychological and somatic symptom burden as well as diabetes-related distress in individuals with diabetes. In a multicenter study considering general trust (not epistemic trust), higher trust in physicians was associated with reduced symptoms of depression and anxiety in patients with diabetes, and further, the predictive value of trust in physicians for adherence to diabetes management could be identified (AlRuthia et al., 2020; Pereira et al., 2020). Following

this line of thinking, it could be assumed that disruptions of epistemic trust and reducing mistrust and credulity pose important aspects in understanding why individuals with diabetes so often have difficulties in meeting their treatment goals, despite extensive support offers and structured disease management programs (see also chapter 2.3). Hence, fostering epistemic trust alongside personality functioning in individuals with diabetes may support diabetes self-management and treatment adherence (and associated psychological burden), even though further research is needed to underpin this notion.

4.2.3. Broader phenomena: loneliness

Although loneliness has been increasingly recognized as an important determinant of mental and physical health, its role in the onset and course of diabetes has only recently attracted research attention, and the underlying mechanisms remain poorly understood. The present work aimed to add to this research field, by showing that loneliness occurs frequently in individuals with diabetes, especially in those with ACEs (**Zara**, Kruse, Brähler, et al., 2025). This association is conveyed by impairments in personality functioning in individuals with diabetes, with especially strong mediation effects in the association between emotional abuse and loneliness (**Zara**, Kruse, Brähler, et al., 2025). These results highlight that individuals with diabetes are more vulnerable to loneliness due to ACE-related impairments in personality functioning. Given that personality functioning comprises important abilities in coping with social and emotional demands, e.g., empathy, intimacy as well as attachment, disruptions in the form of ACEs might promote difficulties in dealing with the demands of the external social environment or accepting social contact offers. Hence, impaired personality functioning might exacerbates loneliness through those reduced abilities in understanding oneself and others, and forming as well as maintaining meaningful connections, which fosters withdrawal from relationships and thereby increases loneliness. A line of thinking which has received support in a representative population-based study, suggesting that impairments in personality functioning are substantially associated with loneliness (Ernst et al., 2023). This emphasizes that intrapsychological abilities next to well researched sociodemographic and biological factors contribute to loneliness (Cho et al., 2024; Y.-C. Huang et al., 2023; X. Wang et al., 2023). An additional aspect might be the already increased emotional and social resources required to deal with diabetes. Especially in individuals with diabetes, impaired personality functioning may further increase

difficulties in coping with the multifaceted demands of the disease, additionally reducing capacities for social and emotionally fulfilling relationships, promoting loneliness.

Investigating the role of epistemic trust regarding loneliness becomes evident, given that disruptions of epistemic trust in the form of epistemic mistrust and credulity negatively influence the ability to form and maintain fulfilling relationships (Nolte, 2024). In individuals with diabetes, there is neither sufficient evidence on the epistemic stance in general, nor on its significance regarding loneliness. The present work shows that epistemic mistrust and credulity are predictors for impairments in personality functioning (**Zara**, Kruse, Brähler, et al., 2025), but epistemic trust was not significantly associated with impairments in personality functioning. This is in line with the observations made regarding epistemic trust, mistrust, and credulity and personality functioning in the context of psychological burden of individuals with diabetes and poor $HbA1_c$ (**Zara**, Ullrich, et al., 2025). Although research on loneliness considering epistemic trust, mistrust, and credulity in individuals with diabetes is scarce, a recent population-based study showed that epistemic mistrust and credulity mediate the association between loneliness and psychopathology (Greiner et al., 2025), providing preliminary evidence on the importance of epistemic mistrust and credulity in the context of loneliness. Regarding individuals with diabetes, it could be assumed that the epistemic stance alongside personality functioning presents a key aspect in the development of loneliness and potentially associated psychological burden. However, this line of research has to be extended.

4.2.4. Part II – Conclusion

The following key findings regarding the role of personality functioning and the epistemic stance have been contributed to the research field:

1. Impairments in personality functioning mediated the association between ACEs and diabetes in adulthood.
2. Impairments in personality functioning mediated the association between ACEs and psychological burden such as depressive and suicidal ideation symptoms in patients with diabetes.
3. Impairments in personality functioning mediated the association between ACEs and somatic symptoms as well as diabetes-related distress in patients with diabetes.
4. Impairments in personality functioning mediated the association between ACEs and broader phenomena such as loneliness.
5. Epistemic mistrust and credulity were predictors of impaired personality functioning in the association between ACEs and psychological burden.
6. Epistemic mistrust and credulity predicted impaired personality functioning in the association between ACEs and diabetes-related distress as well as loneliness.

Consequently, impairments in personality functioning act as an underlying mechanism regarding ACEs and diabetes, which is also demonstrated in the association between ACEs and psychological burden, suicidal ideation, diabetes-related distress as well as broader psychosocial phenomena such as loneliness. Additionally, epistemic mistrust and credulity emerge as predictors of impaired personality functioning in the association between ACEs and psychological burden, diabetes-related distress, and loneliness. As part of the present work, the significance and meaning of these findings regarding diabetes treatment as well as further research will be discussed.

4.3. Part III – Practical implications and outlook

This dissertation demonstrates that ACEs are common among individuals with diabetes, especially those with poor glycemic control, and constitute a risk factor for the occurrence of diabetes itself as well as psychological burden (depressive, anxiety, and suicidal symptoms), diabetes-associated outcomes (somatic symptoms, diabetes-related distress) as well as broader phenomena such as loneliness in patients with diabetes. The associations between ACEs and the respective outcomes were conveyed by impairments of personality functioning, with disruptions of epistemic trust being associated with impairments in personality functioning. From these findings, several practical implications can be drawn.

4.3.1. Addressing ACEs as a risk factor

With the high occurrence of ACEs as an important risk factor, it should be targeted by preventative measures. Especially sexual and physical abuse and their link to numerous adverse health outcomes have received scientific and public attention. In Germany, for example, a National Council Against Sexual Violence Against Children and Young People was established specifically as an interdisciplinary committee dedicated to ensuring that sexual violence against children and young people and its consequences are effectively prevented (Bundesministerium für Familie, Senioren, Frauen und Jugend., 2025). Over the past decades, emotional abuse has been recognized as equally harmful (Dye, 2020; Norman et al., 2012) – however, prevention efforts have not been equally made. This has been addressed by the German Child Protection Association, which draws attention to this matter with an awareness campaign on psychological violence (Der Kinderschutzbund, 2025). Hence, preventative measures should also be expanded to target emotional types of ACEs. While such undertakings are generally beneficial for the general population, the relevance for individuals with diabetes becomes evident when considering the increased psychological burden and associated impaired diabetes self-management in those with ACEs compared to those without. Hence, prevention of ACEs could mitigate the burden resulting from ACEs as well as related psychological burden. In the long run, a reduced frequency of ACEs may also result in fewer diabetes cases, alleviating both individual and system-associated burden.

4.3.2. Considering psychological burden and personality functioning

With the somatic treatment of diabetes remaining the primary focus of care, substantial evidence has shown that psychological burden can interfere with the adequate application and effectiveness of somatic treatment approaches. Given that psychological burden is disproportionately common in individuals with diabetes compared to the general population, and particularly common in patients with diabetes and poor glycemic control, this issue underlines the importance of systematically considering psychological comorbidities within routine diabetes management. This may be achieved for example through standardized screenings or brief assessments. While diabetologists already often use screening tools for e.g., depressive and anxiety symptoms, which remain the most prevalent forms of psychological burden in individuals with diabetes, the present findings show that other types of psychological burden also deserve more attention. Next to depressive and anxiety symptoms, somatic symptoms, suicidal ideation, and loneliness (which is closely linked to psychological burden) were highly common in individuals with diabetes, especially in those with poor glycemic control.

Closely intertwined with these psychological burdens are impairments in personality functioning and disruptions of epistemic trust, which may further complicate disease management and adherence. The present findings show that impairments in personality functioning and disruptions of epistemic trust act as an underlying mechanism. Impairments in personality functioning have shown to be improved by psychotherapeutic treatment (Dönnhoff et al., 2024; Kraus et al., 2021), hence, they may prove a novel treatment approach in individuals with diabetes. Especially psychodynamically oriented interventions or mentalization-based treatment focus on enhancing aspects of personality functioning including related epistemic trust. The relevance of personality functioning and epistemic trust in the treatment of psychological burden could be shown by preliminary findings in the context of psychosomatic rehabilitation for patients with mental health issues: reductions in epistemic mistrust fostered mentalizing capacities (an aspect of personality functioning), which was linked to changes in psychological distress before and after the treatment (Riedl et al., 2023). Following this line of thinking, it may be possible that targeting impairments in personality functioning and disruptions in epistemic trust in individuals with diabetes could not only improve psychological burden, but may also improve diabetes-associated outcomes. Preliminary support for this notion is found in a study in patients with type 2 diabetes, which shows that people with less

impairments in personality functioning showed better decline in their $HbA1_c$ values during a 6-month disease management program (Ehrenthal et al., 2019). Similarly, a short-term integrated psychosomatic treatment program for patients with diabetes and high blood glucose levels as well as diabetes-related distress achieved a reduction in $HbA1_c$ levels over a 6-month period (Kampling, et al., 2022). Ultimately, promoting personality functioning and epistemic trust could enhance the patient-doctor relationship and further, strengthen the patient's trust in diabetes treatment which can positively affect diabetes self-management and treatment adherence.

Building on these findings, new research projects are now considering the close associations between psychological burden, diabetes-outcomes, and personality functioning, and integrating it into clinical intervention design. Within the DFG-funded minDBe study (**Zara**, Kruse, & Kampling, 2025), a novel treatment manual is being developed that aims to systematically address both diabetes-related distress and impairments in personality functioning to enhance psychological well-being and metabolic outcomes in patients with diabetes.

4.3.3. Practical implications

To summarize, the following practical implications for individuals with diabetes and their diabetes treatment are proposed:

I. *Prevention* programs should aim to reduce the occurrence of ACEs, also targeting emotional types, in order to mitigate the directly resulting burden from ACEs as well as the associated psychological burden. While such measures would be beneficial for the general population, they may be particularly relevant for individuals with diabetes: reducing ACEs not only has the potential to decrease the risk of developing diabetes itself but may also alleviate the substantially elevated psychological burden in individuals with diabetes and ACEs compared to those without ACEs.

II. *Screening* tools in routine diabetes treatment which aim at capturing psychological burden more broadly could be beneficial, potentially also considering suicidal ideation and broader phenomena such as loneliness. This could help to faster identify individuals in need of further psychological or psychotherapeutic interventions.

III. *Psychotherapeutic care,* in addition to interventions addressing psychological and psychosocial burden, could specifically comprise impairments in personality functioning and disruptions of epistemic trust. People with diabetes may also benefit from promoting personality functioning and related epistemic trust in the doctor-patient relationship, which could in turn support treatment adherence.

4.4. Strengths and Limitations

A major strength of the present dissertation is the employment of both representative population data as well as clinical data of patients with diabetes and inadequate glycemic control. In-depth analyses in the form of mediation analyses are presented next to providing self-reported frequencies for ACEs, psychological burden, and diabetes-related distress as well as loneliness. The robustness of the present findings is emphasized by various results which were found in both examined populations, especially regarding symptoms of depression and anxiety. ACEs were measured with well-established measures, minimizing methodological issues. Although ACEs were always assessed with self-report measures, which is susceptible to bias, studies indicate that subjective reports of ACEs are associated with psychopathology, independently from objective reports (Danese & Widom, 2020). As one important objective of the present dissertation was to investigate the association between ACEs and psychological burden, self-report measures seem to be suitable even though they underlie the general limitations of self-report measures. At the core of this dissertation is the novel approach to understanding the underlying mechanisms of various forms of psychological burden, diabetes-related distress, and loneliness in individuals with diabetes. For this purpose, the transdiagnostic construct of personality functioning, which addresses e.g., emotion dysregulation, communication difficulties, or disruptions in self-organization, or relationships, was investigated as an underlying mediating factor in all research articles of this dissertation. Additionally, preliminary evidence on the constructs epistemic trust, mistrust and credulity in this population is provided, adding a novel point of view in diabetes research. Not only were the most common mental health issues, namely symptoms of depression and anxiety as well as diabetes-related distress in patients with diabetes investigated, but the research focus was also extended to aspects closely linked to mental health issues, such as suicidal ideation, as well as the highly prevalent psychosocial phenomenon of loneliness.

Next to the strengths of the included studies, when interpreting results, some limitations must be recognized. First, the cross-sectional design does not allow conclusions regarding cause and effect between ACEs and the respective outcome. Further, except from the investigations conducted in a clinical diabetes sample with poor glycemic control, diabetes was assessed via self-report, which limits the validity of the diabetes population the research articles are based on to some degree, even though there is evidence

supporting the utility of self-reported diabetes for clinical studies (Jackson et al., 2013). Moreover, the design of the data collection in the representative samples did not permit separate investigations of people with type 1 diabetes and type 2 diabetes. Therefore, the presented findings allow for separate analyses regarding the clinical sample, and only an overview of type 1 and type 2 diabetes for the analyses in the population samples, disregarding the different pathomechanisms of the diabetes types.

Future research considering ACEs in diabetes populations could control for different confounding variables influencing the occurrence of ACEs and associated outcomes, e.g., race, ethnicity and nativity, household income, migration background, social support, or education level. Moreover, diabetes research should generally investigate patients with type 1 and type 2 diabetes separately and in larger samples. Finally, the present findings should be replicated employing longitudinal data.

