# A socio-ecological analysis of the mental health and adjustment of Burundian refugee children and adolescents

Zusammenfassung und Schriften der kumulativen Dissertation
zur Erlangung des Grades eines Doktors der Naturwissenschaften (Dr. rer. nat.)

vorgelegt von

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Hiermit versichere ich, dass ich die vorliegende Synopse selbstständig sowie die für den Kumulus vorliegenden Schriften als Erstautor verfasst habe. Damit trage ich die inhaltliche und methodische Verantwortung für die angeführten Schriften. Die Arbeit hat in der gegenwärtigen oder in einer anderen Fassung keiner anderen Fakultät oder Universität vorgelegen.

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Florian Scharpf

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*Abstract*

Refugee children are at an increased risk of developing mental health problems due to their exposure to potentially traumatizing experiences and stressors in their home countries, during their flight and in the new living environment after flight. Although the majority of refugee children have resettled in low-and middle-income regions where they often live in refugee camps, research has focused on the minority of refugee children living in high-income countries. However, the dire living conditions that have been reported in low-resource refugee camps may increase children`s mental health risk and/or undermine their resilience. Research with Western non-refugee samples has demonstrated the long-term detrimental consequences of mental health problems in childhood and adolescence for individuals` health and well-being. Moreover, it is widely acknowledged that children`s adjustment is shaped by multiple factors on different socio-ecological levels, i.e. related to the family, peers, school, community, society and culture. As the family constitutes the most proximal context to the individual child, it is considered to be a particularly powerful source of both risk and resilience. Although this view has begun to guide research on the mental health of refugee and other conflict-affected children, to date little is known about the factors that contribute to the mental health and adjustment of refugee youth living in refugee camps close to ongoing conflict and violence.

The objective of this research was therefore to investigate the role of potentially traumatizing experiences and other socio-ecological factors for the mental health and cognitive functioning of refugee youth living in refugee camps. A better understanding of these associations is essential for the development of targeted intervention approaches that aim at reducing and preventing these youth`s suffering and further risks for their well-being.

The research project was a collaboration between the Universities of Zurich and Bielefeld and the Dar es Salaam University College of Education. The study was conducted between January and May 2018 with Burundian refugee families living in the three refugee camps Mtendeli, Nduta and Nyarugusu in Western Tanzania. A combined systematic and random sampling approach resulted in a total sample of 230 families, each consisting of a triad of the mother or primary female caregiver, the father or primary male caregiver and the oldest child within primary school age, i.e. between 7 and 15 years. Data was collected by Tanzanian psychologists and trained Burundian research assistants from the refugee community through structured clinical interviews with each family member. Children were also administered standardized neuropsychological tests.

In order to provide a timely and comprehensive synthesis of the empirical context of the present study, a systematic review of socio-ecological factors contributing to the mental health of refugee youth was conducted. On the one hand, the findings of the systematic review supported the applicability of a socio-ecological perspective on refugee youth`s mental health by showing the contribution of multiple factors related to the individual child, the family, peers, school, community and the sociocultural context. On the other hand, the synthesis emphasized the importance of the present study by demonstrating the scarcity of ecologically informed research with refugee youth living in low- and middle-income countries, particularly in camps, and the lack of studies involving both parents.

The first manuscript investigating the Burundian refugee families revealed an overall low prevalence of current posttraumatic stress disorder (PTSD; 5.7%) as well as increased self-reported (10.9%) and parent-reported (15.9% for mothers and 11.5% for fathers) emotional and behavioral problems among youth. However, 42.6% indicated clinically significant functional impairment due to PTSD symptoms. Among mothers and fathers, one-month prevalence rates of PTSD were 32.6% and 29.1% respectively, while 87.4% of mothers and 83.9% of fathers reported heightened levels of current general psychological distress. A family-based latent class analysis yielded a pattern indicating an accumulation of PTSD symptoms and functional impairment within families: Youth who endorsed high levels of PTSD symptoms (above the median) and symptom-related functional impairment were likely to live in families with two traumatized parents. In contrast, youth were unlikely to report high levels of PTSD symptoms and functional impairment when only one of their parents or neither parent did so. Youth`s rater low exposure to severe interpersonal violence as well as the fact that most of them had fled and all were currently living together with both caregivers may partly explain the low observed prevalence rates of severe mental health problems that are substantially lower than the ones generally reported among refugee youth in high-income countries and similar camp settings. Although these findings suggest that the vast majority of Burundian refugee children are quite resilient, the increased levels of PTSD and general distress among their parents may signal an ongoing risk for their well-being in their proximal environment. In terms of practical implications, the results imply that the number of children who are in need of focused mental health care is rather low. However, one way to better identify affected and vulnerable youth may be through their parents.

Based on these descriptive findings suggesting a link between both parents` and children`s mental health, structural equation modeling for the second manuscript indeed revealed independent associations between both parents` and children`s psychopathology

when controlling for children`s cumulative trauma exposure. For mother-child dyads, this association was mediated by children`s more insecure attachment representations of the mother-child relationship and more child-reported maltreatment by mothers. This finding may be interpreted in terms of a vicious cycle wherein children`s insecure attachment to a mother suffering from psychopathology may increase their risk of experiencing ongoing maltreatment by mothers, which may detrimentally affect their mental health. The association between fathers` and children`s psychopathology, in contrast, was direct and not mediated by attachment representations or maltreatment. While this finding may suggest different roles of mothers and fathers in children`s upbringing and daily lives, it also points to the importance of fathers for their children`s well-being. Practical efforts aiming at improving children`s mental health should also consider both mothers` and fathers` psychopathology. In addition, interventions targeting the mother-child attachment relationship might help to reduce maternal maltreatment and its negative impact on child well-being.

Having established the link between parental maltreatment and children`s mental health, structural equation analyses for the third manuscript showed that higher levels of parental maltreatment were also related to stronger memory deficits in standardized neuropsychological tests in a sub-sample of youth aged between 11 and 15. For the memory domains short-term and working memory as assessed with the Corsi Block Tapping Test, the association between youth-reported maltreatment and memory deficits was mediated by higher levels of psychopathology. This is consistent with Attentional Control Theory, which posits that internalizing psychopathology such as anxiety and distressing cognitions interferes with the attentional resources needed to execute the memory task. However, higher levels of youth-reported maltreatment by parents, but not psychopathology were directly associated with a poorer delayed recall of the Rey-Osterrieth Complex Figure, indicating long-term memory deficits. The differential findings for the memory domains are in line with their main underlying neural substrates, the prefrontal cortex for short-term/working memory and the hippocampus for long-term memory, and their respective overlap with the predominantly frontal brain regions mediating psychopathology. Considering the potentially important role of intact memory functioning for youth`s academic outcomes, interventions to reduce and prevent youth`s ongoing victimization in their families may not only alleviate their individual suffering in terms of mental health problems, but also benefit their academic progress and thus their later socioeconomic wellbeing.

In addition to war-related and maternal violence, the final manuscript took into account other individual (engagement coping), peer (quality of friendships) and community

factors (mothers` social network and exposure to community violence) and their individual associations with negative (PTSD symptoms, internalizing and externalizing problems) and positive aspects (prosocial behavior) of children`s and adolescents` mental health. Multiple regression analyses revealed that higher levels of war-related, maternal and community violence as well as youth`s greater engagement with everyday stressors were related to higher levels of PTSD symptoms and internalizing problems, while only violence by mothers was also positively related to youth`s externalizing problems. Moreover, higher exposure to war-related and community violence was linked to higher levels of youth`s self-reported prosocial behavior, whereas more maternal violence was associated with lower levels of prosocial behavior. Higher quality friendships appeared to be an important protective and promotive social resource for youth as they were related to lower levels of PTSD symptoms and externalizing problems as well as to more prosocial behavior. In a similar vein, youth whose mothers had a higher quality social network also reported more prosocial behavior. On the one hand, these findings underscore the detrimental nature of youth`s previous and ongoing exposures to different forms of violence. On the other hand, they point to the importance of youth`s direct (friendships) and indirect (mothers` network) social resources for their mental health. A comprehensive practical approach towards mental health care for these youth should target these risk, protective and promotive factors across different socio-ecological contexts. Furthermore, the possible (mal-)adaptive nature of certain coping styles and prosocial orientations in relation to the post-conflict camp context should be taken into account.

Our study provides a comprehensive investigation of socio-ecological factors contributing to the mental health and adjustment of Burundian refugee children and adolescents living in large and resource-poor refugee camps in Tanzania close to ongoing conflict in their home country. In doing so, it is the first to include children and both their parents or primary caregivers in such a context. The manuscripts suggest that microsystem factors related to the family and the peer context contribute to youth`s mental health and well-being above and beyond their exposure to violent conflict and displacement. In particular, maltreatment by parents appears to be a proximal risk factor for youth`s psychopathology and cognitive deficits. In the context of accumulating risks due to previous trauma and ongoing structural displacement-related stressors in the camps, the observed socio-ecological factors may represent the most amenable targets for prevention and intervention approaches. Based on our findings, we propose a mental health service model for Burundian refugee children and adolescents in Nyarugusu, Nduta and Mtendeli that aims at an efficient use of scarce resources for mental health care by prioritizing the identification of youth with clinical levels

of mental health problems and the provision of trauma- and family-focused interventions to those in need. Future studies adopting a socio-ecological perspective, involving families and implementing appropriately complex, ideally longitudinal research designs are sorely needed in order to advance our understanding on the factors and mechanisms that shape mental health risk and resilience of refugee youth in general and in refugee camps in particular and to develop interventions that are effective in improving their well-being and long-term adjustment.

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# 1. Overview

## 1.1 Publications and submitted manuscripts of the cumulative dissertation

### 1.1.1 A systematic review of socio-ecological factors contributing to risk and protection of the mental health of refugee children and adolescents

Authors: Florian Scharpf, Elisa Kaltenbach, Angela Nickerson, Tobias Hecker

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### 1.1.2 Prevalence and co-existence of morbidity of posttraumatic stress and functional impairment among Burundian refugee children and their parents

Authors: Florian Scharpf, Edna Kyaruzi, Markus Landolt, Tobias Hecker

Published 2019 in *European Journal of Psychotraumatology* (Publisher: Taylor and Francis)
doi: 1080/20008198.20-19.1676005

### 1.1.3 Fuel to the fire: The escalating interplay of attachment and maltreatment in the transgenerational transmission of psychopathology in families living in refugee camps

Authors: Florian Scharpf, Getrude Mkinga, Frank Neuner, Maregesi Machumu, Tobias Hecker

Published 2020 in *Development and Psychopathology* (Publisher: Cambridge University Press, reprinted with permission)
doi: 10.1017/s0954579-420000516

### 1.1.4 Psychopathology mediates between maltreatment and memory functioning in Burundian refugee youth

Authors: Florian Scharpf, Sven Müller, Masath Faustine Bwire, Mabula Nkuba, Tobias Hecker

Under review in *Child Abuse and Neglect* (Publisher: Elsevier)

### 1.1.5 A socio-ecological analysis of risk, protective and promotive factors for the mental health of Burundian refugee children living in refugee camps

Authors: Florian Scharpf, Getrude Mkinga, Faustine Bwire Masath, Tobias Hecker

Published 2020 in *European Child and Adolescent Psychiatry* (Publisher: Springer)
doi: 10.1007/s00787-020-01649-7

## 1.2 Author contributions to the manuscripts

I was involved in the design of the empirical study, the selection and development of the applied methods. Furthermore, I was responsible for the acquisition of all necessary research and ethical permits to conduct the research project (e. g. writing proposals, meetings with authorities). Together with my Tanzanian colleagues I took care of all logistical prerequisites for the study (e. g. transport, accommodation) and established collaborations with local authorities and non-governmental organizations working in the camps. In the camps I carried the responsibility for the coordination of the data collection and monitored the compliance with all scientific and ethical standards. I was also in charge of referring participants in need of further psychosocial support to collaborating non-governmental organizations. Prior to data collection my colleagues and I selected and trained research assistants from the refugee communities in the camps. Moreover, I was involved in the recruitment of participating families. Following data collection, I prepared and analyzed the data and drafted the manuscripts as first author.

# 2. Introduction to the common context of this research

## 2.1 The refugee experience

### 2.1.1 The global refugee situation

In its *Global Trends* report for the year 2018, the United Nations High Commissioner for Refugees (UNHCR) estimated the global number of people who had been forcibly displaced from their homes due to conflict, persecution and organized violence at a record high of 70.8 million, increasing from 40.3 million people in 2009 (UNHCR, 2019). Among these people, there were 25.9 million refugees, 41.3 million internally displaced people and 3.5 million asylum seekers. According to the UNHCR, a refugee is anyone who *"owing to well-founded fear of being persecuted for reasons of race, religion, nationality, membership of a particular social group or political opinion, is outside the country of his nationality and is unable or, owing to such fear, is unwilling to avail himself of the protection of that country; or who, not having a nationality and being outside the country of his former habitual residence, is unable or, owing to such fear, is unwilling to return to it"* (UNHCR, 2015). Internally displaced persons (IDPs) are *"persons or groups of persons who have been forced or obliged to flee or to leave their homes or places of habitual residence, in particular as a result of or in order to avoid the effects of armed conflict, situations of generalized violence, violations of human rights or natural or human-made disasters, and who have not crossed an internationally recognized state border"* (UNHCR, 2015). Asylum-seekers are individuals who have sought international protection and whose claims for refugee status are pending (UNHCR, 2019). Children and adolescents below 18 years constituted about half of the global refugee population in 2018 (UNHCR, 2019).

The stark rise in forcibly displaced populations within the past decade can be understood in the light of the violent conflicts and crises that have newly erupted or have been ongoing in different parts of the world. The Heidelberg Institute for International Conflict Research counted 38 highly violent conflicts worldwide in 2019, of which 15 were fought on war level (Heidelberg Institute for International Conflict Research, 2020). Six point seven and 2.3 million people had fled from civil wars in Syria and South Sudan respectively, while 1.1 million refugees had been forced to leave Myanmar by the end of 2018 (UNHCR, 2019). In addition to these more recent crises, long-lasting conflicts in Afghanistan, Sudan, the Democratic Republic of Congo and Somalia had continued to displace millions of people (UNHCR, 2019). The vast majority of refugees, about 85%, fled across only one international state border and settled in a country neighboring their country of origin (UNHCR, 2019). This is illustrated by the fact that each of the four countries hosting the largest numbers of refugees in the world, Turkey (3.7 million), Pakistan (1.4 million), Uganda (1.2 million) and Sudan (1.1 million), directly neighbors one of the three largest source countries of refugees, i.e. Syria, Afghanistan and South Sudan (UNHCR, 2019). The countries taking in the biggest flows of refugees are predominantly low- and middle-income countries according to World Bank classifications (World Bank, 2019). These figures suggest that only a small minority of refugees flees to high-income countries in Europe, to North America and Australia. For instance, the number of refugees arriving in the European Union

mostly from Syria, Afghanistan and Iraq peaked in the years 2015 and 2016 with about 1.3 million asylum applications in each year (Eurostat, 2020). Within the past five years, 318 148 refugees have been resettled from low-and middle-income host countries, e.g. Lebanon, Turkey and Uganda, to a high-income third country, e.g. the United States of America, Canada and the United Kingdom (UNHCR, 2020b).

### 2.1.2 Stressors and challenges during the refugee journey

Refugees are likely to face a myriad of perils and challenges on their way, from uprooting and displacement in the country of origin through the flight journey up to more or less permanent resettlement in the host country. A common conceptualization of refugees` experiences, some of which can be highly traumatizing, refers to their temporal occurrence during the refugee journey, i.e. pre-migration/pre-flight, peri-migration/peri-flight/ and post-migration/post-flight (Lustig et al., 2004; Porter & Haslam, 2005; Reed et al., 2012).

As their home countries and regions are often theaters of war and armed conflict, refugees may be exposed to severe interpersonal violence before their flight. The extent and nature of these exposures depends on the specific conflict. While wars and armed conflicts within and between states increasingly involve a large part of the civilian population in an unsystematic manner, some conflicts target specific individuals or groups based on their ethnic or religious affiliation, also referred to as genocide, or their political position (Krug et al., 2002). Moreover, refugees may experience violence directly as victims or more indirectly in varying degrees of proximity, i.e. by witnessing or hearing about violence (Mollica et al., 1992). Torture and sexual violence have become common practices in many conflicts, inflicting severe emotional and physical pain and suffering on the victims (Bastick et al., 2007; Krug et al., 2002). Some refugees may have also been forced to perpetrate violence themselves, e.g. as child soldiers (Betancourt et al., 2010). In studies with adult refugees from different cultural backgrounds and conflict settings, between 7% and 68.3% of the participants had experienced the murder of a family member or friend, between 1% and 35.8% had been tortured and between 0% and 17% had experienced sexual violence (Alpak et al., 2015; Mollica et al., 1993; Schweitzer et al., 2006; Steel et al., 2002; Tang & Fox, 2001). Children and adolescents are indiscriminately exposed to severe violence and atrocities in the midst of war and conflict. For instance, 73% of Syrian refugee children resettled in Turkey had seen dead or severely wounded people (Kandemir et al., 2018), while 75% of the children in IDPs camps in Southern Darfur reported either watching a family member being tortured or themselves being tortured (Morgos et al., 2008).

During their flight, refugees may face additional dangers, partly depending on the duration of the journey and also their socioeconomic opportunities, which may permit more or less safe and comfortable modes of transport. Highly stressful and potentially traumatizing experiences such as violence and mistreatment by authorities in transit countries and human traffickers, forced separation from family members, life-endangering transports for example in boats or trucks, as well as lack of

food , drinks and other basic necessities have been commonly reported by refugees during their journeys (Arsenijević et al., 2017; Dolma et al., 2006; Finklestein & Solomon, 2009; Hauff & Vaglum, 1993; Tinghög et al., 2017). Cuban children and adolescents who fled to the United States across the ocean reported they had seen people drowning and being eaten by sharks during the crossing (Rothe et al., 2002). Unaccompanied refugee youth are a particularly vulnerable group as they often travel alone without protecting guardians and are thus at an increased risk of exposure to physical and sexual violence (Carlson et al., 2012; Freccero et al., 2017). During their flight, refugees may end up in refugee camps, where they are often stuck due to restrictive asylum policies of potential high-income host countries. This is exemplified by the current fate of refugees in camps on Greece islands (Bjertrup et al., 2018; Deutsche Welle, 2020). As described in more detail below, refugee camps constitute living contexts in which multiple different stressors concentrate and accumulate. Refugees in transit may also be forcefully confined in detention centers, which is practiced by the governments of the United States (MacLean et al., 2019) and Australia (Zwi et al., 2018), for instance. Detention may entail forced separation from family members, subjection to abusive behavior by authorities and fellow detainees, social isolation and great uncertainty about the future (Fazel et al., 2012; von Werthern et al., 2018).

Although the arrival in the host country often marks the end of imminent life threat, new challenges related to resettlement and adjustment to the living conditions in the strange environment may surface. The nature and extent of these post-migration or displacement-related stressors depends on the socioeconomic and sociocultural context of resettlement. Refugees resettling in high-income countries may be relatively safe from external harm and all their basic needs for living may be met. However, the culture and social milieu of home country and country of resettlement are often quite different and this cultural distance may bear a host of challenges, such as discrimination and difficulties in learning the host-country`s language (Beiser et al., 2015; d'Abreu et al., 2019; B. H. Ellis et al., 2008; Li et al., 2016). Negative and even hostile attitudes towards refugees among citizens of high-income host countries have been reported (Bruneau et al., 2018; Hangartner et al., 2019; Haslam & Holland, 2012), which may lead to overt discrimination or even violent actions. For instance, in the wake of the large influx of refugees in Germany in 2014 and 2015, there has been a strong surge of hate crimes against foreigners (Benček & Strasheim, 2016).

Children and adolescents tend to adjust quicker to a new culture, which may lead to family conflicts (Lincoln et al., 2016; Renzaho et al., 2017). On the one hand, their families may expect children to serve as "bridges" between them and the new culture, e.g. by translating; on the other hand, children may be criticized for adopting aspects of the new culture, e.g. certain ways of clothing (Lincoln et al., 2016). Qualitative accounts of Bosnian refugee parents resettled in the United States illustrate the potential burden on children and young people, who are viewed both as symbols of hope and a good future and of loss (Weine et al., 2004). Eisenbruch (1988) described how refugee children have to go through a double process of personal and cultural bereavement, in which they grieve both

for the loss of loved ones and for the loss of their cultural identity. For men and fathers, resettling in a new, often Western culture can imply the questioning of their status as dominant figures and family patriarchs (Timshel et al., 2017). Besides these acculturative stressors, dealing with complex asylum procedures and the uncertainty associated with waiting for the resolution of asylum claims represent considerable stressors in high-income settings (Chu et al., 2013; Jakobsen et al., 2017; Laban et al., 2004; Müller et al., 2019).