GERMAN SUMMARY AND ENGLISH ABSTRACT

5. GERMAN SUMMARY AND ENGLISH ABSTRACT

5.1. Deutsche Zusammenfassung

Die vorliegende Dissertation adressiert die Zusammenhänge zwischen Missbrauch und Vernachlässigung in der Kindheit, Diabetes und psychischer Belastung in Form von Angst-, depressiven, somatischen und suizidalen Symptomen, diabetesbezogenen Belastungen sowie psychosozialen Phänomenen wie Einsamkeit. Dabei wurden das transdiagnostische Konstrukt des Strukturniveaus nach OPD als zugrundeliegender Mechanismus sowie das damit eng verbundene Konzept der epistemischen Haltung (epistemisches Vertrauen, Misstrauen und Leichtgläubigkeit) berücksichtigt. Neben der hohen Prävalenz von Missbrauch und Vernachlässigung in der Kindheit bei Menschen mit Diabetes im Vergleich zur Allgemeinbevölkerung zeigen die Ergebnisse, dass Diabetes nach solchen Erfahrungen gehäuft auftritt und Menschen mit Diabetes und Erfahrungen von Missbrauch und Vernachlässigung auch höhere psychische Belastungen, diabetesbezogene Belastungen und Einsamkeit aufweisen. Diese Zusammenhänge werden wesentlich durch ein beeinträchtigtes Strukturniveau vermittelt. Epistemisches Misstrauen und Leichtgläubigkeit sind dabei eng mit Beeinträchtigungen des Strukturniveaus assoziiert.

Daraus lässt sich schlussfolgern, dass in der Behandlung von Menschen mit Diabetes neben somatischen auch psychologische Behandlungsaspekte eine zentrale Rolle einnehmen sollten. Die vorliegenden Ergebnisse zeigen, dass psychische Belastungen bei Menschen mit Diabetes weit mehr als nur depressive und Angstsymptome umfassen und unterstreichen die Bedeutung von somatischen Symptomen sowie Suizidgedanken und breiteren Phänomenen, wie Einsamkeit (was eng mit Psychopathologie verbunden ist). Vor dem Hintergrund der transdiagnostischen Eigenschaften des Strukturniveaus könnte ein gezieltes Screening auf dessen Beeinträchtigungen Hinweise auf die allgemeine psychische Belastung geben und weitere Behandlungsansätze anregen. Dabei könnte das Strukturniveau einen neuartigen Behandlungsansatz für Menschen mit Diabetes und psychischen Belastungen darstellen. Psychodynamische Interventionen oder mentalisierungsbasierte Behandlungen, die das Strukturniveau sowie das epistemische Vertrauen fördern, könnte die Vielzahl an psychischen und psychosozialen Beschwerden von Menschen mit Diabetes positiv beeinflussen, die Arzt-Patient-Beziehung fördern und sich letztlich günstig auf assoziiertes Diabetes-Selbstmanagement und nicht zuletzt die gesundheitsbezogene Lebensqualität von Menschen mit Diabetes auswirken.

5.2. English Abstract

This dissertation addresses the associations between ACEs, diabetes, and psychological burden in the form of anxiety, depressive, somatic, and suicidal symptoms, diabetes-related distress, and psychosocial phenomena such as loneliness. The transdiagnostic construct of impairments in personality functioning according to OPD was considered as the underlying mechanism, as well as the closely related concept of the epistemic stance (epistemic trust, mistrust, and credulity). In addition to the high prevalence of ACEs among people with diabetes compared to the general population, the results show that diabetes occurs more frequently after ACEs and that people with diabetes who have experienced ACEs compared to those without show greater psychological burden, diabetes-related distress, and loneliness. These associations are largely conveyed by impairments in personality functioning. Epistemic mistrust and credulity are closely associated with impairments in personality functioning.

Based on these results it can therefore be concluded that psychological burden should play a central role in the treatment of people with diabetes, alongside somatic aspects. The present findings show that psychological burden in people with diabetes encompasses much more than just depressive and anxiety symptoms, highlighting the importance of somatic symptoms, suicidal ideation, and broader phenomena such as loneliness (which is closely linked to psychopathology). Given the transdiagnostic characteristics of personality functioning, screening for impairments in personality functioning could provide early indications of general psychological burden and initiate further treatment approaches. Impairments in personality functioning could pose a novel treatment approach for people with diabetes and psychological burden. Psychodynamic interventions or mentalization-based treatments that promote personality functioning as well as epistemic trust could positively influence the multitude of psychological and psychosocial complaints of people with diabetes, enhance the patient-doctor-relationship, and ultimately have a beneficial effect on associated diabetes self-management and, not least, the health-related quality of life of people with diabetes.

6. LIST OF ABBREVIATIONS, FIGURES, AND TABLES

ACEs	Adverse Childhood Experiences
AMPD	Alternative Model of Personality Disorders
BMI	Body-Mass-Index
CI	Confidence interval
DALYS	Disability-Adjusted Life Years
DFG	Deutsche Forschungsgemeinschaft
DMP	Disease Management Programm
DSM	Diagnostic and Statistical Manual of Mental Disorders
DSS	Diabetes Distress Scale
$HbA1_c$	Glycated hemoglobin $A1_c$
HR	Hazard ratio
ICD	International Classification of Diseases
minDBe	Zugang zu einem neu adaptierten diabetesspezifischen **m**ultimodalen sektorenübergreifenden **in**terdisziplinären psychotherapeutischen Versorgungsangebot für eine Hochrisikogruppe von PatientInnen mit **D**iabetes mellitus und **Be**lastungen
OPD	Operationalized Psychodynamic Diagnosis
OR	Odds ratio
PAID	Problem Areas in Diabetes Scale
RCT	Randomized Controlled Trial
WHO	World Health Organization
YLD	Years of life lost to disability

Figure 1. Schematic display of the proposed associations between Adverse Childhood Experiences (ACEs) and the respective outcome investigated in this dissertation as well as the indirect (mediating) effect of personality functioning, with epistemic trust, mistrust, and credulity modeled as predictors/covariates. 29

Table 1. Overview of the manuscripts of this dissertation with title, journal, journal impact factor (IF), and research aims.....28

Table 2. Publications related to this dissertation 30

7. REFERENCES

Albai, O., Timar, B., Braha, A., & Timar, R. (2024). Predictive Factors of Anxiety and Depression in Patients with Type 2 Diabetes Mellitus. *Journal of Clinical Medicine*, *13*(10), 3006. https://doi.org/10.3390/jcm13103006

Ali, S. A., Salih, S. M., Abdelmola, A., Makeen, A. M., Solan, Y. M., & Mohammed Ali, M. M. (2024). Association of Anxiety and Depressive Symptoms and Treatment Adherence Among Patients With Type 2 Diabetes Mellitus in Jazan, Saudi Arabia: A Cross-Sectional Study. *Cureus*. https://doi.org/10.7759/cureus.56068

American Diabetes Association. (2017). 2. Classification and Diagnosis of Diabetes. *Diabetes Care*, *40*(Supplement 1), S11–S24. https://doi.org/10.2337/dc17-S005

American Diabetes Association. (2021). 6. Glycemic Targets: *Standards of Medical Care in Diabetes—2021*. *Diabetes Care*, *44*(Supplement_1), S73–S84. https://doi.org/10.2337/dc21-S006

American Psychiatric Association. (2000). *Diagnostic and Statistical Manual of Mental Disorders DSM-IV-TR* (4th ed. Text Revision). American Psychiatric Association.

American Psychiatric Association. (2013). *Diagnostic and Statistical Manual of Mental Disorders , 5th ed.* (Vol. 5). American Psychiatric Publishing.

Angelakis, I., Gillespie, E. L., & Panagioti, M. (2019). Childhood maltreatment and adult suicidality: A comprehensive systematic review with meta-analysis. *Psychological Medicine*, *49*(07), 1057–1078. https://doi.org/10.1017/S0033291718003823

Antoniou, G., Lambourg, E., Steele, J. D., & Colvin, L. A. (2023). The effect of adverse childhood experiences on chronic pain and major depression in adulthood: A systematic review and meta-analysis. *British Journal of Anaesthesia*, *130*(6), 729–746. https://doi.org/10.1016/j.bja.2023.03.008

Aparicio, E., Canals, J., Arija, V., De Henauw, S., & Michels, N. (2016). The role of emotion regulation in childhood obesity: Implications for prevention and treatment. *Nutrition Research Reviews*, *29*(1), 17–29. https://doi.org/10.1017/S0954422415000153

Asuzu, C. C., Walker, R. J., Williams, J. S., & Egede, L. E. (2017). Pathways for the relationship between diabetes distress, depression, fatalism and glycemic control in adults with type 2 diabetes. *Journal of Diabetes and Its Complications*, *31*(1), 169–174. https://doi.org/10.1016/j.jdiacomp.2016.09.013

Atasoy, S., Johar, H., Fleischer, T., Beutel, M., Binder, H., Braehler, E., Schomerus, G., Zöller, D., Kruse, J., & Ladwig, K.-H. (2022). Depression Mediates the Association Between Childhood Emotional Abuse and the Onset of Type 2 Diabetes: Findings From German Multi-Cohort Prospective Studies. *Frontiers in Psychiatry*, *13*, 825678. https://doi.org/10.3389/fpsyt.2022.825678

Atasoy, S., Johar, H., Herder, C., Rathmann, W., Koenig, W., Roden, M., Peters, A., Kruse, J., & Ladwig, K.-H. (2021). Generalized anxiety disorder symptoms and type 2 diabetes onset: Findings from the Prospective Cooperative Health Research in the Region of Augsburg F4 and FF4 studies. *Journal of Psychosomatic Research*, *145*, 110480. https://doi.org/10.1016/j.jpsychores.2021.110480

Bach, B., & Simonsen, S. (2021). How does level of personality functioning inform clinical management and treatment? Implications for ICD-11 classification of personality disorder severity. *Current Opinion in Psychiatry*, *34*(1), 54–63. https://doi.org/10.1097/YCO.0000000000000658

Barman, N., Islam, A. B. M. M. K., & Haque, M. A. (2024). Association between adverse childhood experiences and type 2 diabetes mellitus in later life: A case-control study. *PLOS Global Public Health*, *4*(6), e0002715. https://doi.org/10.1371/journal.pgph.0002715

Beebe, B., Jaffe, J., Markese, S., Buck, K., Chen, H., Cohen, P., Bahrick, L., Andrews, H., & Feldstein, S. (2010a). The origins of 12-month attachment: A microanalysis of 4-month mother-infant interaction. *Attachment & Human Development*, *12*(1–2), 3–141. https://doi.org/10.1080/14616730903338985

Beebe, B., Jaffe, J., Markese, S., Buck, K., Chen, H., Cohen, P., Bahrick, L., Andrews, H., & Feldstein, S. (2010b). The origins of 12-month attachment: A microanalysis of 4-month mother–infant interaction. *Attachment & Human Development*, *12*(1–2), 3–141. https://doi.org/10.1080/14616730903338985

Bellis, M. A., Hughes, K., Ford, K., Ramos Rodriguez, G., Sethi, D., & Passmore, J. (2019). Life course health consequences and associated annual costs of adverse childhood experiences across Europe and North America: A systematic review and meta-analysis. *The Lancet Public Health*, *4*(10), e517–e528. https://doi.org/10.1016/S2468-2667(19)30145-8

Bellis, M. A., Hughes, K., Leckenby, N., Hardcastle, K. A., Perkins, C., & Lowey, H. (2015). Measuring mortality and the burden of adult disease associated with

adverse childhood experiences in England: A national survey. *Journal of Public Health*, *37*(3), 445–454. https://doi.org/10.1093/pubmed/fdu065

Benton, M., Cleal, B., Prina, M., Baykoca, J., Willaing, I., Price, H., & Ismail, K. (2023). Prevalence of mental disorders in people living with type 1 diabetes: A systematic literature review and meta-analysis. *General Hospital Psychiatry*, *80*, 1–16. https://doi.org/10.1016/j.genhosppsych.2022.11.004

Berens, S., Schaefert, R., Ehrenthal, J. C., Baumeister, D., Gauss, A., Eich, W., & Tesarz, J. (2021). The Validity of Somatic Symptom Disorder in Patients With Gastrointestinal Complaints. *Journal of Clinical Gastroenterology*, *55*(8), e66–e76. https://doi.org/10.1097/MCG.0000000000001505

Bitew, Z. W., Alemu, A., Jember, D. A., Tadesse, E., Getaneh, F. B., Seid, A., & Weldeyonnes, M. (2023). Prevalence of Glycemic Control and Factors Associated With Poor Glycemic Control: A Systematic Review and Meta-analysis. *INQUIRY: The Journal of Health Care Organization, Provision, and Financing*, *60*, 004695802311557. https://doi.org/10.1177/00469580231155716

Boone, K., Balzen, K. M., & Sharp, C. (2025). Impairment in personality functioning predicts young adult suicidal ideation and suicide attempt above and beyond depressive symptoms. *Research in Psychotherapy: Psychopathology, Process and Outcome*, *27*(3). https://doi.org/10.4081/ripppo.2024.814

Broekhof, R., Nordahl, H. M., Eikenæs, I. U.-M., & Selvik, S. G. (2024). Adverse Childhood Experiences Are Associated With Personality Disorder: A Prospective, Longitudinal Study. *Journal of Personality Disorders*, *38*(1), 19–33. https://doi.org/10.1521/pedi.2024.38.1.19

Brown, D. W., Anda, R. F., Tiemeier, H., Felitti, V. J., Edwards, V. J., Croft, J. B., & Giles, W. H. (2009). Adverse Childhood Experiences and the Risk of Premature Mortality. *American Journal of Preventive Medicine*, *37*(5), 389–396. https://doi.org/10.1016/j.amepre.2009.06.021

Brüne, M., Linnenkamp, U., Andrich, S., Jaffan-Kolb, L., Claessen, H., Dintsios, C.-M., Schmitz-Losem, I., Kruse, J., Chernyak, N., Hiligsmann, M., Hermanns, N., & Icks, A. (2021). Health Care Use and Costs in Individuals With Diabetes With and Without Comorbid Depression in Germany: Results of the Cross-sectional DiaDec Study. *Diabetes Care*, *44*(2), 407–415. https://doi.org/10.2337/dc19-2487

Bundesamt für Soziale Sicherung. (2024). *Zulassung der strukturierten Behandlungsprogramme (Disease Management Programme—DMP) durch das Bundesamt für Soziale Sicherung*. https://www.bundesamtsozialesicherung.de/de/themen/disease-management-programme/dmp-grundlegende-informationen/

Bundesärztekammer (BÄK), Kassenärztliche Bundesvereinigung (KBV), & Arbeitsgemeinschaft der Wissenschaftlichen Medizinischen Fachgesellschaften (AWMF). (2023). *Nationale VersorgungsLeitlinie Typ-2-Diabetes—Langfassung. Version 3.0*. https://doi.org/10.6101/AZQ/000503

Bundesministerium für Familie, Senioren, Frauen und Jugend. (2023). *Strategie der Bundesregierung gegen Einsamkeit*.