As already mentioned in the first section, the majority of refugees resettle in neighboring low- and middle-income countries that may be struggling themselves with political instability, limited economic opportunities and poorly developed infrastructure (Reed et al., 2012). In these settings, the most salient daily stressors may be poverty, lack of material resources, bad health conditions, inadequate housing and persistent threats to safety (Miller & Rasmussen, 2010; Reed et al., 2012). The sheer proximity to home where war and conflict are ongoing may create a sense of chronic insecurity (Miller, 1996; Woltin et al., 2018). Although the cultural distance between host country and country of origin may be less pronounced, acculturative stress may still occur or, in the case of discrimination, even be exacerbated due to competition for limited resources (Ghosn et al., 2019). Some post-migration stressors may also be relatively independent of the specific resettlement context, such as fear for family members left behind (Nickerson et al., 2010), unemployment (Porter & Haslam, 2005), social isolation (Gorst-Unsworth & Goldenberg, 1998) or family conflict and violence (Hecker et al., 2015; Timshel et al., 2017).

All these stressful and potentially traumatizing experiences may shatter refugees` core beliefs about themselves, others and the world and exert excessive pressure on their physiological, cognitive, social and emotional adaptability, which may jeopardize their mental health and well-being. Importantly, traumas throughout the whole refugee journey can have a cumulative or "building block" effect on refugees` mental health and adjustment (Neuner et al., 2004; Steel et al., 2002). This way, adverse experiences, particularly those involving exposure to violence, occurring in the peri- and post-migration phase compound pre-migration traumas and exacerbate mental health difficulties (Reed et al., 2012; von Werthern et al., 2018). Moreover, newer traumatic experiences and reminders of trauma and loss can reawaken previous traumatic memories (Pynoos et al., 1999). But even chronic and lower-intensity post-migration stressors and challenges, e.g. discrimination, overcrowded housing or social isolation, impact on the mental health of refugees above and beyond their exposure to conflict-related violence (Li et al., 2016; Miller & Rasmussen, 2010).

### 2.1.3. The case of refugee camps

The context of refugee camps merits a more detailed description because camps are the setting of the current research. The term "camp" typically refers to any purpose built, planned and managed location where refugees are accommodated and receive assistance from government and humanitarian

agencies, but it may also comprise informal or self-managed camps and transit camps (UNHCR, 2017b). Refugee camps are one of the most common types of resettlement for refugees, particularly in low- and middle-income countries (Reed et al., 2012); in 2017, about 31% of all refugees in the world and more than half of the refugees in Africa and Asia were estimated to live in camps (UNHCR, 2017b). Although most refugees live outside camps mainly in urban settings (UNHCR, 2020a), camps "have become almost synonymous with the refugee experience" (Harrell-Bond, 2000, p. 1) and constitute the focus and central organizing concept of the international humanitarian aid system (Feldman, 2007). This is surprising considering the fact that none of the three solutions to refugee crises deemed viable and durable by the UNHCR - repatriation, resettlement and local integration – actually mentions refugee camps (Feldman, 2007; S. Turner, 2016). Therefore, according to Turner (2016), refugee camps constitute both a temporal and a spatial paradox: on the one hand, camps are understood as temporary solutions in the emergency phase of a refugee crisis until another solution is found; in reality, however, camps often become quasi-permanent and thus have an "indeterminate temporariness" (S. Turner, 2016, p. 142). In such *protracted refugee situations* lasting more than five consecutive years, refugees can stay in camps for several decades (Feldman, 2007; UNHCR, 2020a). On the other hand, while the borders between inside and outside the camps may be invisible and there may be contact between refugees and host communities, the spatial and legal exclusion from the outside world shapes the lives of the people inside the camps (S. Turner, 2016).

There have been multiple accounts of the living conditions in refugee camps, which generally paint a dark picture. Due to a lack of food and highly rationed supplies, refugees in camps often receive a sub-nutritional diet, which may cause health problems such as anemia, night blindness and scurvy and impair children`s cognitive development (De Bruijn, 2009; Harrell-Bond, 2000). For instance, despite the UNHCR`s recommendation of 2100 kilocalories of food per day for every refugee, the daily food rations given out by the World Food Programme in Tanzanian refugee camps in the years 2005 and 2006 contained 1.700 and 1.460 kilocalories per person, respectively (De Bruijn, 2009). According to regular surveys done in 22 African and Asian refugee camps between 2004 and 2010, half of the camps had acute malnutrition prevalence rates of 15% at least once (Lutfy et al., 2014). About half of the refugee camps are estimated to be unable to provide the recommended minimum of 20 liter of clean water per person per day (UNHCR, 2020c). In a survey by the International Rescue Committee in two refugee camps in Ethiopia and Chad, 64% and 45% of the refugees collected less than 10 liters of water per day per capita (Pezon et al., 2015). Although the UNHCR recommends that all refugees should have a water point within 200 meters from their homes and that there should be one water tap for a maximum of 80 people, only 43% of the population in Ugandan refugee camps had a water point in proximity to their homes and there were on average 450 people per water tap between 2004 and 2007 (De Bruijn, 2009). Long distances to water sources increase children`s and women`s risk of experiencing sexual violence, keep children from attending school and require a considerable amount of time and energy (De Bruijn, 2009; UNHCR, 2020c).

In a similar vein, the sanitary conditions in refugee camps are often dire. About a quarter of the camps in a global analysis of data from 2004 and 2005 were not able to meet the UNHCR´s standard of a maximum of 20 persons per latrine and only 11% in a West African camp had a designated latrine (Cronin et al., 2008). The lack of clean water and adequate sanitation facilities in refugee camps is associated with an increased risk for a number of diseases such as diarrhea, hepatitis and cholera (Breiman et al., 2009; Cronin et al., 2008; Wendee, 2015). Adequate housing is not only important to shelter people from the elements, but also to provide them with dignity and reduce the exposure to communicable diseases (De Bruijn, 2009). However, poor housing quality has been reported in refugee camps, i.e. overcrowding, houses with damp, leaking or mould, lack of ventilation and chimney as well as the use of inferior or even dangerous materials, e.g. asbestos (Al-Khatib et al., 2003; Alnsour & Meaton, 2014; A. Turner et al., 2009). Such living conditions have been associated with a number of physical, e.g. Lassa fever, stomach and head aches, respiratory infections and asthma, and mental health problems, e.g. anxiety and stress (Al-Khatib & Tabakhna, 2006; Bonner et al., 2007; Habib et al., 2006; A. Turner et al., 2009).

Besides these material needs and issues, living in refugee camps can gradually disrupt the social fabrics that make up families and communities (Harrell-Bond, 2000; Williams, 1990). Different groups may be forced to live together in camps with little respect for pre-existing ethnic, social or political differences (Williams, 1990). Communities are also often deprived of the social, economic or political agency that would maintain or create bonds and ties among them (S. Turner, 2016). In the face of scarce resources and constant uncertainty about present and future, a sense of mistrust and resentment may evolve that has the potential to further dissolve social units. Family systems are often visibly disrupted by conflict and displacement when family members have died, gone missing or stayed behind in the country of origin. The proximity of camps to home may increase this awareness and worries about the fate of family members. However, even when the family unit is largely intact, a normal family life is hardly possible in camps (Harrell-Bond, 2000). There may be a significant redistribution and reversal of roles and tasks within the family (Williams, 1990). Harrell-Bond (2000) describes how parents` authority and their roles as caregivers and breadwinners are undermined by the humiliating dependence on external support. While it has been argued that the power structures in camps contribute to a loss of status and participation of women (Williams, 1990), the humanitarian system`s focus on equality may particularly challenge traditional authoritarian roles of men, husbands and fathers (S. Turner, 1999).

The social disorganization is likely to be reciprocally linked to the increased conflict and violence among communities and families that have been reported within refugee camps (Bermudez et al., 2018; Crisp, 1999; De Bruijn, 2009; Harrell-Bond, 2000). In an analysis of Kakuma and Dadaab refugee camps in Kenya, Crisp (1999) notes five widespread types of violence in and around camp settings: domestic and community violence, sexual abuse and violence, armed robbery, violence within and between refugee groups and violence between refugee and host communities. Burmese

children and adolescents in a refugee camp in Thailand identified fighting between caregivers and child abuse and neglect within families as major problems of camp life (Meyer et al., 2013). Rape and sexual violence, particularly against women and girls, but also boys and men, are widespread in camps and frequently occur on the way to collect firewood and building materials in the surroundings of camps (Bermudez et al., 2018; Crisp, 1999). Among Cuban refugee children and adolescents, 80% and 37% respectively witnessed acts of violence and someone commit or attempt suicide while being confined in a refugee camp (Rothe et al., 2002). Due to the closeness of camps to zones of conflict and the often porous borders, refugees within camps may be at an ongoing risk of being attacked by the people or groups they originally fled from (Harrell-Bond, 2000).

Refugee camps` "indeterminate temporariness" (S. Turner, 2016, p. 142) keeps the inhabitants in a chronic state of uncertainty about the future without being able to go back and forth, literally as well as figuratively (Bjertrup et al., 2018). Resettlement to a high-income third country is only reserved for a small minority of camp refugees, mostly particularly vulnerable people, and repatriation is often no option due to fear of violence in the home country (Feldman, 2007). It is conceivable how feelings of hopelessness and lack of control over one`s life are mounting as time spent in a camp increases. Even though children have a relatively good access to education in camps (De Bruijn, 2009), restrictive policies often impede further studies and training or engagement in otherwise productive and meaningful activities (Harrell-Bond, 2000; S. Turner, 2016).

All these indisputable material and immaterial stressors of camp life have always sparked fierce criticism of the concept of refugee camps and their prioritization in the humanitarian aid system (Cannon & Fujibayashi, 2018; Harrell-Bond, 2002). Harrell-Bond (2000, p. 1) describes refugee camps as places where "the inhabitants are depersonalized " and "which are not good for anyone", but in particular not good for the healthy development and well-being of children. Useful aspects of refugee camps have been pointed out, such as being appropriate tools in the emergency stage of a refugee crisis and enabling the efficient and quick distribution of aid to a large number of people (Feldman, 2007). Notwithstanding, it has to be stated that the precarious living conditions in camps, particularly ongoing exposures to different kinds of violence, may constitute new sources of trauma, perpetuating and exacerbating prior experiences of insecurity and helplessness.

## 2.2 Refugee mental health

### 2.2.1 General remarks

The traumatic experiences and challenges during the pre-, peri- and post-migration phase are likely to render refugees vulnerable for the development of mental health problems. When examining the studies on refugee mental health, several things are worth noting: first, there has been more research with adult refugees compared to refugee children. This may be because adults are considered more easily accessible, e.g. at health services, they may be believed to be more reliable reporters of their

experiences and mental health symptoms or there may be a more immediate demand to make them productive members of host societies. For whatever reason, the mental health of refugee children and adolescents must not be neglected. Childhood and adolescence constitute particularly formative stages of human development that are ripe of sensitive periods of biological, emotional, social and cognitive development (Engle et al., 1996; Giedd et al., 1999; L. Steinberg, 2005). However, this also increases youth`s vulnerability for developmental disruptions induced by adversity and trauma and subsequent mental health problems (De Bellis & Zisk, 2014; Patel et al., 2007; Pynoos et al., 1999; Reed et al., 2012).

A second point is that mental health research has focused on the minority of refugees who resettled in high-income countries, i.e. Europe, North America and Australia (Morina et al., 2018; Reed et al., 2012). This is probably due to the fact that research in low- and middle-income countries is complicated by multiple practical and ethical challenges such as potential stigmatization and discrimination of participants, insecure working conditions and methodological limitations (Allden et al., 2009; de Jong et al., 2000; Porter & Haslam, 2005). Notwithstanding, this signifies that the lived realities of the majority of refugees worldwide are not adequately represented by the current state of evidence. As Allden and colleagues (2009, p. 220) state, “the absence of relevant research on mental health and psychosocial support in emergency settings is unethical.“

A third aspect is that studies have focused on investigating posttraumatic stress disorder (PTSD) due to most refugees` exposure to war and violent conflict (Porter & Haslam, 2005; Reed et al., 2012). Depression and anxiety, both highly comorbid and sharing symptoms with PTSD (Ginzburg et al., 2010; Mitchell et al., 2017), have also been commonly researched among refugees (Kien et al., 2019; Morina et al., 2018). Other mental disorders, however, for example substance abuse, psychosis and suicidality, have been rarely assessed. Generally, it has been noted that the uncritical transfer of Western mental health concepts and diagnoses without consideration of local expressions or idioms of distress can mask the true extent of mental health problems in refugees (Silove et al., 2017).

As a fourth and final caveat, reviews and meta-analyses synthesizing the burgeoning evidence on the epidemiology of mental health problems among refugee children and adults note a large heterogeneity between studies in terms of the cultural background and sociodemographic characteristics of samples, the nature and extent of exposure to traumatic events, the context of resettlement as well as methodological aspects such as the sampling method and instruments (Bogic et al., 2015; Kien et al., 2019; Morina et al., 2018; Steel et al., 2009; Vossoughi et al., 2018). This heterogeneity not only accounts for highly varying and partly inflated prevalence rates, it also makes it difficult to translate epidemiological data into policy and practice (Silove et al., 2017). Keeping these considerations in mind, the following two sections present empirically derived prevalence rates of mental health problems in refugee adults and children.

### 2.2.2 Prevalence of mental health problems among adult refugees

Turrini and colleagues (2017) conducted an umbrella synthesis of 13 reviews on the prevalence of PTSD, depression and anxiety in refugees and asylum seekers. Five systematic reviews focused on refugees and asylum seekers in high-income countries, three reviews on those resettled in low- and middle-income countries and five systematic reviews on refugees and asylum seekers in low-, middle- and high-income countries. In those systematic reviews which calculated overall summary measures for common mental disorders, prevalence rates for PTSD ranged between 9% and 36%, for depression between 5% and 44% and for anxiety between 4% and 40% (Turrini et al., 2017). In a systematic review of studies with overall 6743 adult refugees who resettled in high-income countries, the average prevalence of PTSD, depression, anxiety and psychotic disorders was 9%, 5%, 4% and 2% respectively (Fazel et al., 2005). A review of 181 surveys with 81 866 refugees and other conflict-affected populations found unadjusted rates of about 30% for both depression and PTSD (Steel et al., 2009). Both reviews noted a large heterogeneity across studies and lower prevalence rates in larger and more rigorously conducted studies. This is also supported by a recent systematic review adjusting for a wide range of covariates, e.g. sociodemographic sample characteristics and extent of trauma exposure, with age-standardized pooled prevalence rates of 12.9% and of 7.6% for PTSD and major depression among conflict –affected populations (Charlson et al., 2016).

Studies including comparison groups such as host populations or other types of migrants are particularly informative. A meta-analysis of 56 studies with refugees and at least one non-refugee comparison group found that refugees had a moderately higher risk (effect size of 0.41) of poorer mental health outcomes (Porter & Haslam, 2005). In their meta-analysis, Lindert and colleagues (2009) found higher prevalence rates of depression and anxiety among refugees (44% and 40%) compared to labor migrants (20% and 21%). Better economic conditions in the host country were related to better mental health outcomes among labor migrants, but not among refugees (Lindert et al., 2009). Although most refugees spend many years in their host country, most studies have focused on refugees who had resettled within the previous five years, i.e. short-term resettlement (Priebe et al., 2016). A recent systematic review of 29 studies with a total of 16 010 war-affected refugees resettled more than five years in host countries reported highly varying prevalence rates of PTSD (range 4.4 – 86%), depression (range 2.3 – 80%) and anxiety (20.3 – 88%) (Bogic et al., 2015). Besides clinical and methodological factors, the refugees` countries of origin and of resettlement contributed substantially to this heterogeneity. In their narrative review of the evidence, Giacco, Laxhman and Priebe (2018) conclude that only rates of PTSD are increased among refugees compared to host populations during short-term settlement, while rates of other disorders are the same (psychotic, mood and anxiety disorders) or even lower (substance use disorders). During long-term resettlement, however, rates of mood and anxiety are also increased among refugees compared to host populations, while rates of psychotic, somatic and substance use disorders are comparable (Giacco et al., 2018). This pattern may be due to the documented strong association between pre-migration exposure to war-

related trauma, particularly torture, and PTSD and the increasing negative impact of post-migration living difficulties on refugees` general mental health (Bogic et al., 2015; Charlson et al., 2016; Porter & Haslam, 2005; Steel et al., 2009).

Most systematic reviews that focused on low- and middle-income countries included specific groups, e.g. Tibetan (E. Mills et al., 2005), Bhutanese (E. Mills et al., 2008), Syrian and Iraqi (Quosh et al., 2013) and Rohingya refugees (Tay et al., 2019). A recent systematic review, however, synthesized the evidence on the prevalence of psychiatric disorders among adult IDPs and refugees in 32 low- and middle-income countries amidst or close to ongoing conflict (Morina et al., 2018). Similar to previous reviews, there were large variations in prevalence rates for PTSD (3 - 88%), depression (5 – 80%) and anxiety disorders (1 – 81%). Only 12 of the included studies reported on other mental health problems (Morina et al., 2018).

Among adult refugees living in refugee camps, the prevalence rate of depression is generally at least 30% and up to over 80% (Acarturk et al., 2017; Bapolisi et al., 2020; Feyera et al., 2015; Lopes Cardozo et al., 2004; Mahmood et al., 2019; Mollica et al., 1993; Peltzer, 1999; Riley et al., 2017; Sabin et al., 2003; Tang & Fox, 2001; Tekin et al., 2016), while rates for anxiety disorders range between 40% and up to 100% (Bapolisi et al., 2020; Ben Farhat et al., 2018; Bjertrup et al., 2018; Lopes Cardozo et al., 2004; Sabin et al., 2003; Tang & Fox, 2001). Such high rates have been found largely independent of the cultural background of the sample and the region of the refugee camps, suggesting that they are attributable to the hopelessness, passivity and daily stressors associated with camp life *per se* (Bjertrup et al., 2018; Riley et al., 2017). In contrast, the specific context of violent conflicts and subsequent differences in the nature and extent of trauma may explain the large variation in the prevalence of PTSD among refugees living in camps, from 4.6% (Lopes Cardozo et al., 2004) up to 94% (Ainamani et al., 2020). However, in the more specific geographical regions of East Africa (Ainamani et al., 2020; Bapolisi et al., 2020; Kamau et al., 2004; Neuner et al., 2004; Onyut et al., 2009; Peltzer, 1999) and the Middle East (Acarturk et al., 2017; Alpak et al., 2015; Ibrahim & Hassan, 2017; Mahmood et al., 2019; Tekin et al., 2016), prevalence rates of PTSD among camp-based adult refugees have been found to be at least 30%. The majority of studies conducted in camps also found the prevalence of PTSD (Acarturk et al., 2017; Ainamani et al., 2020; Alpak et al., 2015; Mahmood et al., 2019; Neuner et al., 2004; Riley et al., 2017; Tekin et al., 2016) and of depression (Acarturk et al., 2017; Feyera et al., 2015; Mahmood et al., 2019; Riley et al., 2017; Sabin et al., 2003; Tekin et al., 2016) to be higher among women compared to men. Importantly, high prevalence rates of mental health problems have been recorded among refugees who spent between 5 and 20 years in refugee camps (Bogic et al., 2015), pointing to the detrimental effect of long-term resettlement in camps. There is a striking lack of studies comparing the mental health of refugee and host populations in low- and middle-income settings, but evidence suggests markedly worse mental health outcomes for refugees (Akinyemi et al., 2012; Porter & Haslam, 2005).

To conclude, there is substantial between-study variability of prevalence estimates for mental health problems among adult refugees, which is due to characteristics of the populations, conflict and resettlement settings as well as study methodologies. Not all refugees suffer from mental health problems and are in need of psychological support. However, even when considering relevant factors of influence and using rigorous diagnostic methods, epidemiological findings indicate that adult refugees are at an increased risk of developing mental health disorders compared to the general population. Those who reside in camps under harsh living conditions and close to ongoing conflict appear to be particularly vulnerable.