Bundesministerium für Familie, Senioren, Frauen und Jugend. (2025). *Nationaler Rat gegen sexuelle Gewalt an Kindern und Jugendlichen*.

Burton, R., Fryers, P. T., Sharpe, C., Clarke, Z., Henn, C., Hydes, T., Marsden, J., Pearce-Smith, N., & Sheron, N. (2024). The independent and joint risks of alcohol consumption, smoking, and excess weight on morbidity and mortality: A systematic review and meta-analysis exploring synergistic associations. *Public Health*, *226*, 39–52. https://doi.org/10.1016/j.puhe.2023.10.035

Busili, A., Kumar, K., Kudrna, L., & Busaily, I. (2024). The risk factors for mental health disorders in patients with type 2 diabetes: An umbrella review of systematic reviews with and without meta-analysis. *Heliyon*, *10*(7), e28782. https://doi.org/10.1016/j.heliyon.2024.e28782

Cacioppo, J. T., & Cacioppo, S. (2018). The growing problem of loneliness. *The Lancet*, *391*(10119), 426. https://doi.org/10.1016/S0140-6736(18)30142-9

Campbell, C., Tanzer, M., Saunders, R., Booker, T., Allison, E., Li, E., O'Dowda, C., Luyten, P., & Fonagy, P. (2021). Development and validation of a self-report measure of epistemic trust. *PLOS ONE*, *16*(4), e0250264. https://doi.org/10.1371/journal.pone.0250264

Campbell, J. A., Farmer, G. C., Nguyen-Rodriguez, S., Walker, R., & Egede, L. (2018). Relationship between individual categories of adverse childhood experience and diabetes in adulthood in a sample of US adults: Does it differ by gender? *Journal of Diabetes and Its Complications*, *32*(2), 139–143. https://doi.org/10.1016/j.jdiacomp.2017.11.005

Campbell, J. A., Mosley-Johnson, E., Garacci, E., Walker, R. J., & Egede, L. E. (2019). The co-occurrence of diabetes and adverse childhood experiences and its impact on mortality in US adults. *Journal of Affective Disorders*, *249*, 20–25. https://doi.org/10.1016/j.jad.2019.02.016

Chew, B. H., Vos, R. C., Metzendorf, M.-I., Scholten, R. J., & Rutten, G. E. (2017). Psychological interventions for diabetes-related distress in adults with type 2 diabetes mellitus. *Cochrane Database of Systematic Reviews*, *2017*(10). https://doi.org/10.1002/14651858.CD011469.pub2

Chireh, B., Li, M., & D'Arcy, C. (2019). Diabetes increases the risk of depression: A systematic review, meta-analysis and estimates of population attributable fractions based on prospective studies. *Preventive Medicine Reports*, *14*, 100822. https://doi.org/10.1016/j.pmedr.2019.100822

Cho, E., Kim, J., & Bang, S. (2024). Loneliness in older adults with diabetes mellitus: A scoping review. *Psychology, Health & Medicine*, *29*(8), 1548–1563. https://doi.org/10.1080/13548506.2023.2299665

Christiansen, J., Lund, R., Qualter, P., Andersen, C. M., Pedersen, S. S., & Lasgaard, M. (2021). Loneliness, Social Isolation, and Chronic Disease Outcomes. *Annals of Behavioral Medicine*, *55*(3), 203–215. https://doi.org/10.1093/abm/kaaa044

Clemens, V., Huber-Lang, M., Plener, P. L., Brähler, E., Brown, R. C., & Fegert, J. M. (2018). Association of child maltreatment subtypes and long-term physical health in a German representative sample. *European Journal of Psychotraumatology*, *9*(1), 1510278. https://doi.org/10.1080/20008198.2018.1510278

Conti, C., Carrozzino, D., Patierno, C., Vitacolonna, E., & Fulcheri, M. (2016). The Clinical Link between Type D Personality and Diabetes. *Frontiers in Psychiatry*, *7*. https://doi.org/10.3389/fpsyt.2016.00113

d'Huart, D., Hutsebaut, J., Seker, S., Schmid, M., Schmeck, K., Bürgin, D., & Boonmann, C. (2022). Personality functioning and the pathogenic effect of childhood maltreatment in a high-risk sample. *Child and Adolescent Psychiatry and Mental Health*, *16*(1), 95. https://doi.org/10.1186/s13034-022-00527-1

Dagnino, P., Ugarte, M. J., Morales, F., González, S., Saralegui, D., & Ehrenthal, J. C. (2020). Risk Factors for Adult Depression: Adverse Childhood Experiences and Personality Functioning. *Frontiers in Psychology*, *11*, 594698. https://doi.org/10.3389/fpsyg.2020.594698

Dalsgaard, E., Graversen, S. B., Bjerg, L., Sandbaek, A., & Laurberg, T. (2024). Diabetes distress and depression in type 2 diabetes. A cross-sectional study in 18,000 individuals in the Central Denmark region. *Diabetic Medicine*, e15463. https://doi.org/10.1111/dme.15463

Danese, A., & Widom, C. S. (2020). Objective and subjective experiences of child maltreatment and their relationships with psychopathology. *Nature Human Behaviour*, *4*(8), 811–818. https://doi.org/10.1038/s41562-020-0880-3

De Groot, M., Crick, K. A., Long, M., Saha, C., & Shubrook, J. H. (2016). Lifetime Duration of Depressive Disorders in Patients With Type 2 Diabetes. *Diabetes Care*, *39*(12), 2174–2181. https://doi.org/10.2337/dc16-1145

De Heer, C., Bi, S., Finkenauer, C., Alink, L., & Maes, M. (2024). The Association Between Child Maltreatment and Loneliness Across the Lifespan: A Systematic Review and Multilevel Meta-Analysis. *Child Maltreatment*, *29*(2), 388–404. https://doi.org/10.1177/10775595221103420

Der Kinderschutzbund. (2025). *Gewalt ist mehr, als du denkst. Kampagne gegen psychische Gewalt an Kindern*. https://kinderschutzbund.de/gewalt/

Deschênes, S. S., Graham, E., Kivimäki, M., & Schmitz, N. (2018). Adverse Childhood Experiences and the Risk of Diabetes: Examining the Roles of Depressive Symptoms and Cardiometabolic Dysregulations in the Whitehall II Cohort Study. *Diabetes Care*, *41*(10), 2120–2126. https://doi.org/10.2337/dc18-0932

Dirmaier, J., Watzke, B., Koch, U., Schulz, H., Lehnert, H., Pieper, L., & Wittchen, H.-U. (2010). Diabetes in Primary Care: Prospective Associations between Depression, Nonadherence and Glycemic Control. *Psychotherapy and Psychosomatics*, *79*(3), 172–178. https://doi.org/10.1159/000296135

Doering, S. (2019). Borderline Personality Disorder in Patients With Medical Illness: A Review of Assessment, Prevalence, and Treatment Options. *Psychosomatic Medicine*, *81*(7), 584–594. https://doi.org/10.1097/PSY.0000000000000724

Dönnhoff, I., Kindermann, D., Stahl-Toyota, S., Nowak, J., Orth, M., Friederich, H.-C., & Nikendei, C. (2024). Predictors for improvement in personality functioning during outpatient psychotherapy: A machine learning approach within a psychodynamic psychotherapy sample. *European Psychiatry: The Journal of the Association of European Psychiatrists*, *67*(1), e79. https://doi.org/10.1192/j.eurpsy.2024.1780

Du, Y., Baumert, J., Paprott, R., Färber, F., Nübel, J., Hermanns, N., Heidemann, C., & Scheidt-Nave, C. (2023). Diabetes-related distress and associated factors among adults with diabetes in Germany: Results of the nationwide study "Disease knowledge and information needs – Diabetes mellitus 2017." *Journal of Psychosomatic Research*, *164*, 111073. https://doi.org/10.1016/j.jpsychores.2022.111073

Dye, H. L. (2020). Is Emotional Abuse As Harmful as Physical and/or Sexual Abuse? *Journal of Child & Adolescent Trauma*, *13*(4), 399–407. https://doi.org/10.1007/s40653-019-00292-y

Ehrenthal, J., Düx, A., Baie, L., & Burgmer, M. (2019). Levels of personality functioning and not depression predict decline of plasma glucose concentration in patients with type 2 diabetes mellitus. *Diabetes Research and Clinical Practice*, *151*, 106–113. https://doi.org/10.1016/j.diabres.2019.04.011

Ehrmann, D., Kulzer, B., Roos, T., Haak, T., Al-Khatib, M., & Hermanns, N. (2020). Risk factors and prevention strategies for diabetic ketoacidosis in people with established type 1 diabetes. *The Lancet Diabetes & Endocrinology*, *8*(5), 436–446. https://doi.org/10.1016/S2213-8587(20)30042-5

Elamoshy, R., Bird, Y., Thorpe, L., & Moraros, J. (2018). Risk of Depression and Suicidality among Diabetic Patients: A Systematic Review and Meta-Analysis. *Journal of Clinical Medicine*, *7*(11), 445. https://doi.org/10.3390/jcm7110445

Entringer, T. (2022). *Epidemiologie von Einsamkeit in Deutschland*.

Ernst, M., Brähler, E., Kampling, H., Kruse, J., Fegert, J. M., Plener, P. L., & Beutel, M. E. (2022). Is the end in the beginning? Child maltreatment increases the risk of non-suicidal self-injury and suicide attempts through impaired personality functioning. *Child Abuse & Neglect*, *133*, 105870. https://doi.org/10.1016/j.chiabu.2022.105870

Ernst, M., Brähler, E., Kruse, J., Kampling, H., & Beutel, M. E. (2023). Does loneliness lie within? Personality functioning shapes loneliness and mental distress in a representative population sample. *Journal of Affective Disorders Reports*, *12*, 100486. https://doi.org/10.1016/j.jadr.2023.100486

Ernst, M., Niederer, D., Werner, A. M., Czaja, S. J., Mikton, C., Ong, A. D., Rosen, T., Brähler, E., & Beutel, M. E. (2022). Loneliness before and during the COVID-19 pandemic: A systematic review with meta-analysis. *American Psychologist*, *77*(5), 660–677. https://doi.org/10.1037/amp0001005

Felitti, V. J., Anda, R. F., Nordenberg, D., Williamson, D. F., Spitz, A. M., Edwards, V., Koss, M. P., & Marks, J. S. (1998). Relationship of Childhood Abuse and Household Dysfunction to Many of the Leading Causes of Death in Adults. *American Journal of Preventive Medicine*, *14*(4), 245–258. https://doi.org/10.1016/S0749-3797(98)00017-8

Fisher, L., Hessler, D. M., Polonsky, W. H., & Mullan, J. (2012). When Is Diabetes Distress Clinically Meaningful? *Diabetes Care*, *35*(2), 259–264. https://doi.org/10.2337/dc11-1572

Fleetwood, K. J., Wild, S. H., Licence, K. A. M., Mercer, S. W., Smith, D. J., Jackson, C. A., & Scottish Diabetes Research Network Epidemiology Group. (2023). Severe Mental Illness and Type 2 Diabetes Outcomes and Complications: A Nationwide Cohort Study. *Diabetes Care*, *46*(7), 1363–1371. https://doi.org/10.2337/dc23-0177

Fonagy, P., & Campbell, C. (2017). Mentalizing, attachment and epistemic trust: How psychotherapy can promote resilience. *Psychiatria Hungarica: A Magyar Pszichiatriai Tarsasag Tudomanyos Folyoirata*, *32*(3), 283–287.