### 2.2.3 Prevalence of mental health problems among refugee youth

A meta-analysis of 56 studies on the mental health of refugees and internally displaced persons indicated that refugee children and adolescents had relative better mental health outcomes compared to adult refugees, with an effect size of 0.28 for children and 0.53 for adults (Porter & Haslam, 2005). Most systematic reviews have focused on refugee children and adolescents who resettled in high-income countries. Fazel and colleagues (2005) synthesized evidence from 5 surveys on 260 refugee children from Bosnia, Central America, Iran, Kurdistan and Rwanda who had resettled in Sweden, Canada and USA and reported a pooled 11% prevalence rate of PTSD. A systematic review of 22 studies conducted in Europe, Canada and USA found varying rates of 19 – 54% for PTSD and of 3 - 30% for depression (Bronstein & Montgomery, 2011). Large heterogeneity between studies has also been noted by Kien and colleagues (2019) in their recent systemic review of 47 studies on the prevalence of mental disorders in refugee and asylum-seeking minors in Europe: prevalence rates for PTSD ranged between 19% and 52.7%, for depression between 10.3% and 32.8% , for anxiety disorders between 8.7% and 31.6% and for emotional and behavioral problems between 19.8% and 35%. Only few studies reported on other mental health outcomes such as suicidal ideation and behavior, psychosomatic complaints and enuresis, while no studies on the prevalence of psychotic disorders, eating disorders and substance abuse were identified by this review (Kien et al., 2019).

The immediate experience of war-related violence is a particularly important factor in determining the risk of developing PTSD for refugee children. In a systematic review of 17 studies including 7920 children exposed to war, the pooled prevalence of PTSD was 47% and 12 studies reported rates of PTSD above 40% (Attanayake et al., 2009). Studies conducted in the wake of the Yugoslav wars suggested that forcibly displaced children had worse mental health outcomes than their non-displaced peers (Allwood et al., 2002; Kocijan-Hercigonja et al., 1998; Sikić et al., 1997; Sujoldžić et al., 2006).

Similar to research with adults, studies comparing refugee children with native populations in the host country were also mainly conducted in high-income countries, with mixed results. While some studies found higher rates of psychopathology in refugee children and adolescents compared to host peers (Bean et al., 2007; Björkenstam et al., 2020; Tousignant et al., 1999), others reported no

differences (Rousseau et al., 2000; Wahlsten et al., 2001) or that refugee youth even showed lower rates of anxiety and depression than native youth (Björkenstam et al., 2020; Derluyn et al., 2008; Slodnjak et al., 2002). Refugee minors fleeing and resettling without the presence of protective family members appear to constitute a particularly vulnerable group and display high prevalence rates of PTSD, depression and anxiety (El Baba & Colucci, 2018). Studies with clinical and community samples consistently found higher levels of mental health problems among unaccompanied compared to accompanied refugee minors (Bean et al., 2007; Hodes et al., 2008; Norredam et al., 2018; Pinto Wiese & Burhorst, 2007).

The little evidence on long-term mental health outcomes of refugee children comes from few prospective longitudinal studies mainly conducted in high-income countries. In the longest cohort study to date, levels of PTSD and depression among a small sample of Cambodian adolescent refugees declined from 50% and 53% respectively at baseline to 35% and 14% respectively after 12 years (Kinzie et al., 1986; Sack et al., 1999). The findings of a systematic review suggests that levels of PTSD remain relatively stable among resettled refugee children over time (Tam et al., 2017). Both levels of pre-migration traumatic experiences and post-migration stressors seem to be crucial in predicting refugee children`s trajectories of mental health problems over time (Hjern & Angel, 2000; Jakobsen et al., 2017; Jensen et al., 2019; Montgomery, 2010).

The relative scarcity of research in low- and middle-income countries is even more pronounced in the child compared to the adult literature. However, evidence suggests that the mental health of refugee children in these settings is particularly strained (Reed et al., 2012). Vossoughi and colleagues (2018) recently reviewed 20 studies, all but one conducted in low-and middle income countries (World Bank, 2019), on mental health outcomes of youth currently living in refugee and IDP camps. Consistent with previous systematic reviews with adults (e. g. Steel et al., 2009) and children (Kien et al., 2019), they reported highly varying prevalence rates for mental health problems among camp-based refugee youth due to clinical, e.g. war exposure, and methodological, e. g. use of different informants and instruments, factors. For example, one study with Guatemalan refugee children living in Mexican camps did not find any significant levels of PTSD (Miller, 1996), whereas some studies reported rates as high as 57% (Rothe et al., 2002), 75% (Morgos et al., 2008) and 87% (Ahmad et al., 2000). Similarly, rates for anxiety (1.4 - 35%) and depression (35 - 90%) were highly varying in this review (Vossoughi et al., 2018). There is little evidence on how refugee youth resettled in low-and middle-income countries fare compared to host peers. South Sudanese refugee children living in a Ugandan camp had higher levels of PTSD, depressive, behavioral and somatic symptoms than local Ugandan youth (Paardekooper et al., 1999), while Kosovo Albanian children and adolescents who had fled to Turkey had higher levels of anxiety and depression than their Turkish peers (Yurtbay et al., 2003). The few studies that compared refugee children living in camps and in other settings, e.g. private accommodations, suggest that residence in camps increases the risk of developing mental health problems (Reed et al., 2012).

Recently, many studies looked at the mental health of children who fled from the Syrian civil war as well as atrocities committed by the so-called Islamic State into neighboring countries, particularly to Turkey. In these studies, between 18.3% and 68.2% of the children fulfilled criteria for PTSD diagnosis (Beni Yonis et al., 2019; Eruyar, Maltby, et al., 2018; Gormez et al., 2018; Gunes & Guvenmez, 2019; Khamis, 2019; Nasıroğlu et al., 2018; Nasıroğlu & Çeri, 2016) and between 9.6% and 38.7% had elevated levels of emotional and behavioral problems (Cartwright et al., 2015; Çeri & Nasiroğlu, 2018; Eruyar, Maltby, et al., 2018; Nasıroğlu et al., 2018). Moreover, prevalence rates for anxiety disorders ranged between 7.3% and 69% (Gormez et al., 2018; Kandemir et al., 2018; Nasıroğlu & Çeri, 2016; Yalın Sapmaz et al., 2017) and for depression between 13.5% and 59.1% (Gunes & Guvenmez, 2019; Kandemir et al., 2018; Nasıroğlu et al., 2018; Nasıroğlu & Çeri, 2016; Yalın Sapmaz et al., 2017). The religious-ethnic group of the Yazidi people suffered particularly as they became victims of genocide by the Islamic State. In a study with 38 Yazidi refugee children, all children had at least one psychiatric disorder and half had at least two disorders (Çeri et al., 2016).

Independent of the studied population and the resettlement setting, some aspects are noteworthy. First, consistent with findings from adult refugees (e.g. Bapolisi et al., 2020; Tinghög et al., 2017) and non-refugee populations (Famularo et al., 1996; Spinhoven et al., 2014), studies with refugee children and adolescents often noted high comorbidity of mental health problems, particularly among PTSD, depression and anxiety (e.g. Betancourt, Newnham, et al., 2012; Kandemir et al., 2018; Kia-Keating & Ellis, 2007; Thabet et al., 2004). Second, also mirroring the findings of studies with adult refugees, the current evidence suggests that refugee girls have a higher risk for developing PTSD and internalizing problems, i.e. depression and anxiety, compared to boys (Beni Yonis et al., 2019; Braun-Lewensohn & Al-Sayed, 2018; Fazel et al., 2012; Jensen et al., 2019; Mohwinkel et al., 2018; Reed et al., 2012). In contrast, boys appear to be more vulnerable for externalizing problems, e.g. aggression and hyperactive behavior (Çeri & Nasiroğlu, 2018; Oppedal & Idsoe, 2012; Reed et al., 2012). Third, there are only few studies which investigated the mental health of younger refugee children, i.e. below 8 years of age (Frounfelker et al., 2020). Available studies in diverse settings indicate high levels of parent-reported internalizing and externalizing symptoms in toddlers and pre-school children (e.g. Buchmüller et al., 2018; Hjern et al., 1998; Khan et al., 2019). Also, increased levels of PTSD have been found in pre-school refugee children who had been exposed to severe violence as infants (Almqvist & Brandell-Forsberg, 1997).

The epidemiological findings suggest that many refugee children and adolescents are able to adjust well to the often-times extremely stressful experiences and challenges throughout their life journey (Crowley, 2009; Pacione et al., 2013). This high functioning despite exposure to significant adversity has been termed “resilience” (Luthar et al., 2001; Masten & Narayan, 2012; Rutter, 1985). Notwithstanding, a substantial number of young refugees develop debilitating and impairing mental health problems as a result of their experiences, which exceed levels typically found in the general population of children and adolescents, even when using conservative estimated rates (Attanayake et

al., 2009; Bronstein & Montgomery, 2011; Ehntholt & Yule, 2006; Kien et al., 2019; Vossoughi et al., 2018). For example, in a systematic review of 41 studies conducted in 27 countries, the worldwide pooled prevalence for any mental disorder was 13.4% (CI 95% 11.3 - 15.9), for anxiety disorder 6.5% (CI 95% 4.7 - 9.1), for depressive disorder 2.6% (CI 95% 1.7 - 3.9) and for attention-deficit hyperactivity disorder 3.4% (CI 95% 2.6 - 4.5) (Polanczyk et al., 2015). Prevalence rates for PTSD ranged between 1.3 and 6.6% in studies with community samples in high- and low-income countries (Abbo et al., 2013; Kilpatrick et al., 2003; Mullick & Goodman, 2005). Given these figures, it can be concluded that refugee children and adolescents are at an increased risk for developing mental health problems. This particular vulnerability of millions of refugee children worldwide poses a global public health challenge and calls for rigorous and coordinated prevention and intervention approaches to alleviate their suffering and promote their adjustment.

## 2.3 A socio-ecological theoretical framework

### 2.3.1 Bronfenbrenner`s ecological systems theory

In the 1970s, the developmental psychologist Urie Bronfenbrenner first developed his ecological systems theory to better understand the conditions and processes that shape human development (Bronfenbrenner, 1979). Since then, it has become one of the most influential theories in social and health sciences and has been adopted to investigate a wide range of phenomena including mental and physical health, general health promotion, cognitive development, academic outcomes, delinquent behavior, parenting, child maltreatment and bullying (Eriksson et al., 2018; Tudge et al., 2009, 2016).

In Bronfenbrenner`s model, an individual`s ecological environment consists of four systems that are interrelated and nested within each other (Bronfenbrenner, 1977, 1979). The *microsystem* comprises all interactions and relationships between the individual and their immediate environment. For a developing child, the most prominent microsystems are the family, the peer group and the school setting. The *mesosystem* then refers to interrelationships between an individual`s microsystems. In a child`s world, a meeting between a parent representing the family microsystem and a child`s teacher representing the school microsystem would be a classical example (Neal & Neal, 2013). The *exosystem* includes settings and social structures in which the individual does not actively participate, but which nonetheless have an indirect influence on an individual through their direct impact on microsystems. For a child, the parent`s workplace or educational policy makers belong to the exosystem (Ashiabi & O'Neal, 2015; Neal & Neal, 2013). All these levels are nested in the *macrosystem*, which involves societal and cultural norms, values and regulations as well as wider socioeconomic conditions. Examples are societal views about child-rearing and education. Important to note is that there are constant interactions within and between these ecological levels, which ultimately affect an individual`s developmental outcomes (Bronfenbrenner, 1977, 1979). Later,

Bronfenbrenner (1986) added the concept of *chronosystems* to take into account changes and continuity both within the person and in the environment over time. Examples for chronosystems are transitions such as a child`s entering of school or the onset of puberty, but also changes in a parent`s workplace (Bronfenbrenner, 1986).

In yet another refinement of his theory, Bronfenbrenner put the so-called "proximal processes" at the core of his model (Bronfenbrenner, 1995; Bronfenbrenner & Ceci, 1994; Bronfenbrenner & Evans, 2000). Proximal processes were conceptualized as progressively more complex and enduring reciprocal interaction between an individual and the persons, objects and symbols in their immediate environment (Bronfenbrenner, 1995). This definition implies that proximal processes operate within microsystems, involving for example daily parent-child interactions (Ashiabi & O'Neal, 2015; Eriksson et al., 2018). As "engines of development" (Bronfenbrenner & Evans, 2000, p. 118), proximal processes were suggested to exert a more powerful influence on developmental outcomes than contextual factors, e.g. on the exosystem (Bronfenbrenner & Ceci, 1994).

### 2.3.2 Ecological models of child maltreatment

A scientific field that has drawn heavily on Bronfenbrenner`s work is the research on the etiology and sequelae of child maltreatment. Child maltreatment can be defined as any act or series of acts by a parent or other caregiver that results in harm, potential for harm or imminent threat of harm to a child (Leeb et al., 2008). These acts may be intentionally committed such as physical, sexual and psychological/emotional abuse, but they may also be acts of omission, as in the case of physical, emotional and supervision neglect (Leeb et al., 2008).

Ecological models of child maltreatment (Belsky, 1980, 1993; Cicchetti & Lynch, 1993; Garbarino, 1977) share the underlying assumption that maltreatment arises from a complex and transactional process involving multiple factors on different ecological levels. In his etiological model, Belsky (1980, 1993) structures the factors and conditions contributing to the occurrence of child maltreatment along four levels of analysis: ontogenic development, the microsystem, the exosystem and the macrosystem. Ontogenic development refers to the life history and characteristics of parents who maltreat their children and includes parents` own childhood experiences of maltreatment, the negative emotional traits and states commonly associated with psychopathology such as depression and anxiety as well as external control attributions. The microsystem represents the immediate family context in which maltreatment takes place and includes the parent-child interaction and other relationships within the family, e.g. between the parents, but also potentially abuse-eliciting characteristics of children such as their age, physical health and problematic behaviors. The exosystem in Belsky`s model comprises formal and informal social networks, the neighborhood and the socioeconomic conditions including the availability of employment. Low socioeconomic status and unemployment as well as lack of social support within the community and resulting social isolation are examples for exosystem factors. Of particular importance from an ecological perspective is the

point that such immediate adverse living conditions may increase violence within the family microsystem by placing excessive pressure and stress on families` functioning and coping abilities (Belsky, 1980; Garbarino & Sherman, 1980). The macrosystem, finally, refers to the wider societal-cultural context that fosters child maltreatment and comprises a society`s general tolerance of violence and attitude towards children as well as policies determining the overall conditions under which children are educated and raised.

While Cicchetti and Lynch (1993) generally build on Belsky`s framework in their ecological-transactional model, they extend it by considering more strongly protective factors within children`s social ecology and shifting the focus on the consequences of community violence and child maltreatment on children`s development and mental health. In their model, potentiating risk factors increase and compensatory protective factors decrease the prevalence of violence on any ecological level (Cicchetti & Lynch, 1993). Factors on more distal ecological levels, i.e. the macro- and exosystem, determine the likelihood of violence within the community, while factors within the microsystem determine the level of violence within the family. Importantly, the different ecological levels influence each other and have both independent and interactive effects on children`s developmental outcomes. In line with Bronfenbrenner`s model, characteristics of the microsystem are said to have the most direct effect on children as they are most proximal to them (Cicchetti & Lynch, 1993). Potentiating risk factors can take the form of enduring vulnerability factors, e.g. a parent`s childhood history of maltreatment and chronic unemployment, or transient challengers, e.g. a physical injury, loss of a loved one or a child`s difficult developmental stage. Similarly, compensatory protective factors can be enduring, e.g. a parent`s secure attachment history or education, or transient, e.g. a sudden improvement in financial conditions or a period of marital harmony. Unlike in Belsky`s conceptualization, ontogenic development in Cicchetti and Lynch`s (1993) model refers to children`s stage-salient developmental tasks whose resolution plays an important role in determining their successful adaptation or maladaptation, i.e. the development of psychopathology. These developmental issues include the formation of a secure attachment relationship with a primary caregiver, the ability to regulate emotions effectively, acquiring competence in peer relations and adaptation to school (Cicchetti & Lynch, 1993; Cicchetti & Toth, 2005).

While these ecological models had been informed by the evidence base at that time, more recent empirical research largely from Western countries has been widely consistent with the models` assumptions and predictions, in particular the primary role of factors related to the family microsystem. An umbrella synthesis of meta-analyses on risk factors for child maltreatment published between 2014 and 2018 identified parents` own childhood experiences of maltreatment (d = .47), low socioeconomic status of the family (d = .34), dependent and aggressive parental personality (d = .45), intimate partner violence (d = .41), and higher baseline autonomic nervous system activity (d = .24) as the most influential factors (van IJzendoorn et al., 2020). The authors noted, however, that there is still

a large gap of knowledge about the antecedents of child maltreatment, particularly on the role of parental psychopathology.

Single meta-analyses and reviews found parents` current psychopathology including anger/hyper-reactivity, depression, and anxiety to be potent risk factors of physical abuse (Black, Heyman, et al., 2001; Stith et al., 2009), psychological abuse (Black, Smith Slep, et al., 2001) and neglect (Mulder et al., 2018; Stith et al., 2009). Research with civilian and military families also suggests that the symptom characteristics of PTSD including hyperarousal, irritability and anger, increase the risk for physical abuse by parents (Creech & Misca, 2017; Montgomery et al., 2019). Furthermore, a combination of other more distal, e.g. parents` childhood experiences and history of mental health problems, socioeconomic status and family conflict, and more proximal microsystem variables, e.g. parent-child relationships, parental stress, children`s externalizing and internalizing symptoms, appears to contribute to the risk of child maltreatment (Black, Heyman, et al., 2001; Mulder et al., 2018; Stith et al., 2009). In a large longitudinal cohort study in the United Kingdom with 14 893 pregnant mothers who were followed up beyond the infancy period of their newborn child, variables related to mothers` ontogenic development (age, education, a history of psychiatric illness and of childhood abuse) predicted investigation or registration of child maltreatment and were largely mediated by socio-economic factors including poverty (Sidebotham & Heron, 2006). Lynch and Cicchetti (1998) tested their ecological-transactional model in a 1-year longitudinal study with 188 maltreated and 134 non-maltreated children between the ages of 7 and 12 years. They could show that higher levels of community violence increased children`s risk for facing maltreatment within the family and that both types of violence predicted higher levels of children`s mental health problems including PTSD and depression symptoms, internalizing and externalizing problems (Lynch & Cicchetti, 1998).

Although the lion`s share of ecologically informed research on child maltreatment has been done in Western high-income settings, evidence from other cultural settings suggests a pattern of cross-cultural continuity. A review of 23 studies conducted in Sub-Saharan Africa found a range of distal and proximal microsystem factors, e.g. household socioeconomic status, domestic violence, parents` mental health, parent-child relationship and child characteristics, to be related to physical and sexual abuse of children and adolescents (Meinck et al., 2015). Poor parent-child relationship was also identified as an important risk factor for child maltreatment in a review of studies conducted in China (Liao et al., 2011).

### 2.3.3 Application of an ecological model with refugee children and families

Recently, a socio-ecological framework has been increasingly applied to conceptualize the impact of uprooting, flight and resettlement on refugees` mental health and well-being (Betancourt & Khan, 2008; Elbedour et al., 1993; Eruyar, Huemer, et al., 2018; Fazel et al., 2012; Miller & Jordans, 2016; Miller & Rasmussen, 2017; Reed et al., 2012; Wells et al., 2018). For example, Fazel, Reed and

colleagues drew on Bronfenbrenner`s classical ecological model in their comprehensive systematic reviews on risk and protective factors for the mental health of refugee children in low-, middle- and high-income countries (Fazel et al., 2012; Reed et al., 2012). Such a framework is particularly useful to investigate risk and protective factors for (mal-)adjustment in refugee children and adolescents for a number of reasons. First, the model`s broad and comprehensive view is adequate to depict the shattering effect that war and flight have on children`s worlds, on every setting and every significant person within children`s entire social ecology (Betancourt & Khan, 2008; Elbedour et al., 1993; Miller & Jordans, 2016). Not only do children have to struggle with the direct consequences of war and violence on themselves, shaking their trust in and view of themselves, others and the world itself (Cicchetti & Lynch, 1993; Lustig et al., 2004); they also have to cope indirectly with disruptions of their proximal social environment including family, friends, community and school, all while finding themselves in a new society where they are considered as strangers (Betancourt & Khan, 2008; Eisenbruch, 1988; Elbedour et al., 1993).