Fonagy, P., Campbell, C., & Bateman, A. (2017). Mentalizing, Attachment, and Epistemic Trust in Group Therapy. *International Journal of Group Psychotherapy*, *67*(2), 176–201. https://doi.org/10.1080/00207284.2016.1263156

Fonagy, P., Luyten, P., Allison, E., & Campbell, C. (2017). What we have changed our minds about: Part 2. Borderline personality disorder, epistemic trust and the developmental significance of social communication. *Borderline Personality Disorder and Emotion Dysregulation*, *4*(1), 9. https://doi.org/10.1186/s40479-017-0062-8

Fonagy, P., & Nolte, T. (2023). *Epistemisches Vertrauen: Vom Konzept zur Anwendung in Psychotherapie und psychosozialen Arbeitsfeldern*. Klett-Cotta.

Forkmann, T., Brähler, E., Gauggel, S., & Glaesmer, H. (2012). Prevalence of Suicidal Ideation and Related Risk Factors in the German General Population. *Journal of Nervous & Mental Disease*, *200*(5), 401–405. https://doi.org/10.1097/NMD.0b013e31825322cf

Freier, A., Kruse, J., Schmalbach, B., Zara, S., Werner, S., Brähler, E., Fegert, J. M., & Kampling, H. (2022). The mediation effect of personality functioning between different types of child maltreatment and the development of depression/anxiety symptoms – A German representative study. *Journal of Affective Disorders*, *299*, 408–415. https://doi.org/10.1016/j.jad.2021.12.020

Gardner, M. J., Thomas, H. J., & Erskine, H. E. (2019). The association between five forms of child maltreatment and depressive and anxiety disorders: A systematic review and meta-analysis. *Child Abuse & Neglect*, *96*, 104082. https://doi.org/10.1016/j.chiabu.2019.104082

Gemeinsamer Bundesausschuss (Ed.). (2020). *DMP für Patienten mit Typ-1-Diabetes aktualisiert*.

Gemeinsamer Bundesausschuss. (2022). *Pressemitteilung Disease Management Programme. DMP bei Typ-2-Diabetes: Gemeinsamer Bundesausschuss beschließt Aktualisierungen.*

Gimeno, E. J., Bøgelund, M., Larsen, S., Okkels, A., Reitzel, S. B., Ren, H., & Orozco-Beltran, D. (2024). Adherence and Persistence to Basal Insulin Among People with Type 2 Diabetes in Europe: A Systematic Literature Review and Meta-analysis. *Diabetes Therapy*, *15*(5), 1047–1067. https://doi.org/10.1007/s13300-024-01559-w

Gonzalez Heredia, T., González-Ramírez, L. P., Hernández-Corona, D. M., & Maciel-Hernández, E. A. (2021). Anxious depression in patients with Type 2 Diabetes Mellitus and its relationship with medication adherence and glycemic control. *Global Public Health*, *16*(3), 460–468. https://doi.org/10.1080/17441692.2020.1810735

Greiner, C., Besch, V., Bouchard-Boivin, M., Le Hénaff, C., Von Rohr-De Pree, C., Perroud, N., Prada, P., & Debbané, M. (2025). Epistemic Trust, Mistrust and Credulity Questionnaire (ETMCQ) validation in French language: Exploring links to loneliness. *PLOS ONE*, *20*(3), e0303918. https://doi.org/10.1371/journal.pone.0303918

Gruhn, M. A., & Compas, B. E. (2020). Effects of maltreatment on coping and emotion regulation in childhood and adolescence: A meta-analytic review. *Child Abuse & Neglect*, *103*, 104446. https://doi.org/10.1016/j.chiabu.2020.104446

Guerrero Fernández De Alba, I., Gimeno-Miguel, A., Poblador-Plou, B., Gimeno-Feliu, L. A., Ioakeim-Skoufa, I., Rojo-Martínez, G., Forjaz, M. J., & Prados-Torres, A. (2020). Association between mental health comorbidity and health outcomes in type 2 diabetes mellitus patients. *Scientific Reports*, *10*(1), 19583. https://doi.org/10.1038/s41598-020-76546-9

Guerrero-Ramírez, G., & Cumba-Avilés, E. (2018). Factors Associated with Suicidal Ideation and Quality of Life in Adolescents from Puerto Rico with Type 1 Diabetes. *Puerto Rico Health Sciences Journal*, *37*(1), 19–21.

Guo, S., Qing, G., & Yang, G. (2024). The relationship between chronic disease variety and quantity and suicidal ideation: A cross-sectional study of NHANES. *Journal of Psychosomatic Research*, *184*, 111854. https://doi.org/10.1016/j.jpsychores.2024.111854

Haak, T., Gölz, S., Fritsche, A., Füchtenbusch, M., Siegmund, T., Schnellbächer, E., Klein, H. H., Uebel, T., & Droßel, D. (2020). Therapie des Typ-1-Diabetes – Kurzfassung der S3-Leitlinie (AWMF-Registernummer: 057-013; 2. Auflage). *Diabetologie und Stoffwechsel*, *15*(S 01), S40–S50. https://doi.org/10.1055/a-1193-3724

Hailes, H. P., Yu, R., Danese, A., & Fazel, S. (2019). Long-term outcomes of childhood sexual abuse: An umbrella review. *The Lancet Psychiatry*, *6*(10), 830–839. https://doi.org/10.1016/S2215-0366(19)30286-X

Handley, T. E., Ventura, A. D., Browne, J. L., Rich, J., Attia, J. R., Reddy, P., Pouwer, F., & Speight, J. (2016). Suicidal ideation reported by adults with Type 1 or Type 2 diabetes: Results from Diabetes MILES-Australia. *Diabetic Medicine*, *33*(11), 1582–1589. https://doi.org/10.1111/dme.13022

Hankosky, E. R., Schapiro, D., Gunn, K. B., Lubelczyk, E. B., Mitroi, J., & Nelson, D. R. (2023). Gaps Remain for Achieving HbA1c Targets for People with Type 1 or Type 2 Diabetes Using Insulin: Results from NHANES 2009–2020. *Diabetes Therapy*, *14*(6), 967–975. https://doi.org/10.1007/s13300-023-01399-0

Harmer, B., Lee, S., Rizvi, A., & Saadabadi, A. (2025). Suicidal Ideation. In *StatPearls*. StatPearls Publishing. http://www.ncbi.nlm.nih.gov/books/NBK565877/

Hawkley, L. C., & Cacioppo, J. T. (2010). Loneliness Matters: A Theoretical and Empirical Review of Consequences and Mechanisms. *Annals of Behavioral Medicine*, *40*(2), 218–227. https://doi.org/10.1007/s12160-010-9210-8

Hazrati-Meimaneh, Z., Amini-Tehrani, M., Pourabbasi, A., Gharlipour, Z., Rahimi, F., Ranjbar-Shams, P., Nasli-Esfahani, E., & Zamanian, H. (2020). The impact of personality traits on medication adherence and self-care in patients with type 2 diabetes mellitus: The moderating role of gender and age. *Journal of Psychosomatic Research*, *136*, 110178. https://doi.org/10.1016/j.jpsychores.2020.110178

Heidemann, C., Du, Y., Paprott, R., Haftenberger, M., Rathmann, W., & Scheidt-Nave, C. (2016). Temporal changes in the prevalence of diagnosed diabetes, undiagnosed diabetes and prediabetes: Findings from the German Health Interview and Examination Surveys in 1997–1999 and 2008–2011. *Diabetic Medicine*, *33*(10), 1406–1414. https://doi.org/10.1111/dme.13008

Hoffart, A., Johnson, S. U., & Ebrahimi, O. V. (2020). Loneliness and Social Distancing During the COVID-19 Pandemic: Risk Factors and Associations With Psychopathology. *Frontiers in Psychiatry*, *11*, 589127. https://doi.org/10.3389/fpsyt.2020.589127

Hoogendoorn, C. J., Krause-Steinrauf, H., Uschner, D., Wen, H., Presley, C. A., Legowski, E. A., Naik, A. D., Golden, S. H., Arends, V. L., Brown-Friday, J., Krakoff, J. A., Suratt, C. E., Waltje, A. H., Cherrington, A. L., Gonzalez, J. S., GRADE Research Group, Crandall, J. P., McKee, M. D., Behringer-Massera, S., … Walker, E. (2024). Emotional Distress Predicts Reduced Type 2 Diabetes Treatment Adherence in the Glycemia Reduction Approaches in Diabetes: A Comparative Effectiveness Study (GRADE). *Diabetes Care*, *47*(4), 629–637. https://doi.org/10.2337/dc23-1401

Huang, H., Yan, P., Shan, Z., Chen, S., Li, M., Luo, C., Gao, H., Hao, L., & Liu, L. (2015). Adverse childhood experiences and risk of type 2 diabetes: A systematic review and meta-analysis. *Metabolism*, *64*(11), 1408–1418. https://doi.org/10.1016/j.metabol.2015.08.019

Huang, Y.-C., Cho, E., Kuo, H.-J., & García, A. A. (2023). The influences of depression and loneliness on A1C among middle-aged and older adults with diabetes. *Psychology, Health & Medicine*, *28*(6), 1540–1548. https://doi.org/10.1080/13548506.2022.2124287

Huffhines, L., Noser, A., & Patton, S. R. (2016). The Link Between Adverse Childhood Experiences and Diabetes. *Current Diabetes Reports*, *16*(6), 54. https://doi.org/10.1007/s11892-016-0740-8

Hughes, K., Bellis, M. A., Hardcastle, K. A., Sethi, D., Butchart, A., Mikton, C., Jones, L., & Dunne, M. P. (2017). The effect of multiple adverse childhood experiences on health: A systematic review and meta-analysis. *The Lancet Public Health*, *2*(8), e356–e366. https://doi.org/10.1016/S2468-2667(17)30118-4

Humphreys, K. L., LeMoult, J., Wear, J. G., Piersiak, H. A., Lee, A., & Gotlib, I. H. (2020). Child maltreatment and depression: A meta-analysis of studies using the Childhood Trauma Questionnaire. *Child Abuse & Neglect*, *102*, 104361. https://doi.org/10.1016/j.chiabu.2020.104361

Ittoop, T., Jeffrey, K., Cheng, C.-I., & Reddy, S. (2020). The Relationship Between Adverse Childhood Experiences and Diabetes in Central Michigan Adults. *Endocrine Practice*, *26*(12), 1425–1434. https://doi.org/10.4158/EP-2020-0239

Iturralde, E., Chi, F. W., Grant, R. W., Weisner, C., Van Dyke, L., Pruzansky, A., Bui, S., Madvig, P., Pearl, R., & Sterling, S. A. (2019). Association of Anxiety With High-Cost Health Care Use Among Individuals With Type 2 Diabetes. *Diabetes Care*, *42*(9), 1669–1674. https://doi.org/10.2337/dc18-1553

Jackson, J. M., DeFor, T. A., Crain, A. L., Kerby, T., Strayer, L., Lewis, C. E., Whitlock, E., Williams, S., Bonds, D. E., Vitolins, M. Z., Rodabough, R. J., & Margolis, K. L. (2013). Self-reported diabetes is a valid outcome in pragmatic clinical trials and observational studies. *Journal of Clinical Epidemiology*, *66*(3), 349–350. https://doi.org/10.1016/j.jclinepi.2012.01.013

Jeung, H., & Herpertz, S. C. (2014). Impairments of Interpersonal Functioning: Empathy and Intimacy in Borderline Personality Disorder. *Psychopathology*, *47*(4), 220–234. https://doi.org/10.1159/000357191

Jiang, L., Atasoy, S., Johar, H., Herder, C., Peters, A., Kruse, J., & Ladwig, K. -H. (2020). Anxiety boosts progression of prediabetes to type 2 diabetes: Findings from the prospective Cooperative Health Research in the Region of Augsburg F4 and FF4 studies. *Diabetic Medicine*, dme.14232. https://doi.org/10.1111/dme.14232

Kalmakis, K. A., & Chandler, G. E. (2014). Adverse childhood experiences: Towards a clear conceptual meaning. *Journal of Advanced Nursing*, *70*(7), 1489–1501. https://doi.org/10.1111/jan.12329

Kampling, H., Köhler, B., Germerott, I., Haastert, B., Icks, A., Kulzer, B., Nowotny, B., Hermanns, N., & Kruse, J. (2022). An integrated psychosomatic treatment program for people with diabetes (psy-PAD). *Deutsches Ärzteblatt International*. https://doi.org/10.3238/arztebl.m2022.0094

Kampling, H., & Kruse, J. (2020). Diabetes und depressive Störungen. *Diabetologie und Stoffwechsel*, *15*(03), 211–224. https://doi.org/10.1055/a-0983-7416

Kampling, H., Kruse, J., Lampe, A., Nolte, T., Hettich, N., Brähler, E., Sachser, C., Fegert, J. M., Gingelmaier, S., Fonagy, P., Krakau, L., Zara, S., & Riedl, D. (2022). Epistemic trust and personality functioning mediate the association between adverse childhood experiences and posttraumatic stress disorder and complex posttraumatic stress disorder in adulthood. *Frontiers in Psychiatry*, *13*, 919191. https://doi.org/10.3389/fpsyt.2022.919191

Kampling, H., Petrak, F., Farin, E., Kulzer, B., Herpertz, S., & Mittag, O. (2017). Trajectories of depression in adults with newly diagnosed type 1 diabetes: Results from the German Multicenter Diabetes Cohort Study. *Diabetologia*, *60*(1), 60–68. https://doi.org/10.1007/s00125-016-4123-0

Kampling, H., Riedl, D., Lampe, A., Nolte, T., Brähler, E., Ernst, M., Fegert, J. M., Geisel, T., Hettich-Damm, N., Jud, A., Zara, S., & Kruse, J. (2024). Somatic symptom disorder and the role of epistemic trust, personality functioning and child abuse: Results from a population-based representative German sample. *Journal of Affective Disorders*, S0165032724020846. https://doi.org/10.1016/j.jad.2024.12.096

Kerber, A., Gewehr, E., Zimmermann, J., Sachser, C., M Fegert, J., Knaevelsrud, C., & Spitzer, C. (2023). Adverse childhood experiences and personality functioning interact substantially in predicting depression, anxiety, and somatization. *Personality and Mental Health*, *17*(3), 246–258. https://doi.org/10.1002/pmh.1578

Kernberg, O. F. (1970). A psychoanalytic classification of character pathology. *Journal of the American Psychoanalytic Association*, *18*(4), 800–822. https://doi.org/10.1177/000306517001800403

Kershaw, K. A., Storer, B., Braund, T., Chakouch, C., Coleshill, M., Haffar, S., Harvey, S., Newby, J., Sicouri, G., & Murphy, M. (2023). The prevalence of anxiety in adult endocrinology outpatients: A systematic review and meta–analysis. *Psychoneuroendocrinology*, *158*, 106357. https://doi.org/10.1016/j.psyneuen.2023.106357

Khaledi, M., Haghighatdoost, F., Feizi, A., & Aminorroaya, A. (2019). The prevalence of comorbid depression in patients with type 2 diabetes: An updated systematic review and meta-analysis on huge number of observational studies. *Acta Diabetologica*, *56*(6), 631–650. https://doi.org/10.1007/s00592-019-01295-9

Kim, S., Kim, G., Cho, S. H., Oh, R., Kim, J. Y., Lee, Y.-B., Jin, S.-M., Hur, K. Y., & Kim, J. H. (2024). Increased risk of incident mental disorders in adults with new-onset type 1 diabetes diagnosed after the age of 19: A nationwide cohort study. *Diabetes & Metabolism*, *50*(1), 101505. https://doi.org/10.1016/j.diabet.2023.101505

Klein, E. M., Benecke, C., Kasinger, C., Brähler, E., Ehrenthal, J. C., Strauß, B., & Ernst, M. (2022). Eating disorder psychopathology: The role of attachment anxiety, attachment avoidance, and personality functioning. *Journal of Psychosomatic Research*, *160*, 110975. https://doi.org/10.1016/j.jpsychores.2022.110975

Klinger-König, J., Berger, K., & Grabe, H. J. (2023). Childhood Trauma and Somatic and Mental Illness in Adulthood—Findings of the NAKO Health Study. *Deutsches Arzteblatt International*, *Forthcoming*, arztebl.m2023.0225. https://doi.org/10.3238/arztebl.m2023.0225

Klinger-König, J., Erhardt, A., Streit, F., Völker, M. P., Schulze, M. B., Keil, T., Fricke, J., Castell, S., Klett-Tammen, C. J., Pischon, T., Karch, A., Teismann, H., Michels, K. B., Greiser, K. H., Becher, H., Karrasch, S., Ahrens, W., Meinke-Franze, C., Schipf, S., … Grabe, H. J. (2024). Childhood trauma and somatic and mental illness in adulthood—Findings of the NAKO health study. *Deutsches Ärzteblatt International*. https://doi.org/10.3238/arztebl.m2023.0225

König, H., Rommel, A., Baumert, J., Schmidt, C., König, H.-H., Brettschneider, C., & Konnopka, A. (2021). Excess costs of type 2 diabetes and their sociodemographic and clinical determinants: A cross-sectional study using data from the German Health Interview and Examination Survey for Adults (DEGS1). *BMJ Open*, *11*(4), e043944. https://doi.org/10.1136/bmjopen-2020-043944

Krakau, L., Tibubos, A. N., Beutel, M. E., Ehrenthal, J. C., Gieler, U., & Brähler, E. (2021). Personality functioning as a mediator of adult mental health following child maltreatment. *Journal of Affective Disorders*, *291*, 126–134. https://doi.org/10.1016/j.jad.2021.05.006

Kraus, B., Dammann, G., Rudaz, M., Sammet, I., Jeggle, D., & Grimmer, B. (2021). Changes in the level of personality functioning in inpatient psychotherapy. *Psychotherapy Research*, *31*(1), 117–131. https://doi.org/10.1080/10503307.2020.1763493

Kruse, J., Zara, S., & Kampling, H. (2024). Diabetes und depressive Störungen. *Ärztliche Psychotherapie*, *19*(1), 17–21.

Landgraf, R., Aberle, J., Birkenfeld, A. L., Gallwitz, B., Kellerer, M., Klein, H. H., Müller-Wieland, D., Nauck, M. A., Wiesner, T., & Siegel, E. (2023). Therapie des Typ-2-Diabetes. *Diabetologie und Stoffwechsel*, *18*(S 02), S162–S217. https://doi.org/10.1055/a-2076-0024

Lavi, I., Katz, L. F., Ozer, E. J., & Gross, J. J. (2019). Emotion Reactivity and Regulation in Maltreated Children: A Meta-Analysis. *Child Development*, *90*(5), 1503–1524. https://doi.org/10.1111/cdev.13272

Lee, H.-Y., Hahm, M.-I., & Lee, S. G. (2014). Risk of suicidal ideation in diabetes varies by diabetes regimen, diabetes duration, and HbA1c level. *Journal of Psychosomatic Research*, *76*(4), 275–279. https://doi.org/10.1016/j.jpsychores.2014.02.003

Li, D'Arcy, C., & Meng, X. (2016). Maltreatment in childhood substantially increases the risk of adult depression and anxiety in prospective cohort studies: Systematic review, meta-analysis, and proportional attributable fractions. *Psychological Medicine*, *46*(4), 717–730. https://doi.org/10.1017/S0033291715002743

Lin, X., Xu, Y., Pan, X., Xu, J., Ding, Y., Sun, X., Song, X., Ren, Y., & Shan, P.-F. (2020). Global, regional, and national burden and trend of diabetes in 195 countries and territories: An analysis from 1990 to 2025. *Scientific Reports*, *10*(1), 14790. https://doi.org/10.1038/s41598-020-71908-9

Liu, J., Gao, S., & Zhang, L. (2022). *Effects of Physical Exercises on Emotion Regulation: A Meta-Analysis*. https://doi.org/10.1101/2022.07.04.22277120

Liu, X., Haagsma, J., Sijbrands, E., Buijks, H., Boogaard, L., Mackenbach, J. P., Erasmus, V., & Polinder, S. (2020). Anxiety and depression in diabetes care: Longitudinal associations with health-related quality of life. *Scientific Reports*, *10*(1), 8307. https://doi.org/10.1038/s41598-020-57647-x

Liu, Y., Huang, S.-Y., Liu, D.-L., Zeng, X.-X., Pan, X.-R., & Peng, J. (2024). Bidirectional relationship between diabetes mellitus and depression: Mechanisms and epidemiology. *World Journal of Psychiatry*, *14*(10), 1429–1436. https://doi.org/10.5498/wjp.v14.i10.1429

Live Life: An Implementation Guide for Suicide Prevention in Countries (1st ed). (2021). World Health Organization.

Löfman, S., Hakko, H., Mainio, A., Timonen, M., & Räsänen, P. (2012). Characteristics of suicide among diabetes patients: A population based study of suicide victims in Northern Finland. *Journal of Psychosomatic Research*, *73*(4), 268–271. https://doi.org/10.1016/j.jpsychores.2012.08.002

Louie, J. Z., Shiffman, D., Rowland, C. M., Kenyon, N. S., Bernal-Mizrachi, E., McPhaul, M. J., & Garg, R. (2024). Predictors of lack of glycemic control in persons with type 2 diabetes. *Clinical Diabetes and Endocrinology*, *10*(1), 2. https://doi.org/10.1186/s40842-023-00160-7

Lukaschek, K., Baumert, J., Kruse, J., Emeny, R. T., Lacruz, M. E., Huth, C., Thorand, B., Holle, R., Rathmann, W., Meisinger, C., & Ladwig, K.-H. (2013). Relationship between posttraumatic stress disorder and Type 2 Diabetes in a population-based cross-sectional study with 2970 participants. *Journal of Psychosomatic Research*, *74*(4), 340–345. https://doi.org/10.1016/j.jpsychores.2012.12.011

Lutz, J., Morton, K., Turiano, N. A., & Fiske, A. (2016). Health Conditions and Passive Suicidal Ideation in the Survey of Health, Ageing, and Retirement in Europe. *The Journals of Gerontology Series B: Psychological Sciences and Social Sciences*, *71*(5), 936–946. https://doi.org/10.1093/geronb/gbw019

Luyten, P., Campbell, C., Allison, E., & Fonagy, P. (2020). The Mentalizing Approach to Psychopathology: State of the Art and Future Directions. *Annual Review of Clinical Psychology*, *16*(1), 297–325. https://doi.org/10.1146/annurev-clinpsy-071919-015355

Maercker, A., Bernays, F., Rohner, S. L., & Thoma, M. V. (2021). A cascade model of complex posttraumatic stress disorder centered on childhood trauma and maltreatment, attachment, and socio-interpersonal factors. *Journal of Traumatic Stress*, *35*, 446–460. https://doi.org/10.1002/jts.22756

Mascaro, O., & Sperber, D. (2009). The moral, epistemic, and mindreading components of children's vigilance towards deception. *Cognition*, *112*(3), 367–380. https://doi.org/10.1016/j.cognition.2009.05.012

Matlock, K. A., Yayah Jones, N.-H., Corathers, S. D., & Kichler, J. C. (2017). Clinical and Psychosocial Factors Associated With Suicidal Ideation in Adolescents With Type 1 Diabetes. *Journal of Adolescent Health*, *61*(4), 471–477. https://doi.org/10.1016/j.jadohealth.2017.05.004

Matthews, T., Danese, A., Caspi, A., Fisher, H. L., Goldman-Mellor, S., Kepa, A., Moffitt, T. E., Odgers, C. L., & Arseneault, L. (2019). Lonely young adults in modern Britain: Findings from an epidemiological cohort study. *Psychological Medicine*, *49*(2), 268–277. https://doi.org/10.1017/S0033291718000788

McGrath, N., O Neill, K., McHugh, S. M., Toomey, E., & Kearney, P. M. (2021). Epidemiology of undiagnosed depression in people with diabetes mellitus: A comparative analysis of Ireland, England and the USA. *BMJ Open*, *11*(10), e049155. https://doi.org/10.1136/bmjopen-2021-049155

Mersha, A. G., Tollosa, D. N., Bagade, T., & Eftekhari, P. (2022). A bidirectional relationship between diabetes mellitus and anxiety: A systematic review and meta-analysis. *Journal of Psychosomatic Research*, *162*, 110991. https://doi.org/10.1016/j.jpsychores.2022.110991

Messman-Moore, T. L., & Bhuptani, P. H. (2017). A review of the long-term impact of child maltreatment on posttraumatic stress disorder and its comorbidities: An emotion dysregulation perspective. *Clinical Psychology: Science and Practice*, *24*(2), 154–169. https://doi.org/10.1111/cpsp.12193

Miller, Mahajan, H. D., Costacou, T., Sekikawa, A., Anderson, S. J., & Orchard, T. J. (2016). A Contemporary Estimate of Total Mortality and Cardiovascular Disease Risk in Young Adults With Type 1 Diabetes: The Pittsburgh Epidemiology of Diabetes Complications Study. *Diabetes Care*, *39*(12), 2296–2303. https://doi.org/10.2337/dc16-1162

Morina, N., Kip, A., Hoppen, T. H., Priebe, S., & Meyer, T. (2021). Potential impact of physical distancing on physical and mental health: A rapid narrative umbrella review of meta-analyses on the link between social connection and health. *BMJ Open*, *11*(3), e042335. https://doi.org/10.1136/bmjopen-2020-042335

Nolte, T. (2024). Epistemisches Vertrauen und therapeutische Beziehung. *Die Psychotherapie*, *69*(3), 201–214. https://doi.org/10.1007/s00278-024-00722-9

Norman, R. E., Byambaa, M., De, R., Butchart, A., Scott, J., & Vos, T. (2012). The Long-Term Health Consequences of Child Physical Abuse, Emotional Abuse, and Neglect: A Systematic Review and Meta-Analysis. *PLoS Medicine*, *9*(11), e1001349. https://doi.org/10.1371/journal.pmed.1001349

Norris, J. M., Johnson, R. K., & Stene, L. C. (2020). Type 1 diabetes—Early life origins and changing epidemiology. *The Lancet Diabetes & Endocrinology*, *8*(3), 226–238. https://doi.org/10.1016/S2213-8587(19)30412-7

Nouwen, A., Adriaanse, M. C., Van Dam, K., Iversen, M. M., Viechtbauer, W., Peyrot, M., Caramlau, I., Kokoszka, A., Kanc, K., De Groot, M., Nefs, G., Pouwer, F., & the European Depression in Diabetes (EDID) Research Consortium. (2019). Longitudinal associations between depression and diabetes complications: A systematic review and meta-analysis. *Diabetic Medicine*, *36*(12), 1562–1572. https://doi.org/10.1111/dme.14054

Nübel, J., Truthmann, J., Heidemann, C., Du, Y., Paprott, R., Hapke, U., Kruse, J., Scheidt-Nave, C., & Baumert, J. (2022). Sex-specific impact of major depressive disorder on 12-year change in glycaemic status: Results from a nationwide cohort study of adults without diabetes in Germany. *Diabetic Medicine*, *39*(3), e14767. https://doi.org/10.1111/dme.14767

Office for National Statistics (ONS). (2024). *Risk factors for pre-diabetes and undiagnosed type 2 diabetes in England: 2013 to 2019*.