In addition to this comprehensive consideration of potential risk factors, a second merit of the ecological model is that it can account for the resilient outcomes often observed in refugee children and adolescents by also considering the protective and promotive factors that contribute to their positive development in the face of pre-, peri- and post-migration adversities (Betancourt & Khan, 2008; Masten & Narayan, 2012; Tol et al., 2013; Ungar et al., 2013). From a socio-ecological perspective, resilience is viewed as a dynamic process involving interactions between factors at multiple ecological levels, e.g. individual coping abilities, relationships with family and friends, community social support and societal attitudes, that is moderated by both culture and context (Sleijpen et al., 2016; Tol et al., 2013; Ungar et al., 2013).

A third useful aspect of the ecological framework is that it can be applied to systematically investigate the causes and consequences of refugee children`s high exposure to violence on different ecological levels (Dubow et al., 2009; Krug et al., 2002; Rubenstein & Stark, 2017). In particular, it is suitable to assess the processes through which increased stress on the proximal family level stemming from organized violence and displacement may affect refugee children`s mental health.

Miller and Rasmussen (2017) recently introduced their ecological model of refugee distress, which postulates that refugees` mental health is affected not only by exposure to conflict-related violence, but to a considerable extent also by displacement-related stressors. While experiences of war- and flight-related violence represent an individual-level risk factor, displacement-related stressors stem from different levels of the social ecology, for example separation from family members, loss of social support and discrimination, unemployment and poverty as well as restrictive asylum policies. In addition to their direct negative impact on individual`s mental health, exposure to war-related violence and displacement-related stressors may indirectly affect refugee children`s well-being through their influence on parental well-being and family functioning (Miller & Rasmussen, 2017).

Accordingly, ecologically informed research indicated that the family context powerfully mediates the effect of war and community violence on children`s mental health and thereby decisively shapes their risk and resilience (Betancourt & Khan, 2008; Catani, 2018; Dubow et al., 2009; Fazel et al., 2012; Miller & Jordans, 2016). On the one hand, perceived supportive, caring and warm parenting has been shown to protect war-affected children from mental health problems (Fazel et al., 2012; Punamäki et al., 1997; Sriskandarajah et al., 2015). On the other hand, an array of studies from various (post-)conflict settings demonstrated strong links between war trauma, increased family violence against children and children`s psychopathology (Al-Krenawi et al., 2007; Barber, 1999; Catani, Jacob, et al., 2008; Catani, Schauer, et al., 2008; Cummings et al., 2012; Garbarino & Kostelny, 1996; Klasen et al., 2010; Saile et al., 2016), which is consistent with the ecological-transactional model of child maltreatment (Cicchetti & Lynch, 1993; Lynch & Cicchetti, 1998). In fact, a recent meta-analysis of 38 quantitative studies with war-affected families showed that less warm and more harsh parenting partly mediated the association between parents` higher war exposure and children`s poorer mental health including PTSD symptoms, internalizing and externalizing problems (Eltanamly et al., 2019). A recent systematic review suggested that increased violence within refugee families resettled in high-income countries is a result of accumulating, multiple risk factors at the individual (parental trauma and psychopathology, substance abuse and history of child abuse), family (parent-child interaction, family structure and family acculturation stress), societal (low socioeconomic status) and cultural level (patriarchal beliefs) (Timshel et al., 2017).

In addition to war exposure, displacement-related stressors further undermine parents` capacity to provide positive and supportive parenting to their children and increase the risk of maladaptive child-rearing (El-Khani et al., 2016, 2018; Eltanamly et al., 2019; Sim, Fazel, et al., 2018). For example, in a qualitative study with Syrian refugees in Lebanon parents reported that economic hardship, their own distress and perceived insecurity in the community impair parent-child interactions and contribute to harsh and controlling parenting (Sim, Fazel, et al., 2018). Moreover, Syrian mothers living in refugee camps reported a high need for parenting support (El-Khani et al., 2018).

## 2.4 Ecological factors contributing to refugee children`s mental health

### 2.4.1 Factors within the family microsystem

From an ecological perspective, proximal factors and processes within the family microsystem have the most powerful impact on children`s development and well-being (Bronfenbrenner, 1986; Lynch & Cicchetti, 1998; Miller & Rasmussen, 2017). Among refugee families living in resource-poor camps close to ongoing conflict, these processes may be particularly salient given families` exposure to past trauma and current adversities of camp life. However, it is still unclear whether and how these factors

contribute to the mental health and adjustment of refugee children and adolescents living in camps. Therefore, this research focused on parental psychopathology as a family-level risk factor as well as child maltreatment and the parent-child relationship as proximal processes. The following section presents existing evidence for these variables in non-refugee and refugee populations and points out important limitations in the literature.

#### 2.4.1.1 Parental psychopathology

Numerous studies with non-refugee families have consistently demonstrated that children of parents suffering from psychopathology are at an increased risk for developing psychopathology themselves (e.g. S. H. Goodman & Gotlib, 1999; Lambert et al., 2014; McLaughlin et al., 2012). Although the majority of studies have been conducted with mothers, there is also a robust evidence base for the association between fathers` and children`s psychopathology (e.g. Barker et al., 2017; Kane & Garber, 2004; Ramchandani & Psychogiou, 2009). Besides a documented genetic heritability of mental disorders (Beardslee et al., 2011; Duncan et al., 2018; Hicks et al., 2004) and potential epigenetic mechanisms (Lehrner & Yehuda, 2018), environmental factors such as problems in the parent-child relationship and maladaptive parenting behaviors have been proposed as potential mechanisms underlying the transgenerational transmission of psychopathology including PTSD, depression and externalizing problems (Bailey et al., 2009; Cummings & Davies, 1994; van Ee, Kleber, & Jongmans, 2016). For example, meta-analytic reviews demonstrated less positive, e.g. warm, sensitive and supportive, and more negative, e.g. hostile, critical and coercive, parenting behaviors in depressed mothers and fathers (Lovejoy et al., 2000; S. Wilson & Durbin, 2010). Similarly, maladaptive relational patterns and an increased risk of child abuse were found in parents with PTSD (Montgomery et al., 2019; van Ee, Kleber, & Jongmans, 2016). However, a major limitation of many studies is the overreliance on parents` self-report of their relationship with their children and their parenting behaviors, which may be biased by mental health symptoms associated with negative affect and views of oneself and others (Banyard et al., 2003; Ringoot et al., 2015).

In their comprehensive systematic review, Reed and colleagues (2012) noted that the role of parents` mental health for refugee children`s well-being has rarely been studied, particularly in low- and middle-income settings, where parents might be particularly distressed. However, there is increasing evidence documenting associations between parental and child psychopathology in refugee families both in high-income countries (Beiser & Hou, 2016; Fazel et al., 2012; Javanbakht et al., 2018; Wiegersma et al., 2011) and in refugee camps and urban settings in low-and middle-income countries (Betancourt, Yudron, et al., 2012; Eruyar, Maltby, et al., 2018; Meyer, Steinhaus, et al., 2017; Miller, 1996). For example, higher depression symptoms in caregivers were related to more depression and anxiety symptoms in South Sudanese adolescents living in Ugandan refugee camps (Meyer, Steinhaus, et al., 2017), while caregiver distress was prospectively associated with adolescents` internalizing and externalizing problems in an Ethiopian refugee camp (Betancourt,

Yudron, et al., 2012). Mothers` good mental health and coping abilities have also been shown to be a protective factor for the mental health of refugee children in camps (Ajduković & Ajduković, 1993; Ekblad, 1993).

Notwithstanding, with very few exceptions (Ahmad et al., 2000; Javanbakht et al., 2018), fathers have not been included in studies despite the documented independent impact of paternal factors on family functioning and children`s mental health in the aftermath of war and conflict (Palosaari et al., 2013; Punamäki et al., 2001; Saile et al., 2014). An even more important gap is that studies investigating associations between parental and child psychopathology in refugee families have hardly examined potentially underlying mechanisms. Studies with refugee parents and their children who were born in exile in high-income countries point to the importance of parenting and family factors, but these children were not exposed to conflict-related violence and flight stress themselves (Dalgaard et al., 2016; Daud et al., 2008; Field et al., 2013; van Ee, Kleber, & Jongmans, 2016). From an ecological perspective on risk and resilience, children`s mental health problems stemming from war and displacement are likely to play an important role in family processes that may contribute to the transmission of psychopathology in refugee families (Catani, 2018; Timshel et al., 2017). Two studies with trauma-exposed refugee families suggest that impaired parenting may play a key role. Caregiver PTSD (Bryant et al., 2018) and psychological distress (Sim, Bowes, et al., 2018) due to exposure to war and displacement-related stressors were linked to more negative parenting behavior, which was in turn related to higher levels of children`s emotional and behavioral problems. However, these studies assessed parenting and child psychopathology through caregivers` reports and did not consider children`s own trauma exposure.

#### 2.4.1.2 Child maltreatment

Acts of child maltreatment represent extreme forms of impaired parenting behaviors that are the result of escalations in the immediate context of parent-child interactions (Belsky, 1993). Thus, a pathogenic parent-child relationship lies at the core of child maltreatment (Valentino, 2017). Despite ratifications of agendas and treaties such as the United Nations Conventions on the Rights of the Child, which declared child maltreatment illegal worldwide, child abuse and neglect is still widespread around the world. In a review of meta-analyses, the overall worldwide prevalence rates for self-report studies were 127/1000 for sexual abuse, 226/1000 for physical abuse, 363/1000 for emotional abuse, 163/1000 for physical and 184/1000 for emotional neglect (Stoltenborgh et al., 2015).

Child maltreatment has devastating consequences for the individual victims that may persist throughout life, including mental health problems and suicide attempts (Norman et al., 2012), an increased risk for chronical physical diseases and mortality (Felitti et al., 1998), epigenetic changes (Cecil et al., 2020) as well as lower educational attainment and socioeconomic well-being (Currie & Spatz Widom, 2010; R. Mills et al., 2019). On a societal level, child maltreatment entails enormous direct, e.g. child welfare and health care, and indirect, e. g. loss of productivity, costs (Fang et al.,

2012). For children and adolescents, maltreatment has been shown to have an immediate detrimental impact on their mental health and socioemotional development, including deficits in emotion regulation, insecure attachment relationships, peer problems, depressive and anxiety symptoms, externalizing problems such as aggression and attention problems and PTSD (e.g. Bolger & Patterson, 2001; Cicchetti & Toth, 2005; Cullerton-Sen et al., 2008; Cyr et al., 2010; De Bellis, 2001; Gershoff, 2002; Kim & Cicchetti, 2009). Importantly, these negative sequelae of child maltreatment have been documented across a wide range of different cultures (e. g. Hecker et al., 2014; Lansford et al., 2005; Palosaari et al., 2013; Tran et al., 2017).

In addition, studies suggest an association between child maltreatment and deficits in cognitive functioning including memory and learning, attention and executive functions such as planning and cognitive control (De Bellis & Zisk, 2014; Irigaray et al., 2013; Kavanaugh et al., 2017; K. Wilson et al., 2011). However, most studies have been conducted with adult victims of childhood maltreatment and evidence for children and adolescents is inconsistent. This may be partly due to an exclusive grouping approach broadly comparing maltreated and non-maltreated children and a reliance on clinical samples, which leaves the independent contributions of maltreatment per se and associated mental health problems unclear (Hart & Rubia, 2012; K. Wilson et al., 2011). Socioemotional and cognitive deficits are likely to play an important role in explaining the documented link between child maltreatment and impaired academic performance (Romano et al., 2015). The pervasive impact of child maltreatment on the functioning of biological stress systems such as the hypothalamus-pituitary-adrenal (HPA) axis as well as brain structure and function has been proposed to mediate mental health problems and cognitive deficits in maltreated individuals (Hart & Rubia, 2012; McCrory et al., 2010; Teicher & Samson, 2016). For example, childhood maltreatment was associated with volume abnormalities in the hippocampus, a brain region crucial for memory and learning, in young adults (Teicher et al., 2012, 2018). Even when using non-clinical samples, most studies in high-income countries investigating associations between child maltreatment and mental health as well as cognitive functioning included children who had been identified by child welfare and protective services (Augusti & Melinder, 2013; Kim & Cicchetti, 2009). Thus, it may be assumed that measures had been taken to protect these children from further maltreatment by caregivers.

However, little is known about the mental health and cognitive sequelae of maltreatment among refugee children and adolescents, despite the accumulation of ongoing risk factors for maladaptive parenting and child maltreatment in their social ecology (Lebrun et al., 2015; Timshel et al., 2017), particularly in refugee camp settings with widespread poverty, disrupted community and family structures, overcrowded housing, changing gender roles, neighborhood insecurity and dysfunctional child protection systems (El-Khani et al., 2016; Horn, 2010; Meyer et al., 2013; Murphy et al., 2017; Rubenstein & Stark, 2017). Independent of specific displacement-related risk factors, refugees living in camps often come from societies that view violence against children as rather normative and acceptable, e.g. in Sub-Saharan Africa and Middle Eastern countries (Lansford et al.,

2015). Two recent cross-sectional studies conducted in refugee camps in Rwanda and Uganda found that adolescents` higher exposure to maltreatment was associated with higher levels of anxiety (Meyer, Yu, et al., 2017) and depression symptoms (Meyer, Steinhaus, et al., 2017; Meyer, Yu, et al., 2017). To date, there are no studies investigating links between maltreatment and cognitive functioning in refugee children and adolescents. However, in a study with Nicaraguan refugee mothers and their young children, certain aspects of the mother-child relationship, namely the mothers` emotional responsivity to their child and the organization of the child`s physical and temporal environment, as well as the child`s nutritional status were positively related to the child`s cognitive development (Laude, 1999). In a recent study with Syrian refugee adolescents and their Jordanian peers, ongoing poverty, but not trauma exposure and PTSD symptoms, were related to working memory deficits (Chen et al., 2019).

#### 2.4.1.3 Attachment relationships

The formation of a secure attachment relationship with a caregiver is one of the most important developmental tasks for a child in the first two years of life (Cicchetti & Toth, 2005; Valentino, 2017). Interactions with a consistently sensitive and emotionally available parent instill the child with a sense of security and the young child can use the parent as a secure base from which to explore the environment (Bowlby, 1969; De Wolff & van Ijzendoorn, 1997). However, if the parent is not seen as responsive and available, the infant will not be able to derive feelings of security from this relationship and most likely develop an insecure attachment (Toth et al., 2013). Among children whose parents` interactional behaviors are extremely inconsistent, harsh or even frightening, a disorganized attachment pattern has been described (Valentino, 2017). Based on these early interactions, children will develop attachment representations of their primary caregivers and themselves, also called internal working models, which will be generalized to future relationships with other people (Bowlby, 1969). In contrast to securely attached children, children with insecure and disorganized attachments are likely to enter new relationships with negative expectations of how others will behave and how acceptable they are themselves (Cicchetti & Toth, 1995).

Although parent-child attachment is particularly salient in children`s early years of life, it continues to be important in late childhood and adolescence (Cicchetti & Toth, 2005). Independent of the child`s age, the ultimate goal of the attachment system is to gain and maintain the caregiver`s proximity and protection when the child is threatened, endangered or stressed (George, 1996). However, as children grow older, the attachment relationship develops from one marked by dependency and rather passive behaviors by children, e.g. crying and clinging, to a “goal-directed partnership”, to which children actively contribute and adapt by balancing their own and their caregivers` attachment needs (George, 1996). Insecure and disorganized attachments with parents have been associated with a range of negative developmental outcomes such as internalizing and externalizing symptoms, peer problems and reduced cognitive abilities (Brumariu & Kerns, 2010;

Cohn, 1990; Colonnesi et al., 2011; Fearon et al., 2010; Jacobsen et al., 1994). In contrast, the importance of secure parent-child attachment for socioemotional, behavioral, academic and physiological development has been well established (Bohlin et al., 2000; Laible & Thompson, 1998; Moss & St-Laurent, 2001; Schore, 2001).

Notwithstanding older children`s increasing contribution to the attachment relationship, parental characteristics play a major role. The parenting qualities that are crucial determinants of the attachment relationship, i.e. sensitivity and emotional availability, have been shown to be impaired in various kinds of psychopathology including PTSD, anxiety and depression (Lovejoy et al., 2000; van Ee, Kleber, & Jongmans, 2016; S. Wilson & Durbin, 2010). Consequently, attachment may be one pathway through which parental and child psychopathology are related (Cummings & Davies, 1994; van Ee, Kleber, & Jongmans, 2016; Wan & Green, 2009).

Research further suggests an intricate link between attachment and maltreatment by parents. Acts of abuse and neglect by parents constitute, by definition, the extreme opposite of sensitive caregiving and may frighten the child. Therefore, it is hardly surprising that increased rates of insecure and disorganized attachment patterns have been consistently found in maltreated children of different ages compared to non-maltreated peers (Cyr et al., 2010; Finzi et al., 2000; Lynch & Cicchetti, 1991; Morton & Browne, 1998; Stronach et al., 2011). At the same time, in line with the notion that maltreatment constitutes in its essence a pathogenic parent-child relationship (Valentino, 2017), parent-child interactions that are indicative of an insecure attachment, including increased dependency, negative emotions and withdrawal, may increase children`s ongoing risk of experiencing further maltreatment (Belsky, 1993; Cummings & Davies, 1994; Stith et al., 2009). This is also underscored by findings showing that interventions aiming at improving the parent-child relationship were able to reduce child maltreatment (Toth et al., 2013; Valentino, 2017).

Given that the attachment system is activated under conditions of extreme stress and threat, focusing on attachment may help to explain both adjustment problems and resilient outcomes among individuals and families exposed to war and trauma (Juang et al., 2018; Masten & Narayan, 2012; Riggs & Riggs, 2011). For war-affected children, secure attachment relationships with their parents have been shown to be an important protective factor for their mental health (Betancourt & Khan, 2008; Masten & Narayan, 2012). Conversely, insecure attachment representations of parents were associated with higher levels of mental health problems in the aftermath of violent conflict (Okello et al., 2014; Punamäki et al., 2017). Applying an attachment theoretical perspective to the experience of refugee families, it has been suggested that traumatic experiences damage parents` internal attachment representations of themselves as caregivers and of their children, which undermines their capacity of acting as a safe haven for their children and lead them to withdraw from the interaction with their children (Almqvist & Broberg, 2003; De Haene et al., 2010). As a consequence, children may realize that their parents are unable to meet their attachment needs and adapt to this interactional style in ways

that may reinforce parents` feelings of powerlessness and increase the risk of further problematic parent-child interactions (Almqvist & Broberg, 2003).

Accordingly, in two studies with refugee parents and their young children in the Netherlands, parental PTSD was associated with lower emotional availability by mothers and children (van Ee et al., 2012) and with children`s insecure and disorganized attachment (van Ee, Kleber, Jongmans, et al., 2016). Emotional availability did not mediate the association between mothers` PTSD and children`s psychosocial adjustment (van Ee et al., 2012). In a study with Middle Eastern refugee families resettled in Denmark, children`s more insecure attachment representations tended to be related to higher levels of parent-reported emotional and behavioral problems (Dalgaard et al., 2016). However, these studies focused on young children who were born in exile and had no history of trauma. Attachment behaviors and representations may be particularly salient among children whose attachment system has been activated by direct trauma exposure. Other limitations of these studies are that they relied on parents` reports of children`s mental health and did not distinguish between attachment to mothers and fathers. A noticeable exception is a recent study with Syrian refugee minors between 8 and 17 years living in community settings in Turkey, which found that insecure attachment representations of both mothers and fathers were related to children`s self-reported PTSD symptoms and general mental health problems (Eruyar et al., 2020). Nevertheless, the mediational role of attachment representations in the association between parental and child psychopathology has not been assessed in refugee families living in refugee camps.