Ong, K. L., Stafford, L. K., McLaughlin, S. A., Boyko, E. J., Vollset, S. E., Smith, A. E., Dalton, B. E., Duprey, J., Cruz, J. A., Hagins, H., Lindstedt, P. A., Aali, A., Abate, Y. H., Abate, M. D., Abbasian, M., Abbasi-Kangevari, Z., Abbasi-Kangevari, M., Abd ElHafeez, S., Abd-Rabu, R., … Vos, T. (2023). Global, regional, and national burden of diabetes from 1990 to 2021, with projections of prevalence to 2050: A systematic analysis for the Global Burden of Disease Study 2021. *The Lancet*, *402*(10397), 203–234. https://doi.org/10.1016/S0140-6736(23)01301-6

OPD Task Force (Ed.). (2008). *Operationalized psychodynamic diagnostics OPD-2: Manual of diagnosis and treatment planning*. Hogrefe.

Otten, D., Schalinski, I., Fegert, J. M., Jud, A., Brähler, E., Bürgin, D., & Clemens, V. (2025). Child Maltreatment Characteristics and Adult Physical Multimorbidity in Germany. *JAMA Network Open*, *8*(1), e2456050. https://doi.org/10.1001/jamanetworkopen.2024.56050

Parker, E. D., Lin, J., Mahoney, T., Ume, N., Yang, G., Gabbay, R. A., ElSayed, N. A., & Bannuru, R. R. (2024). Economic Costs of Diabetes in the U.S. in 2022. *Diabetes Care*, *47*(1), 26–43. https://doi.org/10.2337/dci23-0085

Petitte, T., Mallow, J., Barnes, E., Petrone, A., Barr, T., & Theeke, L. (2015). A Systematic Review of Loneliness and Common Chronic Physical Conditions in Adults. *The Open Psychology Journal*, *8*(1), 113–132. https://doi.org/10.2174/1874350101508010113

Polonsky, W. H., Anderson, B. J., Lohrer, P. A., Welch, G., Jacobson, A. M., Aponte, J. E., & Schwartz, C. E. (1995). Assessment of Diabetes-Related Distress. *Diabetes Care*, *18*(6), 754–760. https://doi.org/10.2337/diacare.18.6.754

Polonsky, W. H., Fisher, L., Earles, J., Dudl, R. J., Lees, J., Mullan, J., & Jackson, R. A. (2005). Assessing Psychosocial Distress in Diabetes: Development of the Diabetes Distress Scale. *Diabetes Care*, *28*(3), 626–631. https://doi.org/10.2337/diacare.28.3.626

Renaud-Charest, O., Stoljar Gold, A., Mok, E., Kichler, J., Nakhla, M., & Li, P. (2024). Suicidal Ideation, Suicide Attempts, and Suicide Deaths in Adolescents and Young Adults With Type 1 Diabetes: A Systematic Review and Meta-analysis. *Diabetes Care*, *47*(7), 1227–1237. https://doi.org/10.2337/dc24-0411

Riedl, D., Rothmund, M. S., Grote, V., Fischer, M. J., Kampling, H., Kruse, J., Nolte, T., Labek, K., & Lampe, A. (2023). Mentalizing and epistemic trust as critical success factors in psychosomatic rehabilitation: Results of a single center longitudinal observational study. *Frontiers in Psychiatry*, *14*, 1150422. https://doi.org/10.3389/fpsyt.2023.1150422

Röckl, S., Brinks, R., Baumert, J., Paprott, R., Du, Y., Heidemann, C., & Scheidt-Nave, C. (2017). All-cause mortality in adults with and without type 2 diabetes: Findings from the national health monitoring in Germany. *BMJ Open Diabetes Research & Care*, *5*(1), e000451. https://doi.org/10.1136/bmjdrc-2017-000451

Rogers, A. H., Bakhshaie, J., Viana, A. G., Manning, K., Mayorga, N. A., Garey, L., Raines, A. M., Schmidt, N. B., & Zvolensky, M. J. (2018). Emotion dysregulation and smoking among treatment-seeking smokers. *Addictive Behaviors*, *79*, 124–130. https://doi.org/10.1016/j.addbeh.2017.12.025

Rosenkilde, S., Hoffmann, S. H., Thorsted, A. B., Horsbøl, T. A., Madsen, K. R., Lehn, S. F., Kofoed-Enevoldsen, A., Iversen, P. B., Grønkjær, M. S., & Thygesen, L. C. (2024). Loneliness and the risk of type 2 diabetes. *BMJ Open Diabetes Research & Care*, *12*(2), e003934. https://doi.org/10.1136/bmjdrc-2023-003934

Rotella, F., Cresci, B., Monami, M., Aletti, V., Andreoli, V., Ambrosio, M. L., Ricca, V., Dicembrini, I., & Mannucci, E. (2012). Are psychopathological features relevant predictors of glucose control in patients with type 2 diabetes? A prospective study. *Acta Diabetologica*, *49*(S1), 179–184. https://doi.org/10.1007/s00592-012-0403-4

Sanatkar, S., Baldwin, P., Clarke, J., Fletcher, S., Gunn, J., Wilhelm, K., Campbell, L., Zwar, N., Harris, M., Lapsley, H., Hadzi-Pavlovic, D., Christensen, H., & Proudfoot, J. (2020). The influence of personality on trajectories of distress, health and functioning in mild-to-moderately depressed adults with type 2 diabetes. *Psychology, Health & Medicine*, *25*(3), 296–308. https://doi.org/10.1080/13548506.2019.1668567

Santos, S., Pentzek, M., Altiner, A., Daubmann, A., Drewelow, E., Helbig, C., Löffler, C., Löscher, S., Wegscheider, K., Abholz, H.-H., Wilm, S., & Wollny, A. (2023). HbA1c as a shared treatment goal in type 2 diabetes? A secondary analysis of the DEBATE trial. *BMC Primary Care*, *24*(1), 115. https://doi.org/10.1186/s12875-023-02067-9

Scherm, M. G., Achenbach, P., & Daniel, C. (2024). *Deutscher Gesundheitsbericht Diabetes 2024: Die Bestandsaufnahme.*

Schmidt, C., Reitzle, L., Paprott, R., Bätzing, J., & Holstiege, J. (2021). *Diabetes mellitus und Komorbiditäten – Querschnittsstudie mit Kontrollgruppe anhand vertragsärztlicher Abrechnungsdaten*. https://doi.org/10.25646/8326

Schmitt, A., Bendig, E., Baumeister, H., Hermanns, N., & Kulzer, B. (2021). Associations of depression and diabetes distress with self-management behavior and glycemic control. *Health Psychology*, *40*(2), 113–124. https://doi.org/10.1037/hea0001037

Schnabel, K., Schulz, S. M., & Witthöft, M. (2022). Emotional Reactivity, Emotion Regulation, and Regulatory Choice in Somatic Symptom Disorder. *Psychosomatic Medicine*, *Publish Ahead of Print*. https://doi.org/10.1097/PSY.0000000000001118

Schüssler-Fiorenza Rose, S. M., Snyder, M. P., & Slavich, G. M. (2022). Adverse childhood experiences, diabetes and associated conditions, preventive care practices and health care access: A population-based study. *Preventive Medicine*, *160*, 107044. https://doi.org/10.1016/j.ypmed.2022.107044

Seidel-Jacobs, E., Tönnies, T., & Rathmann, W. (2025). Diabetes: Epidemiologie, Ursachen und Prävention. In *Deutscher Gesundheitsbericht Diabetes 2025. Die Bestandsaufnahme.* (pp. 8–11). MedTriX GmbH.

Sethi, D., Yon, Y., Parekh, N., Anderson, T., Huber, J., Rakovac, & Meinck. (2018). *European status report on preventing child maltreatment*. World Health Organization Regional Office for Europe, Denmark. http://www.euro.who.int/__data/assets/pdf_file/0017/381140/wh12-ecm-rep-eng.pdf

Shields, M. E., Hovdestad, W. E., Pelletier, C., Dykxhoorn, J. L., O'Donnell, S. C., & Tonmyr, L. (2016). Childhood maltreatment as a risk factor for diabetes: Findings from a population-based survey of Canadian adults. *BMC Public Health*, *16*(1), 879. https://doi.org/10.1186/s12889-016-3491-1

Shriver, L. H., Dollar, J. M., Calkins, S. D., Keane, S. P., Shanahan, L., & Wideman, L. (2020). Emotional Eating in Adolescence: Effects of Emotion Regulation, Weight Status and Negative Body Image. *Nutrients*, *13*(1), 79. https://doi.org/10.3390/nu13010079

Šimunović Filipčić, I., Jakšić, N., Levaj, S., Ćopo, M., Vuksan-Ćusa, Z., Mikulić, F. L., Grah, M., Skočić Hanžek, M., Šagud, M., Filipčić, I., & Marčinko, D. (2024). Physical multimorbidity in psychiatric patients with personality disorders: Insights within the ICD-11 framework. *General Hospital Psychiatry*, *89*, 16–22. https://doi.org/10.1016/j.genhosppsych.2024.04.013

Smith, K. J., Béland, M., Clyde, M., Gariépy, G., Pagé, V., Badawi, G., Rabasa-Lhoret, R., & Schmitz, N. (2013). Association of diabetes with anxiety: A systematic review and meta-analysis. *Journal of Psychosomatic Research*, *74*(2), 89–99. https://doi.org/10.1016/j.jpsychores.2012.11.013

Smith, K. J., Deschênes, S. S., & Schmitz, N. (2018). Investigating the longitudinal association between diabetes and anxiety: A systematic review and meta-analysis. *Diabetic Medicine*, *35*(6), 677–693. https://doi.org/10.1111/dme.13606

Smith-Palmer, J., Bae, J. P., Boye, K. S., Norrbacka, K., Hunt, B., & Valentine, W. J. (2016). Evaluating health-related quality of life in type 1 diabetes: A systematic literature review of utilities for adults with type 1 diabetes. *ClinicoEconomics and Outcomes Research: CEOR*, *8*, 559–571. https://doi.org/10.2147/CEOR.S114699

Snoek, F. J., Bremmer, M. A., & Hermanns, N. (2015). Constructs of depression and distress in diabetes: Time for an appraisal. *The Lancet Diabetes & Endocrinology*, *3*(6), 450–460. https://doi.org/10.1016/S2213-8587(15)00135-7

Solmi, M., Veronese, N., Galvano, D., Favaro, A., Ostinelli, E. G., Noventa, V., Favaretto, E., Tudor, F., Finessi, M., Shin, J. I., Smith, L., Koyanagi, A., Cester, A., Bolzetta, F., Cotroneo, A., Maggi, S., Demurtas, J., De Leo, D., & Trabucchi, M. (2020). Factors Associated With Loneliness: An Umbrella Review Of Observational Studies. *Journal of Affective Disorders*, *271*, 131–138. https://doi.org/10.1016/j.jad.2020.03.075

Sommer, J., Borgmann, S. O., Gontscharuk, V., Zaharia, O. P., Maalmi, H., Herder, C., Wagner, R., Strassburger, K., Schön, M., Burkart, V., Szendroedi, J., Pfeiffer, A. F. H., Bornstein, S., Blüher, M., Seissler, J., Birkenfeld, A. L., Meyhöfer, S., Roden, M., Icks, A., … Wagner, R. (2024). Depression symptoms, wellbeing, health-related quality of life, and diabetes-related distress in novel subtypes of recent-onset diabetes in Germany: A 5-year observational follow-up study. *The Lancet Diabetes & Endocrinology*, S2213858724002341. https://doi.org/10.1016/S2213-8587(24)00234-1

Sommer, J., Linnenkamp, U., Gontscharuk, V., Andrich, S., Brüne, M., Schmitz-Losem, I., Kruse, J., Evers, S. M. A. A., Hiligsmann, M., Hoffmann, B., & Icks, A. (2024). Prospective health care costs and lost work days associated with diabetes-related distress and depression symptoms among 1488 individuals with diabetes. *Scientific Reports*, *14*(1), 3621. https://doi.org/10.1038/s41598-024-52361-4

Song, Y., Zhu, C., Shi, B., Song, C., Cui, K., Chang, Z., Gao, G., Jia, L., Fu, R., Dong, Q., Feng, L., Zhu, C., Yin, D., Manson, J. E., & Dou, K. (2023). Social isolation, loneliness, and incident type 2 diabetes mellitus: Results from two large prospective cohorts in Europe and East Asia and Mendelian randomization. *eClinicalMedicine*, *64*, 102236. https://doi.org/10.1016/j.eclinm.2023.102236

Spek, V., Nefs, G., Mommersteeg, P. M. C., Speight, J., Pouwer, F., & Denollet, J. (2018). Type D personality and social relations in adults with diabetes: Results from diabetes MILES – The Netherlands. *Psychology & Health*, *33*(12), 1456–1471. https://doi.org/10.1080/08870446.2018.1508684

Spijker, J., De Graaf, R., Bijl, R. V., Beekman, A. T. F., Ormel, J., & Nolen, W. A. (2002). Duration of major depressive episodes in the general population: Results from the Netherlands Mental Health Survey and Incidence Study (NEMESIS). *British Journal of Psychiatry*, *181*(3), 208–213. https://doi.org/10.1192/bjp.181.3.208

Spitzer, C., Göbel, P., Wilfer, T., & Mestel, R. (2022). Persönlichkeitsstruktur und körperliche Gesundheit. *Zeitschrift für Psychosomatische Medizin und Psychotherapie*, *68*(3), 238–249. https://doi.org/10.13109/zptm.2022.68.3.238

Statistisches Bundesamt. (2023). *Suizide*. https://www.destatis.de/DE/Themen/Gesellschaft-Umwelt/Gesundheit/Todesursachen/Tabellen/suizide.html?