### 2.4.2 Other ecological factors contributing to resilience

Besides factors within the family microsystem, other factors related to the individual child, the peer microsystem and the exosystem may contribute to refugee children`s resilience. On the individual level, coping can be defined as action-oriented and intrapsychic efforts to manage the demands created by stressful events (Taylor & Stanton, 2007). Coping strategies can focus on engaging with or approaching the stressor, for example by seeking support, acceptance and changing the way of viewing things, and on disengaging from or avoiding the stressor, for example by denying or wishful thinking (Carver & Connor-Smith, 2010). Ample research with non-refugee populations has shown that engagement coping is associated with better mental health outcomes and higher well-being, whereas disengagement coping is linked to less optimal mental health outcomes including anxiety, depression and increased stress (Carver & Connor-Smith, 2010; Taylor & Stanton, 2007). As refugee children often face multiple highly stressful conditions and situations before, during and after their flight, the way they cope with these experiences may be particularly relevant for their adjustment. Notwithstanding, there is little evidence for the role of coping strategies for refugee children`s mental health (Eruyar, Huemer, et al., 2018). In a study with unaccompanied refugee youth in Norway, disengagement coping predicted lower life satisfaction and more depressive symptoms, but engagement coping did not predict less depressive symptoms (Seglem et al., 2014). In another study

with Bosnian refugee youth in Denmark, the use of engagement coping strategies was related to the presence of PTSD (Elklit et al., 2012). Only one study examined coping strategies among refugee children living in a resource-poor camp (Paardekooper et al., 1999): South Sudanese refugee children used more different and more disengagement strategies than local Ugandan children. The authors reasoned that in the context of the refugee camp with high dependence on external aid and bureaucracy, children had few opportunities to use engagement or problem-focused coping strategies (Paardekooper et al., 1999). It is important to better understand the role of coping for children`s well-being in such a setting rife with daily stressors as a potential target for prevention and intervention strategies.

Friendships and positive peer relationships constitute microsystem factors that are linked to many aspects of children`s and adolescents` positive development including their general well-being, life satisfaction, self-esteem, academic success and prosocial behavior (Holder & Coleman, 2015). A main function of children`s peer relationships is to provide social support, which is likely to be protective in the face of severe adversity (Betancourt & Khan, 2008). For example, peer relations moderated the association between the experience of political violence and antisocial behavior in Palestinian youth (Barber, 2001). A systematic review identified self-reported support from friends as a protective factor for the mental health of refugee children who resettled in high-income countries (Fazel et al., 2012). Less is known about the role of peer relationships for the mental health of refugee children living in low- and middle-income countries. South Sudanese children living in a Ugandan camp were less satisfied with their social support network compared to local Ugandan children (Paardekooper et al., 1999). For Namibian refugee adolescents residing in a Sub-Saharan host country, higher levels of social support ameliorated the effect of chronic stress as represented by an increased time in exile on depressive symptoms (Shisana & Celentano, 1985). However, these studies did not assess whether the source of social support were actually youth`s peers. While there is no reason to assume that peer relationships have a different influence on camp-dwelling refugee children`s mental health, they may be particularly relevant for this group to the extent that other social support networks such as the family and wider community have been weakened.

Social support also operates on an exosystem level and may benefit children and adolescents even if they are not the immediate recipients. Just as community violence and wider socioeconomic conditions may indirectly affect children through their direct impact on parents` well-being and functioning (Lynch & Cicchetti, 1998; Masarik & Conger, 2017), parents` positive social resources within the community may have a protective effect on their children`s mental health. Social support is often conceptualized as social capital, which can be understood as the bonds that are created by belonging in groups which instill “habits of cooperation, solidarity and public service” (Putnam, 1993, pp. 89-90). Studies that examined the link between social capital and mental health provide evidence that social capital serves as a buffer for mental health problems (De Silva et al., 2005; Hall, Bolton, et al., 2014; Nakayama et al., 2014; Shisana & Celentano, 1987) In a systematic review by McPherson

and colleagues (2014), parents` wider and higher quality social networks were generally related to children`s and adolescents` lower levels of internalizing problems. In a study with refugee adolescents resettled in Canada, those whose families had wider kin contacts and whose mothers received more visitors at home had lower levels of psychopathology (Tousignant et al., 1999). However, the potentially protective role of parents` social integration for children`s mental health has not been investigated in the context of refugee camps. In the systematic review by McPherson et al. (2014), caregivers from impoverished communities who reported fewer contacts with neighbors also reported better mental health outcomes for their children. This might also be the case in resource-poor refugee camps.

## 2.5 The need for ecologically informed studies on refugee children`s mental health in refugee camps

Refugee children are at an increased risk of developing mental health problems due to their potential exposure to war-related and other traumatic experiences before and during their flight as well as to a myriad of displacement-related stressors (Hodes & Vostanis, 2019; Miller & Rasmussen, 2017; Reed et al., 2012). In longitudinal studies with non-refugee Western samples, mental health problems in childhood predicted a wide range of health, legal, financial and social difficulties in adulthood (Copeland et al., 2015; A. Goodman et al., 2011). In addition, refugee families` exposure to trauma and ongoing adversities may constantly challenge the family unit`s functioning and coping capacities and contribute to a reproduction of violence against children within their families (Cicchetti & Lynch, 1993; Rubenstein & Stark, 2017). Early exposure to severe interpersonal violence and trauma has been shown to cast a life-long shadow on survivors, including persistent mental and physical health problems (Danese & McEwen, 2012; Springer et al., 2007), altered brain development (Teicher & Samson, 2016), worse educational attainment (Mersky & Topitzes, 2010) and reduced socioeconomic well-being (Zielinski, 2009). Moreover, there is ample evidence suggesting that children who grow up in violent families and communities bear an increased risk to perpetrate violence themselves in later life, against their own children and partners, but also against other people (Kwong et al., 2003; Thornberry et al., 2012; Weierstall et al., 2012; Widom & Maxfield, 2001). Importantly, refugee children`s experiences of violence and subsequent mental health problems may impede their capacity for learning and academic progress, which may jeopardize their long-term adjustment and deny them economic opportunities (Graham et al., 2016; Kaplan et al., 2016). Poverty and lack of prospect, in turn, are among the main drivers of violent conflict (Cilliers, 2018; Krug et al., 2002), implying a vicious cycle of uprooting, flight and chronic destabilization of volatile regions.

Both the high levels of individual suffering and the far-reaching societal consequences illustrate the urgent need for prevention and intervention approaches targeting the mental health of

refugee children and adolescents, particularly those living in refugee camps. It has been increasingly acknowledged that such approaches should be designed and implemented within an ecological framework (Betancourt et al., 2013; de Jong et al., 2015; Eruyar, Huemer, et al., 2018; Hodes & Vostanis, 2019). This implies that interventions should integrate risk and protective factors at multiple levels of children`s social ecology, i.e. individual, family, peers, school and community, instead of targeting factors in isolation. Numerous scholars have called for evidence-based interventions involving caregivers and families as a powerful source of risk and resilience in children`s immediate environment (Betancourt et al., 2013; Miller & Jordans, 2016; Vostanis, 2016). However, a recent systematic review identified only six studies on family interventions with traumatized refugees (Slobodin & de Jong, 2015).

A general imperative for any kind of intervention is that they should be based on a rigorous and sensitive assessment of the prevalence of mental health problems in a given setting as well as contextually and culturally relevant risk and protective factors that may be targeted by practical efforts (de Jong et al., 2015). Notwithstanding the substantial role that has been attributed to the family in mediating the impact of war and violence on children`s mental health and well-being (Betancourt & Khan, 2008; Cicchetti & Lynch, 1993; Miller & Jordans, 2016), little is known about whether and how this applies to refugee families living in refugee camps in low-and middle-income settings. For example, in a review of mental health outcomes for refugee youth currently living in camps, only five of 20 studies actually included children`s caregivers, albeit mostly only the mother (Vossoughi et al., 2018). It is conceivable that this lack of relevant research with families in these settings impeded the development and implementation of appropriate interventions. Furthermore, it has been well documented that multiple risk factors within children`s and adolescent`s social environment may have a cumulative impact on their mental health and adjustment (Evans et al., 2013; Garbarino & Kostelny, 1996). While the reality of past exposure to war and flight cannot be changed and many stressors of camp-life such as poverty, lack of food and inadequate housing are rather structural in nature, factors related to children`s immediate socio-ecological environment, particularly the family, may be most amenable to change through interventions (Miller & Jordans, 2016). Consequently, there is a high need for ecologically informed studies that focus on how family-related and other proximal factors may contribute to the mental health of refugee children living in refugee camps.

Furthermore, research with children living in camps is essential to map their need for mental health care and thus enable an efficient allocation of resources for prevention and intervention. Generally, mental health care in low- and middle-income countries, where most humanitarian crises take place, is impeded by a lack of trained specialists and an inequitable distribution of available resources (de Jong et al., 2015). Although health services within refugee camps may be better equipped than in the surrounding regions due to the presence of international organizations (Feldman, 2007), the increased mental health needs in these settings probably still exceed existing capacities (Lokuge et al., 2013). Underfunding of refugee situations further impede the delivery of adequate

health care. Furthermore, a report by the organization Médécins sans Frontières (MSF) in the DRC Congo and Iraq showed that children and adolescents constituted only 14% and 17.5% respectively, of all presentations to MSF mental health services in these countries, suggesting that young people may not be specifically targeted by mental health services (Lokuge et al., 2013) and/or that there may be potential barriers for children`s and adolescents` access to mental health care. Including families may help to better understand these barriers, as parents and other caregivers play a decisive role in navigating health care pathways. In addition to barriers such as stigma and cultural concepts of mental health, distrust of authorities or prioritization of displacement-related stressors among families (Colucci et al., 2015; B. H. Ellis et al., 2011), parents being caught up in their own distress may simply not be aware of their children`s emotional needs (Pumariega et al., 2005). This suggests that it might be valuable to involve the family not only in treatment, but already at the early stage of identifying children and adolescents who might be in need of mental health care.

## 2.6. Overall objective of the current work

This study aims to shed light on the mental health and adjustment of refugee children and adolescents living in large refugee camps in a low-income region close to ongoing conflict. These youth have been neglected by research so far, although they constitute a significant proportion of the global refugee population and the context of their displacement may render them particularly vulnerable to adjustment problems (Frounfelker et al., 2020; Reed et al., 2012; UNHCR, 2019; Vossoughi et al., 2018). Considering the paramount importance of children`s proximal social ecology for their development, this study adopted an ecological family focus. In doing so, it drew on Bronfenbrenner`s theory of human development (Bronfenbrenner, 1979, 1995) and its applications to the etiology and consequences of child maltreatment (Belsky, 1980, 1993; Cicchetti & Lynch, 1993), refugee distress (Miller & Rasmussen, 2017) and to parenting in the context of war and displacement (Murphy et al., 2017) as theoretical frameworks. The overall objective of the current research was to investigate associations between risk and protective factors on different socio-ecological levels (individual, microsystem(s), exosystem) and refugee youth`s mental health as well as their cognitive functioning as another facet of adjustment. The findings were expected to provide the foundation for the development of prevention and intervention efforts to promote the well-being and alleviate distress of refugee children living in refugee camps.

The basic premise guiding this research was that children are embedded within families, who are embedded within the wider socioeconomic and cultural context. Factors on more distal levels, i.e. the macro- and exosystem, impact on the proximal family level, which impacts on children`s mental health and cognitive functioning. Of particular importance is the notion of proximal processes (Bronfenbrenner & Ceci, 1994), which comprise enduring reciprocal between interactions between children and family members and are considered to exert the most powerful influence on children`s

development. This study focuses on two kinds of proximal processes, child maltreatment and the attachment relationship. Both processes can be subsumed under the broad concept of parenting, with maltreatment representing extreme forms of maladaptive parenting behaviors and attachment being a key determinant of the parent-child relationship (Toth et al., 2013; Valentino, 2017). By assessing experiences of maltreatment and attachment representations through children`s perspectives, this study emphasized the transactional nature of these processes (Belsky, 1993; George, 1996).

Both maltreatment and attachment behaviors are likely to be particularly salient among refugee families living in camps close to ongoing conflict due to their past exposure to trauma and to stressors of camp life (Almqvist & Broberg, 2003; El-Khani et al., 2016; Meyer et al., 2013). At the same time, given that many displacement-related stressors, e. g. poverty and lack of protection systems, are rather structural in nature and depend on the implementation of policies, factors related to family functioning and parenting may constitute those sources of risk within children`s ecology that are most amenable to change (Miller & Jordans, 2016). Parenting is critically determined by caregivers` well-being and mental health, which is in turn decisively shaped by refugees` exposure to war-related trauma and to displacement-related stressors on various ecological levels (Miles et al., 2019; Miller & Rasmussen, 2017; Murphy et al., 2017). Consequently, this study also focused on parental mental health problems as a critical family-related factor for refugee children`s mental health. Although the focus was on family-related factors, we also considered other individual (exposure to war-related traumatic events, children`s age, gender and education, engagement coping), microsystem (quality of children`s friendship) and exosystem factors (mother`s social support networks and exposure to community violence) in our analysis. Other displacement-related factors were not systematically assessed in this study as the objective exposure to harsh living conditions such as overcrowded and bad housing, poverty and unemployment, lack of material resources and bad sanitary conditions were not supposed to vary to a great extent between families. However, all these factors are considered to impact on children and parents` mental health and proximal processes. Figure 1 displays the conceptual model of this study.

In an effort to overcome limitations of previous studies investigating the role of socio-ecological factors for children`s mental health, we assessed parenting variables and children`s mental health through children`s self-report. This not only helps to minimize biases in parental reports of child outcomes stemming from parents` own distress, it also takes into account refugee children`s agency and acknowledges the importance of considering their views and perceptions for planning interventions (Eruyar et al., 2020). However, in order to get a more comprehensive picture of children`s mental health and given evidence suggesting that parents tend to be better reporters of children`s externalizing problems (De Los Reyes & Kazdin, 2005), we also included parents` ratings of children`s emotional and behavioral symptoms. This multi-informant approach was complemented by a multi-method approach, which consisted in investigating associations between children`s memory functioning assessed through standardized neuropsychological tests and self-report interview data of

children`s experiences and mental health. In addition, unlike most previous studies, we included both parents in the study and assessed family-related factors (psychopathology, maltreatment, attachment relationship) separately for mothers and fathers. As the use of clinical and convenience samples as well as self-report questionnaires may produce inflated prevalence estimates of mental health problems (Fazel et al., 2005; Kien et al., 2019), we chose to apply a systematic random sampling approach and structured clinical interviews to assess refugee children and parents` mental health problems.

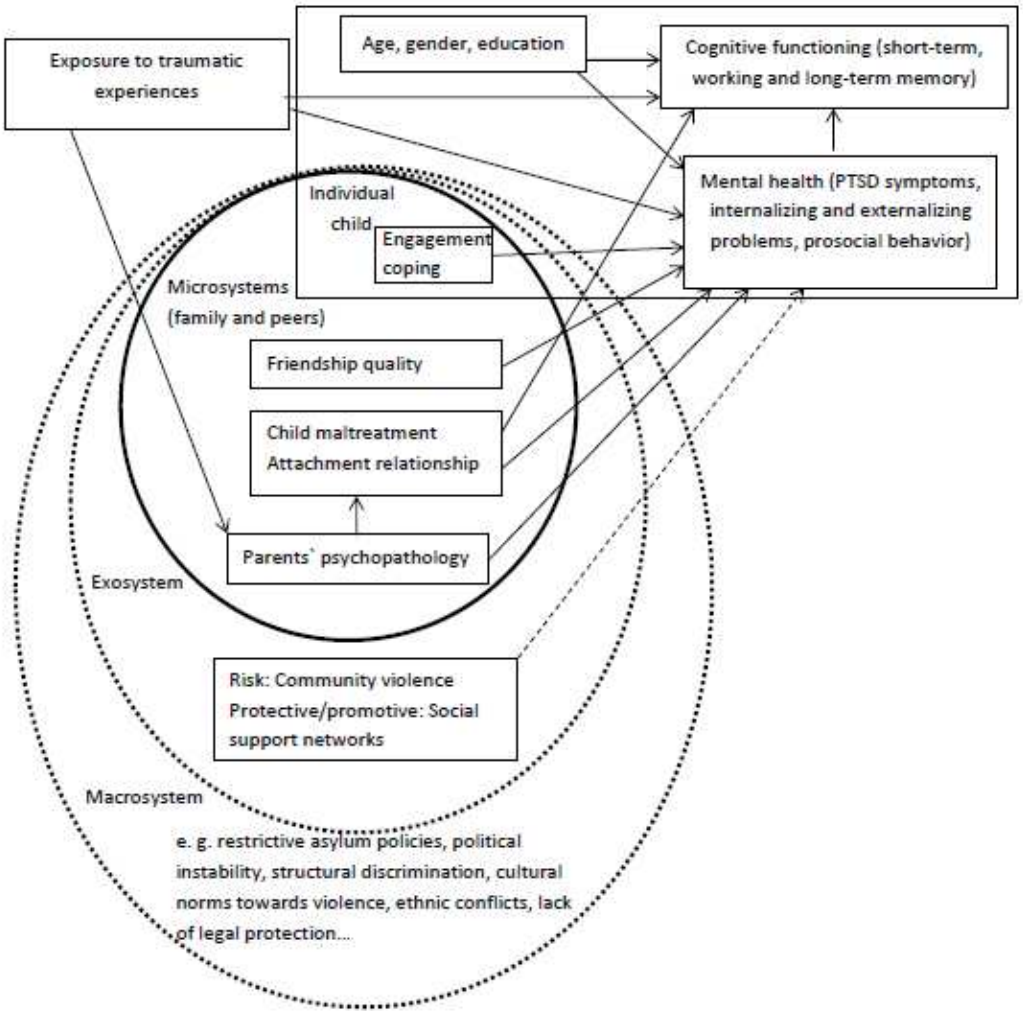


*Figure 1:* Conceptual model of investigated factors and associations

## 2.7. The context of the current work

### 2.7.1 Mapping the empirical context: A systematic review of factors contributing to risk and protection of refugee children`s mental health

In order to be able to embed this study in the wider empirical context, a systematic review of the current evidence on socio-ecological factors contributing to the mental health of refugee children and adolescents was conducted. The most comprehensive systematic reviews to date focusing on refugee

children living in high-income countries (Fazel et al., 2012) and in low- and middle-income countries (Reed et al., 2012) only considered studies that had been published until July 2010. During the past decade, however, there has been a dramatic surge in the number of forcibly displaced people in the world and a myriad of studies on refugee children`s mental health has been conducted, pointing to the need for a timely and comprehensive systematic review of the evidence. Recent reviews on this topic did not comprehensively meet this need as they were focused on specific settings of resettlement, e.g. only high-income countries (Marley & Mauki, 2018; Reavell & Fazil, 2017), particular subgroups of refugee youth, e.g. unaccompanied refugee minors (El Baba & Colucci, 2018; Mitra & Hodes, 2019) and Syrian children (Yaylaci, 2018), specific disorders, e.g. PTSD and depression (Reavell & Fazil, 2017; Tam et al., 2017) , or specific factors of influence, e.g. placement type (O'Higgins et al., 2018) and acculturative stress (d'Abreu et al., 2019). Reviews that adopted a broader focus (Eruyar, Huemer, et al., 2018; Hodes & Vostanis, 2019) did not apply rigorous methods including systematic study selection criteria and quality appraisals of included studies. This systematic review claimed to fill these gaps by using rigorous selection and quality criteria and by not posing a limit on certain factors, samples or outcomes. While this heterogeneity precluded the use of meta-analytic techniques, such a broad focus was deemed essential to reflect the diversity of refugee children`s lived experiences. Besides mapping the empirical context for the current study with refugee families, the central goal of the synthesis of the current evidence was to enable empirically grounded conclusions on which risk and protective factors shape the mental health and well-being of refugee children and should therefore be targeted by prevention and intervention approaches. Moreover, it aimed to point out limitations of current studies and make concrete recommendations for further research efforts. Consistent with the overall socio-ecological framework of this study and previous reviews (Fazel et al., 2012; Lustig et al., 2004; Reed et al., 2012), the systematic review classified factors according to their socio-ecological context (individual, family, community, society/culture) and the temporal stage in the refugee journey (pre-, peri- and post-migration).