Statistisches Bundesamt. (2024). *Pressemitteilung Nr. 261 vom 5. Juli 2024*. https://www.destatis.de/DE/Presse/Pressemitteilungen/2024/07/PD24_261_46241.html?

Świątoniowska-Lonc, N., Tański, W., Polański, J., Jankowska-Polańska, B., & Mazur, G. (2021). Psychosocial Determinants of Treatment Adherence in Patients with Type 2 Diabetes—A Review. *Diabetes, Metabolic Syndrome and Obesity: Targets and Therapy*, *14*, 2701–2715. https://doi.org/10.2147/DMSO.S308322

Tabb, K. M., Perez-Flores, N., Wang, Y., & Huang, H. (2017). The burden of suicidal ideation among persons with type II diabetes: A scoping review. *Journal of Psychosomatic Research*, *103*, 113–118. https://doi.org/10.1016/j.jpsychores.2017.10.009

Teismann, T., Forkmann, T., Glaesmer, H., Alpers, G. W., Brakemeier, E. L., Brockmeyer, T., Christiansen, H., Fehm, L., Glombiewski, J., Heider, J., Hermann, A., Hoyer, J., Kaiser, T., Klucken, T., Lincoln, T. M., Lutz, W., Margraf, J., Pedersen, A., Renneberg, B., … In-Albon, T. (2024). Prevalence of suicidal ideation in German psychotherapy outpatients: A large multicenter assessment. *Journal of Affective Disorders*, *351*, 971–976. https://doi.org/10.1016/j.jad.2024.02.019

Tönnies, T., Röckl, S., Hoyer, A., Heidemann, C., Baumert, J., Du, Y., Scheidt-Nave, C., & Brinks, R. (2019). Projected number of people with diagnosed Type 2 diabetes in Germany in 2040. *Diabetic Medicine*, *36*(10), 1217–1225. https://doi.org/10.1111/dme.13902

Tsenkova, V., Boylan, J. M., & Ryff, C. (2013). Stress eating and health. Findings from MIDUS, a national study of US adults. *Appetite*, *69*, 151–155. https://doi.org/10.1016/j.appet.2013.05.020

Twig, G., Afek, A., Derazne, E., Tzur, D., Cukierman-Yaffe, T., Gerstein, H. C., & Tirosh, A. (2014). Diabetes Risk Among Overweight and Obese Metabolically Healthy Young Adults. *Diabetes Care*, *37*(11), 2989–2995. https://doi.org/10.2337/dc14-0869

Tyrer, P., Mulder, R., Kim, Y.-R., & Crawford, M. J. (2019). The Development of the ICD-11 Classification of Personality Disorders: An Amalgam of Science, Pragmatism, and Politics. *Annual Review of Clinical Psychology*, *15*(1), 481–502. https://doi.org/10.1146/annurev-clinpsy-050718-095736

Van Der Feltz-Cornelis, C., Allen, S. F., Holt, R. I. G., Roberts, R., Nouwen, A., & Sartorius, N. (2021). Treatment for comorbid depressive disorder or subthreshold depression in diabetes mellitus: Systematic review and meta-analysis. *Brain and Behavior*, *11*(2), e01981. https://doi.org/10.1002/brb3.1981

Venables, M. C., & Jeukendrup, A. E. (2009). Physical inactivity and obesity: Links with insulin resistance and type 2 diabetes mellitus. *Diabetes/Metabolism Research and Reviews*, *25*(S1), S18–S23. https://doi.org/10.1002/dmrr.983

Vidal-Arenas, V., Bravo, A. J., Ortet-Walker, J., Ortet, G., Mezquita, L., Ibáñez, M. I., & Cross-Cultural Addictions Study Team, null. (2022). Neuroticism, rumination, depression and suicidal ideation: A moderated serial mediation model across four countries. *International Journal of Clinical and Health Psychology: IJCHP*, *22*(3), 100325. https://doi.org/10.1016/j.ijchp.2022.100325

Voeltz, D., Vetterer, M., Seidel-Jacobs, E., Brinks, R., Tönnies, T., & Hoyer, A. (2024). Projecting the economic burden of type 1 and type 2 diabetes mellitus in Germany from 2010 until 2040. *Population Health Metrics*, *22*(1), 17. https://doi.org/10.1186/s12963-024-00337-x

Vos, T., Lim, S. S., Abbafati, C., Abbas, K. M., Abbasi, M., Abbasifard, M., Abbasi-Kangevari, M., Abbastabar, H., Abd-Allah, F., Abdelalim, A., Abdollahi, M., Abdollahpour, I., Abolhassani, H., Aboyans, V., Abrams, E. M., Abreu, L. G., Abrigo, M. R. M., Abu-Raddad, L. J., Abushouk, A. I., … Murray, C. J. L. (2020). Global burden of 369 diseases and injuries in 204 countries and territories, 1990–2019: A systematic analysis for the Global Burden of Disease Study 2019. *The Lancet*, *396*(10258), 1204–1222. https://doi.org/10.1016/S0140-6736(20)30925-9

Wang, B., An, X., Shi, X., & Zhang, J.-A. (2017). Management of Endocrine Disease: Suicide risk in patients with diabetes: a systematic review and meta-analysis. *European Journal of Endocrinology*, *177*(4), R169–R181. https://doi.org/10.1530/EJE-16-0952

Wang, F., Wang, S., Zong, Q. -Q., Zhang, Q., Ng, C. H., Ungvari, G. S., & Xiang, Y. -T. (2019). Prevalence of comorbid major depressive disorder in Type 2 diabetes: A meta-analysis of comparative and epidemiological studies. *Diabetic Medicine*, *36*(8), 961–969. https://doi.org/10.1111/dme.14042

Wang, X., Ma, H., Li, X., Heianza, Y., Fonseca, V., & Qi, L. (2023). Joint association of loneliness and traditional risk factor control and incident cardiovascular disease in diabetes patients. *European Heart Journal*, *44*(28), 2583–2591. https://doi.org/10.1093/eurheartj/ehad306

Watanabe, M., Reynolds, E. L., Banerjee, M., Charles, M., Mizokami-Stout, K., Albright, D., Ang, L., Lee, J. M., Pop-Busui, R., Feldman, E. L., & Callaghan, B. C. (2024). Bidirectional Associations Between Mental Health Disorders and Chronic Diabetic Complications in Individuals With Type 1 or Type 2 Diabetes. *Diabetes Care*, *47*(9), 1638–1646. https://doi.org/10.2337/dc24-0818

Weber, S., Jud, A., & Landolt, M. A. (2016). Quality of life in maltreated children and adult survivors of child maltreatment: A systematic review. *Quality of Life Research*, *25*(2), 237–255. https://doi.org/10.1007/s11136-015-1085-5

Welch, G. W., Jacobson, A. M., & Polonsky, W. H. (1997). The Problem Areas in Diabetes Scale: An evaluation of its clinical utility. *Diabetes Care*, *20*(5), 760–766. https://doi.org/10.2337/diacare.20.5.760

Westermair, A. L., Stoll, A. M., Greggersen, W., Kahl, K. G., Hüppe, M., & Schweiger, U. (2018). All Unhappy Childhoods Are Unhappy in Their Own Way—Differential Impact of Dimensions of Adverse Childhood Experiences on Adult Mental Health and Health Behavior. *Frontiers in Psychiatry*, *9*, 198. https://doi.org/10.3389/fpsyt.2018.00198

Whiteford, H. A., Harris, M. G., McKeon, G., Baxter, A., Pennell, C., Barendregt, J. J., & Wang, J. (2013). Estimating remission from untreated major depression: A systematic review and meta-analysis. *Psychological Medicine*, *43*(8), 1569–1585. https://doi.org/10.1017/S0033291712001717

Wicaksana, A. L., Apriliyasari, R. W., & Tsai, P.-S. (2025). Prevalence and risk factors for loneliness among individuals with diabetes: A systematic review and meta-analysis. *Systematic Reviews*, *14*(1), 96. https://doi.org/10.1186/s13643-025-02850-y

Wierenga, K. L., Lehto, R. H., & Given, B. (2017). Emotion Regulation in Chronic Disease Populations: An Integrative Review. *Research and Theory for Nursing Practice*, *31*(3), 247–271. https://doi.org/10.1891/1541-6577.31.3.247

Witt, A., Sachser, C., Plener, P. L., Brähler, E., & Fegert, J. M. (2019). The Prevalence and Consequences of Adverse Childhood Experiences in the German Population. *Deutsches Arzteblatt International*, *116*(38), 635–642. https://doi.org/10.3238/arztebl.2019.0635

Woon, L. S.-C., Sidi, H. B., Ravindran, A., Gosse, P. J., Mainland, R. L., Kaunismaa, E. S., Hatta, N. H., Arnawati, P., Zulkifli, A. Y., Mustafa, N., & Leong Bin Abdullah, M. F. I. (2020). Depression, anxiety, and associated factors in patients with diabetes: Evidence from the anxiety, depression, and personality traits in diabetes mellitus (ADAPT-DM) study. *BMC Psychiatry*, *20*(1), 227. https://doi.org/10.1186/s12888-020-02615-y

World Health Organization. (1992). *The ICD-10 classification of mental and behavioural disorders: Clinical descriptions and diagnostic guidelines* (10th ed.). World Health Organization.

World Health Organization. (2023). *Noncommunicable diseases*. https://www.who.int/news-room/fact-sheets/detail/noncommunicable-diseases

World Health Organization. (2024). *Social Isolaion and Loneliness*. Social Isolation and Loneliness (who.int)

World Health Organization. (2025). *Suicide worldwide in 2021*.

Zajec, A., Trebušak Podkrajšek, K., Tesovnik, T., Šket, R., Čugalj Kern, B., Jenko Bizjan, B., Šmigoc Schweiger, D., Battelino, T., & Kovač, J. (2022). Pathogenesis of Type 1 Diabetes: Established Facts and New Insights. *Genes*, *13*(4), 706. https://doi.org/10.3390/genes13040706

Zara, S., Brähler, E., Sachser, C., Fegert, J. M., Häuser, W., Krakau, L., Kampling, H., & Kruse, J. (2023). Associations of different types of child maltreatment and diabetes in adulthood – the mediating effect of personality functioning: Findings from a population-based representative German sample. *Annals of Epidemiology*, *78*, 47–53. https://doi.org/10.1016/j.annepidem.2022.12.004

Zara, S., Kruse, J., Brähler, E., Ernst, M., Fegert, J. M., Lampe, A., Nolte, T., Rassenhofer, M., Riedl, D., & Kampling, H. (2025). Exploring loneliness in individuals with diabetes – The role of childhood abuse and neglect, and personality functioning: Findings from a German population-based sample. *Journal of Psychosomatic Research*, *198*, 112390. https://doi.org/10.1016/j.jpsychores.2025.112390

Zara, S., Kruse, J., Brähler, E., Sachser, C., Fegert, J. M., Ladwig, K.-H., Ernst, M., & Kampling, H. (2024). Suicidal ideation in patients with diabetes and childhood abuse - The mediating role of personality functioning: Results of a German representative population-based study. *Diabetes Research and Clinical Practice*, *210*, 111635. https://doi.org/10.1016/j.diabres.2024.111635

Zara, S., Kruse, J., & Kampling, H. (2025). Access to a Newly Adapted Diabetes-Specific Multimodal Cross-Sectoral and Interdisciplinary Psychotherapeutic Care Option for a High-Risk Group of Patients With Diabetes Mellitus and Distress: Protocol for the minDBe Pilot Study. *JMIR Research Protocols*, *14*, e73199. https://doi.org/10.2196/73199

Zara, S., Kruse, J., Leveling, A. M., Schmitz, J., Hempler, I., & Kampling, H. (2022). Capturing Diabetes-Related Distress and Burden From the Perspective of Patients With Type 1 or Type 2 Diabetes: Protocol for an Explorative Mixed Methods Study. *JMIR Research Protocols*, *11*(8), e38477. https://doi.org/10.2196/38477

Zara, S., Ullrich, I. C., Leveling, A. M., Saretzki, F. G. G., Schmitz, J., Eckhard, M., Kruse, J., & Kampling, H. (2025). Diabetes-related distress and psychological burden in patients with type 1 and type 2 diabetes – the role of child maltreatment, personality functioning, and epistemic trust: Findings from a German clinical inpatient sample. *Frontiers in Psychiatry*, *16*. https://doi.org/10.3389/fpsyt.2025.1608601

Zhang, Y., Pan, X.-F., Chen, J., Xia, L., Cao, A., Zhang, Y., Wang, J., Li, H., Yang, K., Guo, K., He, M., & Pan, A. (2020). Combined lifestyle factors and risk of incident type 2 diabetes and prognosis among individuals with type 2 diabetes: A systematic review and meta-analysis of prospective cohort studies. *Diabetologia*, *63*(1), 21–33. https://doi.org/10.1007/s00125-019-04985-9