### 2.7.2 The Burundian refugee crisis and the Tanzanian camps

The study focused on refugee families from Burundi who were living in refugee camps in neighboring Tanzania. Burundi is a small, landlocked country in the Great Lakes region in Eastern Africa. It is one of the most densely populated countries in the world, with an estimated 435 inhabitants per $km^2$ in 2015, and it also one of the poorest countries, ranking $184^{th}$ out of 188 countries in the Human Development Index of the United Nations (World Bank, 2018). Following Burundi`s independence from the Belgian colonialists in 1962, deeply rooted ethnic tensions between the Hutu and Tutsi groups were misused to gain and secure political power and erupted in several waves of extreme violence, for example in 1972, 1988 and a long-lasting civil war from 1993 until 2005 (Irankunda et al., 2017; Uvin, 2009). Due to these returning crises in Burundi`s younger history, a large part of the countries` population has been forced to flee and seek refuge in a neighboring country, particularly

Tanzania, Rwanda and the Democratic Republic of Congo, at least once, with phases of displacement and repatriation often taking turns (Uvin, 2009). It can be assumed that these atrocious traumas in Burundi`s younger history left their marks on the mental health of its citizens, which is supported by studies showing high rates of distress in samples of displaced and non-displaced Burundians (de Jong et al., 2000; Familiar et al., 2016; Yeomans et al., 2008). It also suggests that Burundi is a case in point for the importance of an intergenerational perspective in order to understand how the effects of trauma are transmitted from one generation to another (Berckmoes et al., 2017; Song et al., 2014).

In April 2015, Burundi plunged into the latest crisis, when the president Pierre Nkurunziza announced to stay in power for an illegitimate third term. Violence and atrocities committed by members of the ruling party, particularly its youth wing *Imbonerakure*, towards perceived opponents, including abductions, extrajudicial killings and torture, caused more than 400 000 Burundians to flee to neighbouring countries, making Burundi the 10$^{th}$ largest source country for refugees worldwide at the end of 2017 (Human Rights Watch, 2017; UNHCR, 2018b). Tanzania hosted the largest number of Burundian refugees with over 250 000 people as of October 2017, 58% of whom were children (UNHCR, 2018a). The refugees were resettled in three refugee camps, Nyarugusu, Nduta and Mtendeli, in the Kigoma region in Western Tanzania close to the border to Burundi. Nyarugusu camp was opened in 1996 to provide refuge for people fleeing the war in DRC and hosted 69 065 Burundian and 80 080 Congolese refugees as of October 2017 (UNHCR, 2017a), making it the third largest refugee camp in the world (International Federation of Red Cross and Red Crescent Societies, 2019). Nduta and Mtendeli camps were reopened in 2015 to relieve the capacities of Nyarugusu and to manage the ongoing influx of refugees, hosting 120 043 and 47 296 Burundian refugees respectively at the end of 2017 (UNHCR, 2017a).

To better understand the overall context and climate in which Burundian refugees lived in the host environment after the latest flight wave, it is important to understand how Tanzania`s attitudes towards hosting refugees have changed over time. After Tanzania had become independent in 1961, the country`s first president Julius Nyerere pursued a welcoming “open door policy” towards refugees from neighbouring countries that was based on the values of humanism and pan-africanism and emphasized finding permanent and sustainable solutions to refugee crises (Chaulia, 2003). In 1998, however, the Tanzanian government passed a new Refugee Act as a response to the refugee crisis shaking the Great Lakes region in the 1990`s, now focusing on providing short-term relief for refugees in camps and restricting their rights to live, work and move outside the camps (Chaulia, 2003). This restrictive camp-oriented policy has been Tanzania`s status-quo ever since, even though in 2008, Tanzanian citizenship was offered to 200 000 Burundian refugees who had been living in Tanzania since 1972 (Kuch, 2017). The current government under president John Magufuli has taken a tough stance toward the Burundian refugees, urging them to return home to Burundi in July 2017 (The New Humanitarian, 2018). Early 2018, when this study was conducted, a constant fear among the refugees that the camps would be closed and that they would be forcefully repatriated to Burundi, where

violence and human rights violations were ongoing, was palpable. Apart from the political perspective, narratives of members of the host communities around Mtendeli and Nduta revealed that the locals have many concerns about the Burundian refugees, for example related to increased insecurity in the region, the loss of farmland to the camp areas and an increased risk of diseases (Felix Da Costa, 2018).

Burundians living in Nyarugusu, Nduta and Mtendeli have been facing extremely harsh living conditions. As of 2018, the Burundian refugee situation was the one which received least funding by international donors worldwide (Reliefweb, 2018), which affected all areas of life. For example, throughout 2017 the World Food Programme had to reduce monthly food rations given out to the refugees due to lack of funding up to only 62% of the required minimum intake (Felix Da Costa, 2018). As there are no alternative sources of cooking fuel, women and girls have to travel up to 15 kilometres per day outside of the camp to collect firewood, which additionally increases their already high risk of facing sexual gender-based violence (Al Jazeera, 2016). The lack of available resources is also keenly felt in inadequate shelters, overcrowded health centres and classrooms as well as reduced capacity to provide services to vulnerable groups such as unaccompanied children and victims of sexual violence (Reliefweb, 2018). The legal confinement to the camps including the prohibition to move and work outside the camps has been described as a "prisonlike" by their inhabitants (Deutsche Welle, 2018; Felix Da Costa, 2018). Although it is illegal for the refugees to leave the camps, they often do so due to the scarcity of food and lack of livelihoods inside the camps. This, however, increases the risk of conflicts with host communities and exposes them to abuse and violence by police and locals (Felix Da Costa, 2018). Personal accounts of Burundians who left the Tanzanian camps to go to Uganda highlight the ongoing fear of insecurity also inside the refugee camps, indicating that due to the closeness to the Burundian border members of the Imbonerakure were able to enter the camps and continue to harass and attack people (Human Rights Watch, 2019).

## 2.8 Specific objectives and hypothesis

### 2.8.1 Prevalence of traumatic experiences and mental health problems among Burundian refugee families and patterns of morbidity

Although the vast majority of refugees in the world live in low- and middle-income countries and many of them in refugee camps, research on the mental health of refugees has focused on those who resettled in high-income settings such as Europe, North America and Australia (Reed et al., 2012; UNHCR, 2019). This asymmetry is especially pronounced when looking at the evidence base for refugee children and adolescents, who make up about half of the global refugee population (UNHCR, 2019), but have been the focus of less studies compared to adult refugees. The negligence of children is a major gap because the adversities of violent conflict and displacement may disrupt children and adolescents` socioemotional, biological and cognitive development and render them particularly

vulnerable for developing long-lasting and debilitating adjustment problems (Eisenbruch, 1988; Lustig et al., 2004; Reed et al., 2012). The lack of research in refugee camp settings is a further limitation. On the one hand, it implies that the lived realities of a substantial part of refugees in the world are not adequately represented by the current evidence base. On the other hand, the extremely harsh living conditions in camps, e.g. lack of food and material resources, crowded housing, high rates of violence, disruption of social networks, may negatively impact refugees` mental health above and beyond uprooting and flight (De Bruijn, 2009; Miller & Rasmussen, 2010). Accordingly, studies with children and adults living in camps found high prevalence rates of trauma exposure and mental health problems (Neuner et al., 2004; Tekin et al., 2016; Vossoughi et al., 2018).

The fundamental role of the immediate family context, particularly parental functioning, for children and adolescents` healthy development and well-being has been well documented in non-refugee samples (Bronfenbrenner, 1986; Masarik & Conger, 2017; L. Steinberg, 2001). Moreover, research from current and post-conflict settings has begun to elucidate how the family mediates the effects of war and violence on children`s adjustment (Betancourt & Khan, 2008; Catani, 2018; Dubow et al., 2009). In contrast, there is a paucity of studies investigating parental and child mental health in tandem among refugee families in general and in camps in particular. Most studies focused either only on adults, many of whom can also be assumed to be parents, or only on children. The limited evidence leaves the role of parents` well-being for refugee children`s mental health risk and resilience in camps unclear. On the one hand, high levels of exposure to traumatic experiences and daily hardships may overtax parental functioning and put children at an increased risk (Miller & Rasmussen, 2017). On the other hand, among multiple stressors and risks for children`s mental health, parents` good mental health and continuous ability to support their children may be crucial protective factors (Fazel et al., 2012). However, this cannot be taken for granted and insights from totally different contexts and cultures cannot be simply transferred to others.

Therefore, the objective of the first study was to assess the prevalence and familial patterns of traumatic experiences and mental health problems among Burundian refugee children, their mothers and fathers. We focused on PTSD as the major psychological consequence of war events (Neuner et al., 2004), but considered also general psychological distress in parents as well as child-and parent-reported internalizing and externalizing problems. Given that children and adults who do not fulfill criteria for a full-blown PTSD diagnosis may still experience debilitating functional impairment in their social relationships, school, work or other domains (Angold et al., 1999; Carrion et al., 2002; Cukor et al., 2010), we also considered the prevalence of functional impairment due to PTSD symptoms. Based on previous studies conducted in refugee camps (e. g. Neuner et al., 2004; Riley et al., 2017; Vossoughi et al., 2018), we expected to find high levels of traumatic experiences, mental health problems and functional impairment among refugee children and their parents. Moreover, as trauma affects not only the individual, but the whole family system (Horesh & Brown, 2018;

Punamäki et al., 2017), we hypothesized to observe an accumulation of morbidity in terms of PTSD symptoms and functional impairment within families.

### 2.8.2 The interplay of attachment and maltreatment in the transgenerational transmission of psychopathology

While the first manuscript took a descriptive approach towards refugee children`s and parents` mental health problems by examining their prevalence and patterns of co-existence of morbidity, the second manuscript examined potential mechanisms underlying the association between parents` and children`s psychopathology. Parents` ongoing psychopathology such as PTSD, depression and anxiety has been shown to be a risk factor for child maltreatment (Black, Smith Slep, et al., 2001; Montgomery et al., 2019; Mulder et al., 2018; Stith et al., 2009), which is in turn associated with poor mental health outcomes for children (Cicchetti & Toth, 2005; Norman et al., 2012). Parents suffering from psychopathology have also been shown to be less able to be emotionally available to the child and react sensitively to children`s cues (van Ee, Kleber, & Jongmans, 2016; Wan & Green, 2009), qualities that are crucial for the formation of a secure attachment (De Wolff & van Ijzendoorn, 1997). It has been theorized that trauma damages the parents` internal attachment representations of themselves as caregivers and of their children being in need of their love and protection, which affects the quality of the parent-child relationship (Almqvist & Broberg, 2003; De Haene et al., 2010). Insecurely attached children are at an increased risk of developing mental health problems such as depression, anxiety and externalizing problems (Brumariu & Kerns, 2010; Colonnesi et al., 2011; Fearon et al., 2010).

Furthermore, intricate associations between child maltreatment and insecure attachment patterns have been consistently found, indicating that children who experience abuse and/or neglect by their parents are more likely to develop an insecure attachment compared to children who are not maltreated (Baer & Martinez, 2006; Cyr et al., 2010; Lowell et al., 2014; Morton & Browne, 1998). The conceptualization of maltreatment as an escalation of a disturbed parent-child relationship and the consideration of family contexts in which maltreatment is recurrent and may occur on a daily basis suggests that an insecure attachment relationship may be cause and consequence of maltreatment at the same time. In older children and adolescents, the attachment relationship is far from being a one-way street, but a goal-directed partnership, to which they actively adapt and contribute (Bowlby, 1969; George, 1996). Children of parents who suffer from psychopathology and may thus be less able to engage in the parent-child relationship and meet children`s attachment needs, may adapt to this relational experience in ways that match what the parent can offer, but increases their risk of facing maltreatment by parents. For example, children who withdraw from the parent-child relationship to avoid the pain of not getting the love and support they need, may ultimately trigger abusive and neglectful treatment by parents by reminding them of their failure as caregivers and attachment figures (Almqvist & Broberg, 2003; Cummings & Davies, 1994).

Hence the key objective of the second manuscript was to investigate the interplay of parental psychopathology, attachment and maltreatment and how these factors were related to child psychopathology. Our sample was particularly appropriate to test such a model due to the hypothesized high prevalence of parental mental health problems and child maltreatment in refugee camps and the presumed salience of the attachment system which is activated in contexts of threat and stress. Unlike most previous studies, which focused on attachment between mothers and their young children assessed through behavioral observations, we were interested in older children`s *representations* of their relationships with both mothers and fathers. We hypothesized that 1) higher levels of parents` psychopathology would be associated with more child maltreatment both directly and indirectly through children`s more insecure attachment representations of their relationships with their parents; 2) children`s more insecure attachment representations would partially mediate the relation between higher levels of parental and child psychopathology; 3) more child maltreatment would partially mediate the association between higher levels of parental and child psychopathology; 4) more child maltreatment would partially mediate the relation between children`s more insecure attachment representations and higher levels of child psychopathology.

### 2.8.3 The mediating role of psychopathology in the association between maltreatment and memory functioning

The third manuscript aimed to shed light on the potential consequences of child maltreatment and psychopathology for children`s cognitive functioning. Extensive research with non-refugee samples has shown that child maltreatment detrimentally affects victims` educational outcomes (R. Mills et al., 2019; Romano et al., 2015) and socioeconomic well-being in adult life (Currie & Spatz Widom, 2010; Zielinski, 2009), which may be due to maltreatment-related disruptions in cognitive abilities (Irigaray et al., 2013; Kavanaugh et al., 2017). Memory, consisting of the sub-systems short-term, working and long-term memory, is a cognitive domain that is critical for academic and intellectual outcomes (Alloway, 2009; Alloway & Alloway, 2010; Bull et al., 2008; Unsworth, 2010). There is scant evidence on cognitive and in particular memory functioning in refugee children, for whom academic participation and progress is a building block for their long-term adjustment in the host environment. Refugee children may be at an increased risk of experiencing maltreatment due to an accumulation of risk factors in their social ecology (Lebrun et al., 2015; Timshel et al., 2017) which may impede their capacities for learning and academic progress above and beyond pre-migration trauma and stressors related to post-migration adjustment (Graham et al., 2016; Kaplan et al., 2016). In already fragile low-income settings, lack of prospect and low socioeconomic status among repatriated refugees may contribute to a cycle of ongoing conflict and displacement (Cilliers, 2018; Uvin, 2009). Available evidence on associations between maltreatment and memory functioning in children and adolescents is inconclusive with regard to whether memory impairments are due to maltreatment per se or due to maltreatment-related psychopathology (e. g. Augusti & Melinder, 2013; De Bellis et al., 2010; Hecker

et al., 2016; Yasik et al., 2007). Disentangling these associations has been hampered by various factors, for example the reliance on clinical samples with PTSD, a categorical conceptualization of maltreatment and psychopathology and the use of caregiver reports (Hart & Rubia, 2012; Kavanaugh et al., 2017; K. Wilson et al., 2011).

Consequently, the objective of the third manuscript was to investigate associations between child maltreatment by parents, psychopathology and memory functioning. To overcome previous limitations, we drew on a community sample and conceptualized maltreatment and psychopathology as dimensional concepts assessed through children`s self-reports. Moreover, we considered not only PTSD symptoms, but also emotional problems and posttraumatic cognitions as manifestations of psychopathology and differentiated between short-term, working and long-term memory. Short- and working memory were assessed with the Corsi Block Tapping Task (Berch et al., 1998), while long-term memory was assessed with the Rey-Osterrieth Complex Figure (Waber & Holmes, 1986). Based on the established link between maltreatment and psychopathology (e. g. Hecker et al., 2014; Kim & Cicchetti, 2004; Lansford et al., 2014) and on previous evidence on short-term and working memory deficits in children with internalizing problems (e.g. Blanken et al., 2017; Moran, 2016), we hypothesized that higher levels of psychopathology would mediate the association between more severe maltreatment and greater deficits in short-term and working memory. As evidence on long-term memory deficits in children with mental disorders is inconsistent (Günther et al., 2004; Toren et al., 2000), we did not have an a priori hypothesis on the association between maltreatment, psychopathology and long-term memory deficits.

### 2.8.4 Risk, protective and promotive factors for the mental health of Burundian refugee children

The three previous articles focused on risk factors for refugee children`s adjustment within the family microsystem and conceptualized adjustment in terms of mental health problems and memory deficits. The fourth article aimed to broaden this risk and deficit perspective with a family focus by also considering potential protective and promotive factors within children`s social ecology, i.e. related to the individual child (engagement coping), another microsystem (peer relationships) and exosystem (maternal social support network), and both negative (PTSD symptoms, internalizing and externalizing problems) and positive (prosocial behavior) aspects of adjustment. Besides war-related and maternal violence, the level of current community violence as reported by mothers was included as an additional exosystem risk factor. While previous evidence has been inconclusive about whether engagement coping is a risk or protective factor for the mental health of refugee youth (Elklit et al., 2012; Khamis, 2019), the important role of friendships for children`s mental health and well-being in the face of adversity has been well documented in refugee samples in high-income countries (Oppedal & Idsoe, 2015; Reed et al., 2012; Sierau et al., 2018) and in non-refugee populations (Waldrip et al., 2008; Yearwood et al., 2019). Similarly, previous research with refugee and non-refugee children

suggests that the quality of mothers` social support networks is beneficial for their offspring`s mental health and socioemotional development (Markiewicz et al., 2001; McPherson et al., 2014; Tousignant et al., 1999). Ecologically informed research has further shown how war-related, community and family violence independently and jointly impair children`s mental health and adjustment (Cummings et al., 2012; Lynch & Cicchetti, 1998; Saile et al., 2016).

Notwithstanding, evidence on the role of these factors for the mental health and well-being of refugee children living in refugee camps close to ongoing conflict is scarce. A better understanding of ecological factors contributing to these children`s mental health risk and resilience can provide important insights on which aspects should be prioritized and capitalized on in prevention and intervention programs. Based on available evidence from refugee and non-refugee populations, we hypothesized that violence on the different ecological levels (war-related, maternal, community) would be associated with higher levels of mental health problems and lower levels of prosocial behavior. Due to the inconclusive previous findings, we did not have a priori hypotheses regarding the association between engagement coping and mental health outcomes. In addition, we expected that higher quality relationships with friends as well as higher quality maternal social support networks would be associated with lower levels of mental health problems and higher levels of prosocial behavior.

## 3. Methods and procedure

### Study process

The study was conducted as a collaboration project between the University of Zurich, the University of Bielefeld and the Dar es Salaam University College of Education (DUCE). The core project team consisted of three psychologists from Tanzania who all had a master degree and two German psychologists, one with a PhD and one with a master degree.

The overall study process consisted of three phases. In the first phase from July until December 2017, we acquired all necessary permits to conduct research in Tanzania and the refugee camps including the general research permit issued by the Commission for Science and Technology (COSTECH) and the permission to enter the camps by the Tanzanian Ministry of Home Affairs to conduct research in the refugee camps. We also received ethical approval by the National Institute for Medical Research (NIMR) and by the Ethics Commission of the University of Zurich. Moreover, this phase included a training of the project team in the use of the research instruments and in dealing with challenging situations that might occur during data collection. In addition, we conducted a pilot assessment with the neuropsychological tests at a primary school to ensure their general feasibility. All activities during the first task took place in Dar es Salaam.

In the second phase from December 2017 until January 2018, we conducted logistical preparations in the area of the refugee camps in the Kigoma region in Western Tanzania. These

activities included meetings with local authorities and the camp administrators to introduce the project team and the study and served to establish a solid foundation for the field work in the camps. We also approached UNHCR and non-governmental organizations (NGOs) working in the camp in order to gain practical support in the realization of the study on the ground. In this phase we also organized accommodation in proximity to the camps as well as a means of transport to the camps.

The third phase from February to May 2018 covered the actual data collection in the camps, starting in Mtendeli, then in Nduta and finally in Nyarugusu. In each camp, we proceeded in the following order to implement and conduct data collection: first, we organized support by the camp administration and NGOs (Plan International and International Rescue Committee) who provided necessary space and other resources (chairs, tables etc.) for data collection. Second, we recruited and trained research assistants from the local refugee communities to support data collection as translators and interviewers. Third, we recruited and interviewed four to six refugee families per day depending on availability of resources and research assistants. The second and third steps are described in more detail in the following sections.

**Selection and training of research assistants**

With the support of the collaborating NGOs, camp authorities and community leaders, we identified members of the refugee community in each camp who could assist the data collection as interviewers. Selection criteria for research assistants were a secondary school or preferably a university degree, fluency in English and Kiswahili besides their native language Kirundi and prior work experience with NGOs within the camps, preferably in the areas of psychosocial support or child protection. After doing short interviews with the candidates, the project team pre-selected potential assistants based on these criteria who then participated in a one week training workshop. The training consisted of a theoretical and a practical part. In the theoretical part, the study instruments were read item by item and the psychologists explained the underlying mental health concepts giving realistic examples. Qualitative group discussions served to assess the applicability and relevance of the mental health symptoms in Burundian culture. Furthermore, general principles of conducting clinical interviews for example regarding the establishment of a trustful relationship between interviewer and interviewee were explained and discussed. The practical part focused on intensive practice in applying the study instruments in the form of role plays. This also included the simulation of potentially challenging interviewing situations, for example with interviewees who do not focus on answering the questions or who are reluctant to talk. The project team made a further selection based on their impressions during the training workshops, resulting in a final selection of four to six interviewers from the refugee community in each camp.

In the first camp Mtendeli, it became clear from conversations with camp officials, NGO workers and refugee representatives that the general knowledge of Kiswahili, despite being the lingua franca in the camps, among the Burundian refugees may not be sufficient to fully understand the partly complicated mental health terms and concepts. This was confirmed by a pilot assessment with eight

families in Mtendeli. Therefore, we additionally selected and trained interpreters who could translate from Kiswahili to Kirundi if necessary. The interpreters needed to have the same qualifications as the interviewer assistants, specifically prior work experience as interpreters for NGOs within the camps. The interpreter training involved qualitative discussions among the participants to find equivalent terms for describing mental health symptoms and concepts in Kirundi language, the explanation of interpreting rules and practice in the form of role plays.

**Sample selection**

We combined a systematic and a random strategy to the recruit the study sample which theoretically gave every refugee family in each camp the same chance to participate in the study. Each camp was divided into camp zones labelled for example A to L. Before starting the data collection in each camp, we randomly selected two zones. Based on geographical maps of the camps, we determined the centers of these zones. A screening team consisting of one or two members of the project team and NGO workers from the refugee community went to the centers of the selected zones. A sampling direction was then randomly chosen by spinning a pen. Every sixth hut or tent in this direction was approached and the family residing there was invited to come to the NGO compound to participate in the study on the following day at a specific time. For our study, we defined a family as a triad consisting of the father or primary male caregiver, the mother or primary female caregiver and the oldest child within primary school age in Tanzania, i. e. between 6 and 15 years. If a family was absent during the recruitment or did not meet our inclusion criteria, for example when a male or female caregiver was permanently not present, the next household in the determined sampling direction was approached. When the end of the assigned zone was reached, a new sampling direction was randomly determined by spinning a pen and the procedure was repeated until the necessary number of families for the next day, usually four to six had been recruited.

This sampling strategy resulted in a total of 230 family triads, i. e. 460 caregivers and 230 children. As the majority of the caregivers were the children`s biological parents (84.3% of the mothers and 83% of the fathers), we always refer to caregivers as mothers and fathers in the following. More than 60% of the families had arrived at the camps in 2015 after the outbreak and peak of political violence in Burundi, but over 30% fled only in 2016. On the one hand, this shows that the situation in Burundi had continued to be unsafe after 2015 and on the other hand, the fact that most families had lived in the camps for more than two years at the time of the study points to the protracted nature of the Burundian refugee crisis in Tanzania. The majority of families had lived in Burundian provinces directly bordering Tanzania before their flight (see Figure 2). About 80% of the mothers and fathers identified the political violence in their country as the main reasons for their flight, while approximately 15% indicated conflicts with their extended family, often about land and properties, and other factors, for example extreme poverty or ethnic discrimination, as main reasons. With over 80% of the families living in households of six or more people and about 30% of the parents reporting to have no monthly income at all, the living situation in the camps could well be described as

overcrowded and the socioeconomic opportunities as poor. Other sociodemographic characteristics of the full study sample can be found in the first manuscript.

**Procedure**

Upon arrival at the NGO compound, families were welcomed by the project team and led to separate private areas. Families then received a detailed oral and written explanation of the purpose of the study, the procedure, associated risks, their right to withdraw from participation at any time and confidentiality of their data. Each family member gave their informed consent by signing with their names or fingerprints. Children aged 11 or older gave their own consent, while parents consented for younger children. All but two invited families were willing to participate in the study. Following this introduction, the child, mother and father of each family were interviewed individually by the Tanzanian psychologists and Burundian research assistants. The child interviews were conducted by psychologists who were experienced in research and practical work with children of different age ranges. It was also taken care that girls and mothers were paired with female interviewers. After the interviews children and mothers participated in a behavioural observation, which consisted of free play for five minutes and a mildly challenging task, i. e. building a tower of small wooden blocks, for another five minutes. At the end, children, mothers and fathers provided buccal swabs and, if possible, hair samples as biological markers of exposure to trauma and stress. The behavioural observation and biological markers are not relevant for this study. Finally, families were thanked for their participation and received a material compensation of 20,000 Tanzanian Shillings (ca. 8 Euro).

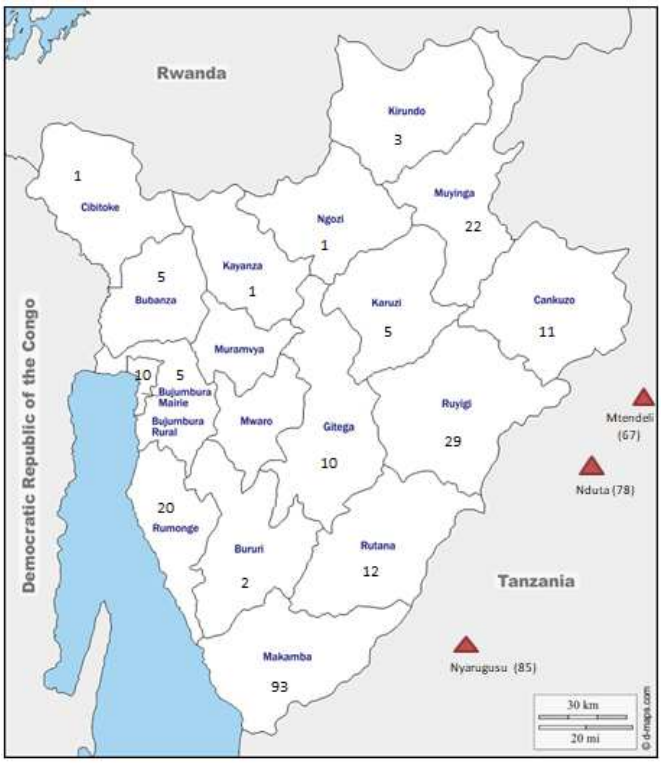


*Figure 2*: Number of refugee families per Burundian region and refugee camp

In order to support participants who presented with an increased risk of suicide or who expressed their wish for further treatment of their mental health problems, we had established a referral system together with the NGO International Rescue Committee (IRC), the main provider of mental health and psychosocial services within the camps. If a screening at the beginning of the interview had indicated a heightened suicide risk, a psychologist of the research team provided a detailed suicide assessment and immediately provided short-term suicide prevention. The interview was continued only if participants agreed. After the interview the psychologist provided another suicide assessment, made an oral agreement with the participants to meet the following day and referred them to IRC provided their consent. All other participants whose interviews revealed increased levels of mental health problems were asked if they wished further support for these problems and if they agreed, they were given an appointment with IRC. In the case of children, the parents` consent was critical for referral. At the appointment with IRC, a psychologist of the research team introduced the participant to the psychologist in charge and shared relevant information from the interviews provided the participant`s consent.

**Measures**

The interview guides for children and parents consisted of individual questionnaires that were administered in the form of a structured clinical interview to ensure standardized and comparable responses. Nevertheless, interviewers were flexible to reformulate or pose further questions and give examples, and the interview format allowed interviewers to incorporate their clinical impression and participants` non-verbal behavior in their judgement. The instruments making up the interview guides were translated from English to Kiswahili, or existing Kiswahili versions were used, according to scientific guidelines using blind back translation procedures (Brislin et al., 1973). Discrepancies in translations were discussed and resolved by the Tanzanian project team members. Qualitative focus group discussions during the trainings of research assistants from the Burundian refugee community supported the applicability of the instruments and underlying scientific concepts in Burundian culture. The pilot assessment of eight families in Mtendeli further provided evidence for the cultural and contextual applicability of the measures. In addition to answering interview questions, children also completed a battery of standardized neuropsychological test assessing memory, attention and executive functions. These tests had been selected together with the Tanzanian project team members with special attention to their applicability in an East-African cultural context. Table 1 lists all the assessment instruments used in the overall study. The instruments relevant for this study are described in more detail in the manuscripts.

**Statistical analysis**

The applied statistical analyses depended on the respective hypotheses and are described in more detail in the methods sections of the individual manuscripts. In general, data preparations, descriptive

analyses including the determination of prevalence rates, calculations of bivariate correlations and group comparisons were conducted with IBM SPSS Statistics Versions 24 and 25, while more complex analyses involving multivariate associations between study variables were performed in the statistical environment R (R Core Team, 2019).

**Table 1:** Study variables and corresponding assessment instruments

<table>
<tr><th>Refugee children</th><th>Refugee parents</th></tr>
<tr><td colspan="2"><u>Structured clinical interview</u><br>Sociodemographic data: Purposive-built questions inspired by Ainamani et al. (2017)<br>Traumatic exposure: Adapted checklist from Neuner et al. (2004)</td></tr>
<tr><td>• Mental health:<br>o Posttraumatic Stress Disorder (PTSD): University of California at Los Angeles Child/Adolescent PTSD Reaction Index for DSM-5 (Pynoos & Steinberg, 2015; A. M. Steinberg et al., 2004)<br>o Child Posttraumatic Cognition Inventory (Meiser-Stedman et al., 2009)<br>o Internalizing and externalizing problems: Strength and Difficult Questionnaire (SDQ)-Child version (R. Goodman et al., 1998)<br>o Suicidality: Suicidality Scale of the Mini-International Neuropsychiatric Interview for Children and Adolescents (M.I.N.I.-Kid) (Sheehan et al., 2010)</td><td>• Mental health:<br>o Posttraumatic Stress Disorder (PTSD): PTSD Check List for DSM-5 (Weathers et al., 2013)<br>o Psychological distress: Brief Symptom Inventory (BSI; Derogatis, 2000)<br>o Suicidality: Suicidality Scale of the Mini-International Neuropsychiatric Interview (M.I.N.I.) (Sheehan et al., 1998)</td></tr>
<tr><td>• Child maltreatment and harsh discipline: Parent-Child Conflict Tactics Scale (Straus et al., 1998)<br>• Psychosocial functioning in everyday life: Purposive-built questions<br>• Attachment relationships: People In My Life (Cook et al., 1995)<br>• Coping strategies: Kidcope (Spirito et al., 1988)<br><br><u>Neuropsychological testing</u><br>• Cognitive functioning<br>o <u>Memory:</u><br>- Corsi Block Tapping Task (Berch et al., 1998)<br>- Rey-Osterrieth Complex Figure (Waber & Holmes, 1986)<br>o <u>Attention:</u><br>- Cancellation (Wechsler Intelligence Scale for Children–WISC-IV) (Petermann & Petermann, 2011)<br>o <u>Executive function:</u><br>- Verbal Fluency Test (Jukes et al., 2002)<br>- Emotional Stroop Test (Cisler et al., 2011)</td><td>• Childhood experiences of violence: Parent-Child Conflict Tactics Scale- short version (Straus et al., 1998)<br>• Community violence: Adapted checklist from Hecker et al. (2015)<br>• Psychosocial functioning in everyday life: Luo Functioning Scale (Ertl et al., 2010)<br>• Social capital (e.g., social trust, social network, organizational attendance, community support): Locally adapted version of Social Capital Integrated Questionnaire (Grootaert et al., 2004)<br><br>• Children's mental health problems: Strength and Difficult Questionnaire (SDQ) – parent version (Goodman et al., 1998)<br>• Applied harsh discipline and violence toward children: Parent-Child Conflict Tactics Scale- short version (Straus et al., 1998)</td></tr>
<tr><td colspan="2"><u>Behavioral Observation</u><br>Interactional Features (Sensitivity, Structuring, Non-intrusiveness, non-hostility, responsiveness, involvement): Emotional Availability Scales (Biringen et al., 2014)</td></tr>
<tr><td colspan="2"><u>Physiological Measures</u><br>Hair cortisol and endocannabinoids: Collection of hair strands; DNA material: Buccal swabs</td></tr>
</table>

*Note*: The instruments applied in this study are written in bold and italic font.

# 4. Summary of results

## 4.1 Systematic review of the current evidence on factors contributing to risk and protection of refugee children`s mental health

The databases Medline, PsycINFO, Web of Science, and Cochrane were searched for English studies published in peer-reviewed journals between August 2010 and May 2020. The following search algorithm was used: (“asylum seeker” or “refugee” or “displaced person” or “migrant”) and (“child” or “adolescent” or “young” or “minor” or “teenage” or “youth”) and (“psychiatr*” or “psycholog*” or “psychosocial” or “mental” or “well-being” or “adaptation” or “adjustment” or “emotion” or “behaviour” or “behavior” or “trauma” or “traumatic” or “PTSD” or “posttraumatic stress” or “internalizing” or “externalizing” or “anxiety” or “depression”) and (“resilience” or “protective factor” or “modifying factor” or “recovery” or “outcome” or “risk factor” or “vulnerability factor”). The literature search yielded 2413 potential studies, of which 63 fulfilled all inclusion criteria and were therefore included in the narrative synthesis. Forty-one studies were conducted in high-income countries and 22 studies in low- and middle-income countries with refugee children coming from overall 53 different countries. Only 8 studies were conducted in refugee camps. Most studies (51) were cross-sectional and only 7 of those included a comparison group, while 12 studies used a longitudinal one-group design. According to the Systematic Assessment of Quality in Observational Research (SAQOR; Ross et al., 2011), 13 studies were of low quality, 26 of moderate quality and 24 of high quality. The factors contributing to risk and protection of the mental health of refugee youth identified by this systematic review across different socio-ecological levels (individual, family, community, society/culture) and stages of the refugee experience (pre-. peri- and postmigration) are displayed in Table 2. Pre-migration individual (risk: exposure to war-related trauma, female gender) and post-migration family factors (risk: parental mental health problems and impaired parenting, protective: family cohesion) have received wide support across a variety of different resettlement contexts. Post-migration community (protective: school connectedness, support by peers) and sociocultural factors (risk: discrimination and acculturative stress, protective: integrative acculturation) appear to play a role as well, but have only been investigated in high-income countries.

**Table 2:** Risk and protective factors according to socio-ecological context and stage in the refugee phase

| | Premigration | Perimigration | Postmigration |
|---|---|---|---|
| Individual | Exposure to war-related traumatic events (risk)[22] (25)<br><br>Being female (risk for internalizing symptoms and PTSD)[14] (21)<br>Being male (risk for externalizing symptoms)[3] (3)<br><br>**Longer period of schooling (protective)[6]** | **Length of current stay in a refugee camp (risk)[2]** | **Depression and anxiety symptoms (risk)[2]**<br><br>**Better perceived school performance (protective)[2]**<br><br>**Avoidant coping strategies (risk)[4]**<br><br>**Individual resilience (protective)[6]** |
| Family | **Loss of a parent (risk)[2]** | Separation from immediate family members (risk)[4] (3)<br><br>**Socioeconomic status in a refugee camp (protective)[2]** | **Living with at least one biological parent (protective)[2]**<br><br>Parental mental health problems (risk)[10] (2)<br><br>**Negative parenting behaviors (risk)[5]**<br>**Parental abuse (risk)[4]**<br><br>Family cohesion (protective)[4] (3)<br><br>**Warm parent-child relationship (protective)[3]** |
| Community | | | Support by peers (protective)[2] (4)<br><br>**Close relationships with friends (protective)[2]**<br><br>School connectedness (protective)[4] (3)<br><br>**Cumulative exposure to daily stressors (risk)[5]** |
| Society/Culture | | **Detention (risk)[2]** | Perceived discrimination (risk)[4] (3)<br><br>**Integrative acculturation style (protective)[6]**<br>**Exposure to acculturation stressors (risk)[4]**<br><br>**Resettlement in a poor region (risk)[2]**<br><br>**Low-support living arrangements (risk for unaccompanied minors)[3]**<br>**Asylum granted in host country (protective)[4]** |

Note: Only factors that were found in at least two studies are shown. Factors not included in the previous reviews by Fazel and colleagues (2012) and Reed and colleagues (2012) are highlighted in bold. The numbers indicate the number of studies that found the respective factor in the current review (without brackets) and in the reviews by Fazel and colleagues (2012) and Reed and colleagues (2012) (with brackets).

### 4.2 Prevalence of traumatic experiences and mental health problems among Burundian refugee families and familial patterns of morbidity

Children reported to have experienced an average of 7.53 (*SD* = 5.28) potentially traumatizing events with a maximum of 27 traumatic event types. Almost every child (98.7%, n = 227) had been exposed to at least one potentially traumatizing event and two thirds (65.2%) had experienced five or more events. The most common trauma was the death of a close person (84.3%), followed by seeing someone who was beaten up, shot at or killed (55.7%). Almost one half reported to have experienced a dangerous flight (45.7%). Less common events included being raped or sexually assaulted (7.4%), being beaten or tortured by armed personnel (4.8%) or being forcefully abducted (0.9%). There were no differences between girls and boys and between older (> 11 years) and younger children in total trauma exposure.

Mothers had been exposed to a mean number of 16.91 (*SD* = 6.19) potentially traumatizing events with a maximum of 30 traumatic event types. Every woman had experienced at least one potentially traumatizing event, 86.5% (*n* = 199) indicated to have experienced 10 or more potentially traumatizing events during their life. Fathers reported the highest levels of traumatic exposure (*M* = 20.80 *SD* = 5.72, *Max.* = 34). Every man indicated to have experienced at least two potentially traumatizing events, 95.7% (*n* = 220) 10 or more events and almost two third (61.7%, *n* = 142) 20 or more events. Over 80% of mothers and about 90% of fathers reported to have experienced a dangerous flight and being in close proximity to combat situations, crossfires and burning houses. More than half of mothers (53.9%) and two thirds of fathers (67%) had witnessed the murder or killing of someone. One fifth of all mothers (20.9%) reported having been raped or sexually assaulted. Less frequently reported was perpetration of severe physical or sexual violence by parents themselves and these events were reported more often by fathers, for example raping (5.7%) or killing (4.8%) someone.

The prevalence rates of mental health problems among children and parents are displayed in Table 3. The rates of increased mother-reported internalizing symptoms and of father-reported externalizing symptoms were almost twice (27.8%) and four times (5.4%) as high respectively as in the child report (16.5% and 1.3%). There were no age or gender differences in children`s mental health problems except that fathers reported significantly more externalizing problems in younger compared to older children ($U = 4462.00$, $n_1 = 75$, $n_2 = 152$, $p = .008$). Mothers had significantly higher levels of PTSD symptoms, $t\ (447) = -3.26$, $p = .001$, and other mental health problems, $U = 20140.00$, $p < .001$, compared to fathers.

Moving from a variable-oriented to a person-oriented approach and from a categorical to a more dimensional conceptualization of PTSD symptomatology, the application of latent class analysis revealed four distinct classes of families indicating an accumulation of PTSD symptoms and related functional impairment within families. In the largest class labelled “traumatized families” and containing 35.4% (n = 80) of all families, every member had a high probability of scoring above the median in PTSD symptom severity and being functionally impaired. The second largest class (27.4%,

n = 62) consisted of families in which every member had a low relative probability of endorsing high levels of PTSD symptoms and impairment and was therefore called “non-traumatized families”. The next class (20.8%, n = 47), “traumatized mothers”, was characterised by families in which only mothers were highly likely to report high levels of PTSD symptoms and functional impairment. The smallest class (16.4%, n = 37) was labelled “traumatized fathers” because all fathers in these families had high levels of PTSD symptoms and were impaired by these symptoms, while mothers had a medium and children a low probability of morbidity. The validity of these classes was supported by further analyses showing that “traumatized families” had significantly higher scores in their individual members` traumatic exposure and child-reported maltreatment than “non-traumatized families” (Pillai’s trace = 0.44, $F$ (15, 660) = 7.46, $p < 0.001$, $\eta^2 = 0.1$). Moreover, the classes corresponded well to the prevalence of PTSD diagnoses. For example, all but one child with PTSD diagnosis belonged to the “traumatized families” class and 75.7% of fathers in the “traumatized fathers” class met diagnostic criteria for PTSD.