8. COMPLETE LIST OF PUBLICATIONS

No.	Publication title	Impact Factor
18	**Zara, S.**, Kruse, J. & Kampling, H. (2025). Study protocol for the minDBe pilot study: access to a newly adapted diabetes specific multimodal cross-sectoral and interdisciplinary psychotherapeutic care offer for a high-risk group of patients with diabetes mellitus and distress, JMIR Research Protocols. Doi: 10.2196/73199	1.5 (2024)
17	**Zara**, **S.**, Kruse, J., Brähler, E., Ernst, M., Fegert, J. M., Lampe, A., Nolte, T., Rassenhofer, M., Riedl, D., & Kampling, H. (2025). Exploring loneliness in individuals with diabetes – The role of childhood abuse and neglect, and personality functioning: Findings from a German population-based sample. Journal of Psychosomatic Research, 198, 112390. https://doi.org/10.1016/j.jpsychores.2025.112390	3.3 (2024)
16	**Zara, S.**, Ullrich, I.C., Leveling, A.M., Saretzki, F.G.G., Schmitz, J., Eckhard, M., Kruse, J. & Kampling, H. (2025). Diabetes-related distress and psychological burden in patients with type 1 and type 2 diabetes – the role of child maltreatment, personality functioning, and epistemic trust: findings from a German clinical inpatient sample. Frontiers in Psychiatry 16:1608601. doi: 10.3389/fpsyt.2025.1608601	3.2 (2024)
15	Klein, E. M., Kasinger, C., Ernst, M., Brähler, E., **Zara, S.**, Benecke, C., Kruse, J., & Kampling, H. (2025). Assessment of Personality Functioning Across Immigrant Groups-Measurement Invariance and Its Association with Mental Distress in a German Population-Based Sample. Journal of personality assessment, 107(5), 599–610. https://doi.org/10.1080/00223891.2025.2454021	2.8 (2024)

14	Kampling, H., Riedl, D., Lampe, A., Nolte, T., Brähler, E., Ernst, M., Fegert, J. M., Geisel, T., Hettich-Damm, N., Jud, A., **Zara, S.**, & Kruse, J. (2025). Somatic symptom disorder and the role of epistemic trust, personality functioning and child abuse: Results from a population-based representative German sample. Journal of affective disorders, 373, 429–437. https://doi.org/10.1016/j.jad.2024.12.096	4.9 (2024)
13	Kampling, H., **Zara, S.**, & Kruse, J. (2024). Somatische Belastungsstörungen und die Rolle des epistemischen Vertrauens. PiD – Psychotherapie im Dialog, 25(04): 33–36. doi: 10.1055/a-2249-8040	-
12	**Zara, S**., Kruse, J., Brähler, E., Sachser, C., Fegert, J.M., Ladwig, K.-H., Ernst, M. & Kampling, H. (2024). Suicidal ideation in patients with diabetes and childhood abuse – The mediating role of personality functioning: Results of a German representative population-based study, Diabetes Research and Clinical Practice, doi: https://doi.org/10.1016/j.diabres.2024.111635	6.1 (2023)
11	Kruse, J., **Zara, S.**, & Kampling, H. (2024). Diabetes und depressive Störungen, Ärztliche Psychotherapie, 19(1), 17-21. doi: 10.21706/aep-19-1-17	-
10	Kruse J, Kampling H, Bouami SF, Grobe TG, Hartmann M, Jedamzik J, Marschall U, Szecsenyi J, Werner S, Wild B, Zara S, Heuft G & Friederich HC. Outpatient Psychotherapy in Germany. An evaluation of the structural reform (2024). Dtsch Arztebl Int, doi: 10.3238/arztebl.m2024.0039	6.5 (2023)
9	Kampling, H., Riedl, D., Hettich, N., Lampe, A., Nolte, T., **Zara, S.**, Ernst, M., Brähler, E., Sachser, C., Fegert, J. M., Gingelmaier, S., Fonagy, P., Krakau, L., & Kruse, J. (2024). To trust or not to trust in the thrall of the COVID-19 pandemic:	5.4 (2022)

	Conspiracy endorsement and the role of adverse childhood experiences, epistemic trust, and personality functioning. Social science & medicine (1982), 341, 116526. https://doi.org/10.1016/j.socscimed.2023.116526	
8	Kruse, J., **Zara, S.**, & Kampling, H. (2023). Diabetes mellitus und Extrembelastungen in der Kindheit, Ärztliche Psychotherapie, 18(3), 171-175. doi:10.21706/aep-18-3-171	-
7	**Zara, S.**, Brähler, E., Sachser, C., Fegert, J. M., Häuser, W., Krakau, L., Kampling, H., & Kruse, J. (2023). Supplementary data analyses for the associations of child maltreatment and diabetes in adulthood and the mediating effect of personality functioning. Data in Brief, 49, 109441. doi: 10.1016/j.dib.2023.109441	1.2 (2022)
6	**Zara, S.**, Kampling, H., Friederich, H.-C., Heuft, G., Grobe, T., Marschall, U., Szecsenyi, J., Liebau, M., Schunter, J., Wild, B., Hartmann, M., Werner, S. & Kruse, J. (2024). Patienten mit Diabetes mellitus in der ambulanten psychotherapeutischen Versorgung. Psychotherapie 68, 157–164 (2023). https://doi.org/10.1007/s00278-023-00644-y	1.0 (2023)
5	**Zara, S.**, Brähler, E., Sachser, C., Fegert, J. M., Häuser, W., Krakau, L., Kampling, H., & Kruse, J. (2023). Associations of different types of child maltreatment and diabetes in adulthood - the mediating effect of personality functioning: Findings from a population-based representative German sample. Annals of Epidemiology, 78, 47–53. https://doi.org/10.1016/j.annepidem.2022.12.004	5.6 (2022)
4	**Zara, S.**, Kruse, J., Leveling, A., Schmitz, J., Hempler, I., & Kampling, H. (2022). Capturing diabetes-related distress and burden from the individual perspective of patients with type 1 or type 2 diabetes: study protocol for an explorative study	0.58 (2021)

	applying a mixed-methods design. JMIR Research Protocols, 11(8). doi: 10.2196/38477	
3	Kampling, H., Kruse, J., Lampe, A., Nolte, T., Hettich, N., Brähler, E., Sachser, C., Fegert, J. M., Gingelmaier, S., Fonagy, P., Krakau, L., **Zara, S.** & Riedl, D. (2022). Epistemic trust and personality functioning mediate the association between adverse childhood experiences and posttraumatic stress disorder and complex posttraumatic stress disorder in adulthood. Frontiers in Psychiatry 13:919191. doi: 10.3389/fpsyt.2022.919191	5.435 (2021)
2	Freier, A., Kruse, J., Schmalbach, B., **Zara, S.**, Werner, S., Brähler, E., Fegert, J.M., & Kampling, H. (2022). Supplementary Data for the Mediation Effect of Personality Functioning – Gender Differences, Separate Analyses of Depression and Anxiety Symptoms and Inferential Statistics of the Relationship between Personality Functioning and Different Types of Child Maltreatment. Data in Brief, 42, 108272. doi: 10.1016/j.dib.2022.108272	0.280 (2021)
1	Freier, A., Kruse, J., Schmalbach, B., **Zara, S.**, Werner, S., Brähler, E., Fegert, J. M., & Kampling, H. (2022). The mediation effect of personality functioning between different types of child maltreatment and the development of depression/anxiety symptoms - A German representative study. Journal of affective disorders, 299, 408–415. https://doi.org/10.1016/j.jad.2021.12.020	6.533 (2021)

9. LIST OF CONFERENCE PRESENTATIONS

Zara S, Kruse J, Brähler E, Ernst M, Fegert JM, Lampe A, Nolte T, Rassenhofer M, Riedl D & Kampling H (2025). Exploring loneliness in individuals with diabetes – the role of adverse childhood experiences, personality functioning, and epistemic trust. [Konferenzbeitrag]. Deutscher Kongress für Psychosomatische Medizin und Psychotherapie 2025, Berlin, Germany.

Zara S, Kruse J, Brähler E, Sachser C, Fegert JM, Ladwig K-H, Ernst M & Kampling H (2024). Suizidgedanken bei Patienten mit Diabetes und Erfahrungen von Missbrauch in der Kindheit - die mediierende Rolle des Strukturniveaus: Ergebnisse einer deutschen repräsentativen bevölkerungsbasierten Studie [Konferenzbeitrag]. Deutscher Kongress für Psychosomatische Medizin und Psychotherapie 2024, Berlin, Germany.

Zara S, Kampling H, Beutel ME, Brähler E, Fegert JM, Häuser W, Sachser C & Kruse J (2023). Associations of different types of child maltreatment and diabetes in adulthood – the mediating effect of personality functioning: findings from a population-based representative German sample [Konferenzbeitrag]. EAPM 2023, Berlin, Germany.

Kampling H, Liebau M, Schunter J, Werner S, **Zara S**, Kruse J & das ES-RiP-Konsortium (2022). Auswirkungen der Strukturreform in der Versorgung komplex erkrankter Patienten: Eine repräsentative Bevölkerungsbefragung [Konferenzbeitrag]. Deutscher Kongress für Psychosomatische Medizin und Psychotherapie 2022, Berlin, Germany.

Zara S, Kampling H, Beutel ME, Brähler E, Fegert JM, Häuser,W, Sachser C & Kruse J (2022). Der Zusammenhang zwischen Missbrauch und Vernachlässigung in der Kindheit und Diabetes im Erwachsenenalter – die mediierende Rolle des Strukturniveaus: Ergebnisse einer repräsentativen Bevölkerungsbefragung [Konferenzbeitrag]. Deutscher Kongress für Psychosomatische Medizin und Psychotherapie 2022, Berlin, Germany.

10. EHRENWÖRTLICHE ERKLÄRUNG

Hiermit erkläre ich, dass ich die vorliegende Arbeit selbständig und ohne unzulässige Hilfe oder Benutzung anderer als der angegebenen Hilfsmittel angefertigt habe. Alle Textstellen, die wörtlich oder sinngemäß aus veröffentlichten oder nichtveröffentlichten Schriften entnommen sind, und alle Angaben, die auf mündlichen Auskünften beruhen, sind als solche kenntlich gemacht. Bei den von mir durchgeführten und in der Dissertation erwähnten Untersuchungen habe ich die Grundsätze guter wissenschaftlicher Praxis, wie sie in der „Satzung der Justus-Liebig-Universität Gießen zur Sicherung guter wissenschaftlicher Praxis“ niedergelegt sind, eingehalten sowie ethische, datenschutzrechtliche und tierschutzrechtliche Grundsätze befolgt. Ich versichere, dass Dritte von mir weder unmittelbar noch mittelbar geldwerte Leistungen für Arbeiten erhalten haben, die im Zusammenhang mit dem Inhalt der vorgelegten Dissertation stehen, und dass die vorgelegte Arbeit weder im Inland noch im Ausland in gleicher oder ähnlicher Form einer anderen Prüfungsbehörde zum Zweck einer Promotion oder eines anderen Prüfungsverfahrens vorgelegt wurde. Alles aus anderen Quellen und von anderen Personen übernommene Material, das in der Arbeit verwendet wurde oder auf das direkt Bezug genommen wird, wurde als solches kenntlich gemacht. Insbesondere wurden alle Personen genannt, die direkt und indirekt an der Entstehung der vorliegenden Arbeit beteiligt waren. Mit der Überprüfung meiner Arbeit durch eine Plagiatserkennungssoftware bzw. ein internetbasiertes Softwareprogramm erkläre ich mich einverstanden.

_____ _____

Ort/Datum Unterschrift

11. DANKSAGUNG

Mein besonderer Dank gilt Professor Dr. med. Johannes Kruse, der mir den Weg in die Wissenschaft eröffnet und mich mit großer Verlässlichkeit, fachlicher Exzellenz und menschlicher Wärme begleitet hat. Seine inspirierende Betreuung hat diese Arbeit nicht nur möglich gemacht, sondern auch maßgeblich geprägt.

PD Dr. phil. Hanna Kampling danke ich von Herzen für ihre stetige Präsenz, ihren offenen Raum für gemeinsames Denken und ihre unvergleichliche Fähigkeit, Orientierung zu geben, wenn der Blick im Detail zu versinken drohte. Unsere Zusammenarbeit – voller Humor, komplexem Dialog und gedanklicher Freiräume – hat mich fachlich wie persönlich unendlich bereichert.

Für die wertvolle Zusammenarbeit im Projekt „Ed-iPP: Erfassung diabetesbezogener Belastungen aus der individuellen Perspektive von Patienten mit Typ 1 Diabetes oder Typ 2 Diabetes: Eine explorative Studie im Mixed-Methods-Design“ gilt mein ausgesprochener Dank Jana Schmitz, Anna Maria Leveling, Friederike Saretzki und Imogen Ullrich sowie allen teilnehmenden Patientinnen und Patienten.

Mein tief empfundener Dank gilt meinem Partner Sebastian Gräf, dessen Unterstützung, Geduld und Fürsorge mich durch Höhen und Tiefen getragen haben. Ohne ihn wäre dieser Weg kaum denkbar gewesen.

Meiner Familie danke ich für ihren anhaltenden Rückhalt und ihren unerschütterlichen Stolz, der mir über all die Jahre Kraft und Zuversicht gegeben hat.

Schließlich gilt mein Dank Dr. rer. nat. Albert Gräf, dessen Begeisterung und Vertrauen mich bestärkt haben, meinen eigenen Platz in der academia zu finden.