**Table 3.** Prevalence rates of mental health problems among children, mothers and fathers

| | Children (n = 230) | | Mothers (n = 230) | | Fathers (n =230) | |
|---|---|---|---|---|---|---|
| | *M* | *SD* | *M* | *SD* | *M* | *SD* |
| PTSD Symptom Severity[a b] | 14.55 | 11.29 | 38.39 | 19.28 | 32.90 | 16.44 |
| PTSD DSM-5 Diagnosis[a b] % (n) | 5.7 (13) | | 32.6 (75) | | 29.1 (67) | |
| Emotional/behavioral problems (SDQ)[c] | 10.63 | 5.04 | 10.84 | 6.04 | 9.30 | 5.56 |
| High SDQ Score [c] % (n) | 10.9 (25) | | 15.9 (36) | | 11.5 (26) | |
| General distress (BSI-18)[d] | - | | 31.11 | 16.53 | 24.33 | 14.21 |
| High Score BSI-18[d] % (n) | - | | 90.9 (211) | | 83.9 (193) | |

For Children: Assessed with the University of California at Los Angeles posttraumatic stress disorder reaction index for DSM-5 (UCLA PTSD RI); Value range 0 – 88.
[b] For caregivers: Assessed with the PTSD Check List for DSM-5 (PCL-5); Value range 0 – 88.
[c] SDQ, Strengths and Difficulties Questionnaire; Difficulties Score is composed of sum scores in Subscales *Conduct Problems, Hyperactivity, Emotional Symptoms* and *Peer Problems* (Value range 0 – 40). The values in the parents` columns refer to the parent-report. Cut-off score ≥18 for self-report and ≥17 for parent-report.
[d] BSI-18, Brief Symptom Inventory Short Form; Global Severity Index is the sum score of all 18 items (value range 0 – 72). Cut-off score ≥13 for mothers and ≥10 for fathers

## 4.3 The interplay of attachment and maltreatment in the transgenerational transmission of psychopathology

While the analyses for the previous manuscript suggested that both parents` traumatization may be a risk factor for children`s well-being, the second manuscript specifically investigated associations between parents` and children`s psychopathology as well as the mediational role of the attachment relationship and child maltreatment. Four families from the full sample were excluded from these analyses because these foster parents had been living with the children only for a short time.

Therefore, the relevant study sample consisted of 226 families. We analysed two separate structural equation models for mothers and fathers each containing the latent factors maternal/paternal psychopathology (PTSD symptoms and psychological distress), maltreatment by mother/father (physical and emotional abuse and neglect), the children`s attachment representations of mother/father and children`s psychopathology (PTSD symptoms and emotional/behavioural symptoms), controlling for children`s cumulative trauma exposure, age and gender. The measurement models using item parcels as indicators of latent variables showed a good fit. Fit indices of the structural models were also good for the model containing maternal {Comparative Fit Index (CFI) = 0.96, Tucker Lewis Index (TLI) = 0.95, Root Mean Square Error of Approximation (RMSEA) = 0.052, 90% Confidence Interval CI [0.040–0.063], Standardized Root Mean Square Residual (SRMR) = 0.077} and paternal variables (CFI = 0.96; TLI = 0.96; RMSEA = 0.050, 90% CI [0.038–0.061]; SRMR = 0.065).

As shown in Figure 3, maltreatment by mothers significantly mediated associations between maternal and child psychopathology in that higher levels of maternal psychopathology were associated with higher levels of child-reported maltreatment by mothers, which were in turn related to higher levels of child psychopathology ($\beta = 0.04$, $p = .043$). Children`s insecure attachment representations of the mother-child relationship also played an important mediational role in the tested model: More psychopathology in mothers was significantly related to children`s more insecure attachment representations, which were associated with more maltreatment ($\beta = 0.05$, $p = .028$) and also with higher levels of child psychopathology through their link to increased maltreatment ($\beta = -0.06$, $p = .025$). Thus the analyses revealed no direct but complex indirect associations between maternal and child psychopathology involving both maltreatment and attachment representations.

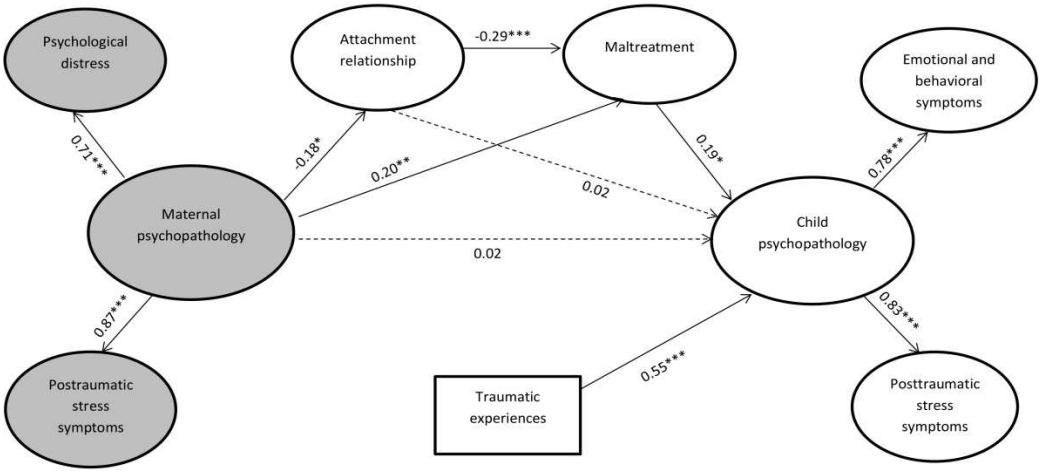


*Figure 3*. Structural model of the hypothesized relationship between maternal psychopathology, attachment, maltreatment and child psychopathology. Dashed lines indicate nonsignificant effects. ***$p < 0.001$, **$p < 0.01$, *$p < 0.05$.

In contrast, higher levels of psychopathology in fathers were directly significantly associated with higher levels of child psychopathology ($\beta = 0.17$, $p = .012$), as displayed in Figure 4. Although

children`s more insecure attachment representations of the father-child relationship were highly significantly related to more child-reported maltreatment by fathers ($\beta$ = -0.38, $p$ < .001), these two factors did not play any mediational role. Children`s own cumulative exposure to traumatic events was the strongest predictor of children`s psychopathology in both models ($\beta$ = 0.55/56, $p$ < .001).

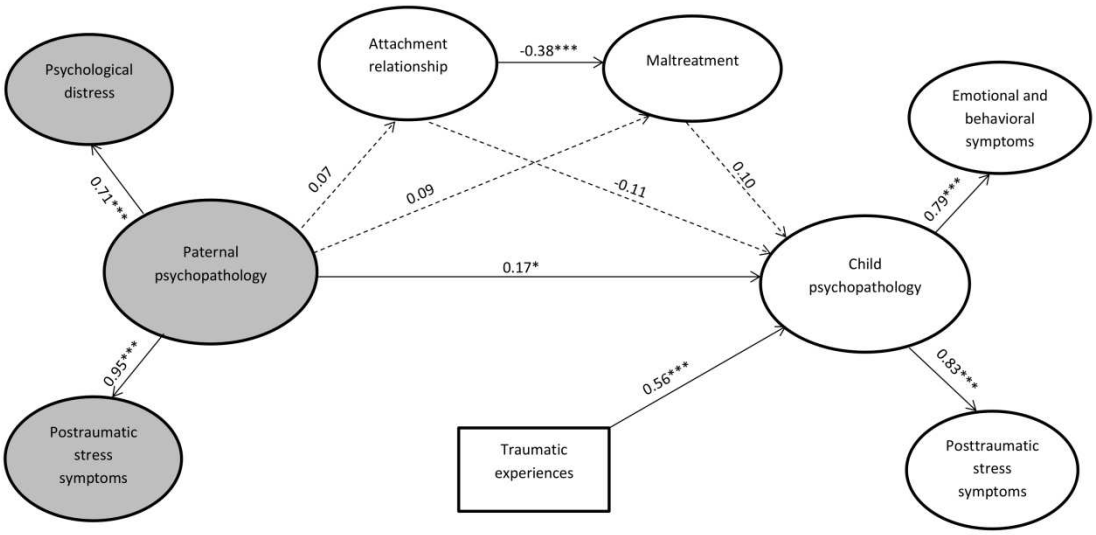


*Figure 4*. Structural model of the hypothesized relationship between paternal psychopathology, attachment, maltreatment and child psychopathology. Dashed lines indicate nonsignificant effects. ***$p$ < 0.001, **$p$ < 0.01, *$p$ < 0.05.

## 4.4 The mediating role of psychopathology in the association between maltreatment and memory functioning

The previous two manuscripts had established maltreatment by parents as a relevant factor within children`s family microsystem that contributes to children`s psychopathology. The third manuscript brought into focus another facet of children`s adjustment that may equally be impaired by maltreatment, children`s cognitive and specifically their memory functioning. The associations between maltreatment by parents, children`s psychopathology and their visuospatial short-term, working and long-term memory functioning were investigated in a sub-sample of 11 to 15 years old adolescents ($n$ = 155) using three structural equation models, one for each memory domain. Children`s exposure to war-related traumatic events, their age, gender and grade level were included as covariates. Psychopathology was modeled as latent factor with sum scores of internalizing problems, PTSD symptoms and posttraumatic cognitions as indicators, which provided a good fit of the measurement model.

The structural equation models are displayed in Figure 5. The structural model with working memory as outcome showed good model fit, CFI = .95, RMSEA = 0.05 ($p$ = 0.65), SRMR = 0.07. Higher levels of maltreatment by parents were associated with higher levels of children`s self-reported

psychopathology, which were in turn related to a reduced working memory capacity, indicating a significant mediation by mental health symptoms ($\beta$ = -0.07, $p$ = 0.02). However, there was no direct effect of maltreatment on working memory. Similarly, in the structural model containing short-term memory (model fit: CFI = 0.95, RMSEA = 0.05 ($p$ = 0.58), SRMR = 0.07), no direct effect of maltreatment was observed, but there was a trend towards mediation of the association between more maltreatment and reduced short-term memory capacity by higher levels of psychopathology ($\beta$ = -0.05, $p$ = 0.06). The structural model with delayed recall from long-term memory as outcome showed good fit to the data, CFI = 0.96, RMSEA = 0.04 ($p$ = .82), SRMR = 0.06. In contrast to the other two models, there was no indication of mediation by psychopathology, but higher levels of maltreatment by parents were directly significantly associated with stronger recall deficits from long-term memory ($\beta$ = -0.19, $p$ = 0.02).

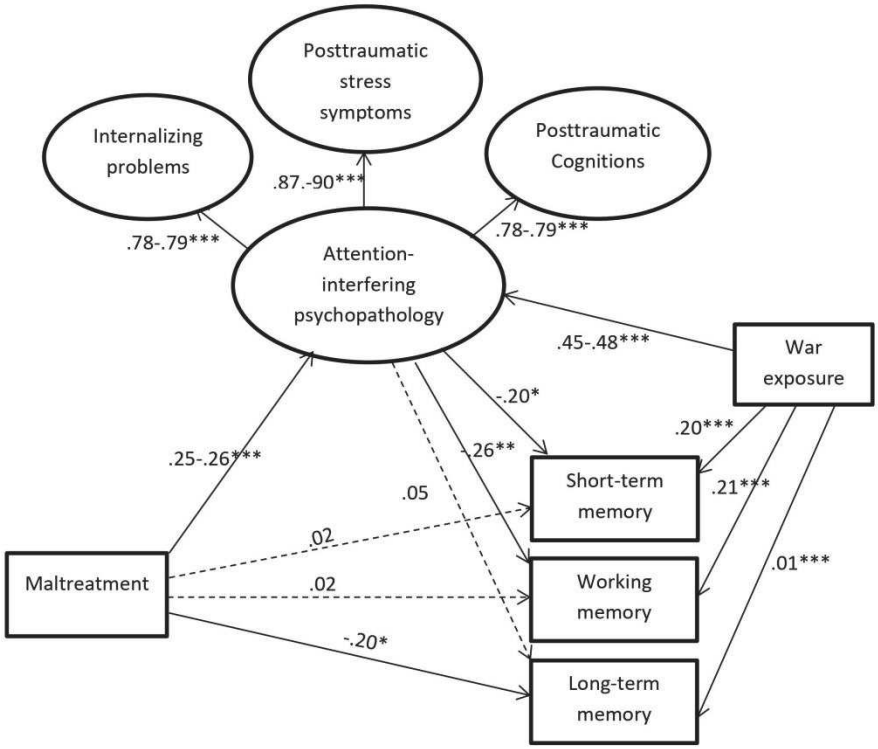


*Figure 5.* Structural model of the associations between maltreatment, psychopathology and memory functioning (short-term, working and long-term memory). The covariates age, gender and class are not shown. Dashed lines indicate nonsignificant effects. ***$p \leq 0.001$, **$p \leq 0.01$, *$p \leq 0.05$.

## 4.5 Risk, protective and promotive factors for Burundian refugee children` mental health

The study sample consisted of 217 mother-child dyads with complete data for the relevant study variables. We developed four multiple linear regression models to investigate associations between

individual (war-related violence, engagement coping), microsystem (violence by mothers, friendship quality) and exosystem factors (community violence, maternal social support network) as predictors and children`s PTSD symptoms, internalizing problems, externalizing problems and prosocial behavior as outcomes. Children` age and gender were included as control variables in every model. The model predicting PTSD symptoms explained 41% of the variability of PTSD symptoms (adj. $R^2 = 0.41$, $F(8, 198) = 18.83$, $p < 0.001$, $f^2 = 0.69$). Children`s higher exposure to war-related, maternal and community violence as well as more frequent use of engagement coping strategies in daily stressful situations were significantly associated with higher levels of children`s PTSD symptoms (see Table 4). Children`s higher quality friendships, in contrast, were significantly related to lower levels of PTSD symptoms. The model predicting internalizing problems explained 12% of the variability of internalizing problems (adj. $R^2 = 0.12$, $F(8, 194) = 4.46$, $p < 0.001$, $f^2 = 0.14$). Higher exposure to war-related violence, violence by mothers and within the community as well as more frequent use of engagement coping strategies were significantly associated with higher levels of internalizing problems. The model predicting externalizing problems explained 12% of the variability of externalizing problems (adj. $R^2 = 0.12$, $F(8, 191) = 4.29$, $p < 0.001$, $f^2 = 0.14$). Higher exposure to violence by mothers was significantly associated with higher and higher quality friendships with lower levels of externalizing problems. Finally, the model predicting prosocial behavior accounted for 19% of the variability in prosocial behavior (adj. $R^2 = 0.19$, $F(8, 200) = 7.20$, $p < 0.001$, $f^2 = 0.23$). Higher exposure to war-related and community violence, higher quality friendships and mothers` social networks were significantly related to higher levels of prosocial behavior, whereas higher violence by mothers was significantly related to lower levels of prosocial behavior.

**Table 4:** Results of multiple regression analyses

| | PTSD symptoms ($n$ = 207) | | Internalizing problems ($n$ = 203) | | Externalizing problems ($n$ = 200) | | Prosocial behavior ($n$ = 209) | |
|---|---|---|---|---|---|---|---|---|
| | ***β*** | ***p*** | ***β*** | ***p*** | ***β*** | ***p*** | ***β*** | ***p*** |
| Sociodemographic variables | | | | | | | | |
| Age | .003 | .95 | -.01 | .86 | -.10 | .18 | -.07 | .38 |
| Gender | **-.12** | **.03** | -.11 | .12 | .12 | .09 | **-.13** | **.05** |
| Individual | | | | | | | | |
| War-related trauma | **.50** | **< .001** | **.20** | **.03** | .09 | .22 | **.26** | **< .001** |
| Engagement coping | **.15** | **.01** | **.15** | **.04** | -.06 | .40 | -.05 | .51 |
| Microsystem | | | | | | | | |
| Violence by mothers | **.19** | **.001** | **.17** | **.01** | **.23** | **.001** | **-.16** | **.01** |
| Friendship quality | **-.12** | **.05** | .10 | .20 | **-.20** | **.005** | **.24** | **.002** |
| Exosystem | | | | | | | | |
| Community violence | **.13** | **.03** | **.22** | **.002** | .02 | .73 | **.13** | **.05** |
| Maternal social network | .04 | .45 | .07 | .32 | .08 | .06 | **.29** | **< .001** |

# 5. General discussion

The current research investigated the mental health and adjustment of refugee children and adolescents using a socio-ecological framework. The systematic review provided the most comprehensive synthesis of socio-ecological factors contributing to refugee children`s mental health to date and served to map the overall empirical context for the current study with Burundian refugee families living in Tanzanian camps. The findings of the systematic review showed that refugee children`s mental health is determined by multiple factors related to the individual child, family, peers, school, community and the wider sociocultural context. At the same time, they also underscored the importance and relevance of the present empirical investigation with Burundian refugee families in several ways: first, the striking paucity of studies conducted in low- and middle-income countries in general and in refugee camps in particular proved that the current evidence base does not reflect the lived realities and experiences of the majority of refugee children and adolescents worldwide. Second, individual-level factors have still received the greatest attention by studies, while factors on other ecological levels have been less frequently investigated. Third, among the few studies that also included children`s caregivers, only one study included both mothers and fathers. Fourth, although the recent evidence suggests an important role of parents` own psychopathology for children`s adjustment, the pathways potentially underlying this association in refugee families remain to be elucidated. In an effort to address these gaps, the current empirical study is the first to report on the mental health of refugee children and adolescents and both their parents living in refugee camps close to ongoing conflict. The four manuscripts point to the relevance of a socio-ecological approach in these contexts by demonstrating associations between individual (war exposure, coping), microsystem (parental psychopathology, parent-child relationship, maltreatment, friendship quality) and exosystem factors (community violence, mother`s social support) and youth`s mental health and memory functioning. In the following, the findings will first be discussed in relation to the current evidence base. Then key implications of the systematic review and the empirical studies for further research will be presented. Finally, implications of the findings for prevention and intervention approaches aiming to improve the mental health of refugee children in general and of the Burundian refugee children living in Tanzanian camps in particular will be discussed.

## 5.2 Discussion of the findings in the context of the current evidence

The first manuscript showed that both children and parents had been generally exposed to high levels of traumatic experiences. Parents had experienced the Burundian civil war from 1993 until 2005 and, depending on their age, earlier periods of extreme violence (1972, 1988), which explains their high rates of exposure. The nature of the political violence in Burundi, which targets perceived, predominantly male opposition members, can explain the high frequency of events involving violent

acts by armed personnel among fathers. Notwithstanding, the prevalence rates of severe mental health problems among children and adolescents was rather low. The one-month prevalence rate of 5.7% for PTSD is in the same range as lifetime prevalence rates for PTSD observed in non-refugee samples in Western high-income countries (Lewis et al., 2019; McLaughlin et al., 2013). However, it is substantially lower than the rates of up to 50% and 80% found among trauma-exposed refugee children resettled in high-income countries (Bronstein & Montgomery, 2011; Kien et al., 2019) and in refugee camps in low-and middle-income countries (Vossoughi et al., 2018) respectively. Similarly, the prevalence rates of about 11% (child- and father-report) and 16% (mother-report) for high levels of emotional and behavioural problems are comparable to rates found in community samples of children and adolescents in Western Europe (R. Goodman et al., 2000; Ravens-Sieberer et al., 2008). As with PTSD, these rates are much lower than the rates of up to 40% among refugee children in Europe (Kien et al., 2019) and the Middle East (Cartwright et al., 2015; Çeri & Nasiroğlu, 2018; Eruyar, Maltby, et al., 2018).

Three aspects may help to at least partially explain the lower rates found in the present investigation: first, we used structured clinical interviews to assess children`s mental health problems. Previous research has shown that interview assessments tend to result in lower prevalence rates compared to self-report or parent-report assessments (Fazel et al., 2005; Kien et al., 2019). A case in point, the prevalence of increased internalizing problems was about 28% in the mother-report, which may however be biased by mothers` own mental health problems (Kelley et al., 2017). Second, a closer look at the prevalence of children`s traumatic experiences suggests that most children might not have been directly exposed to experiences of severe interpersonal violence, which strongly increase the risk of developing PTSD (Alisic et al., 2014). As indicated above, the violence committed by members of Burundi`s ruling party targeted special groups of people supposed to belong to the political opposition and to a lesser extent the civilian population. Moreover, after the relatively recent long-lasting civil war in Burundi most people may have decided to flee the country very soon after hearing about the latest outbreak of political violence without more recent direct exposure to severe violence. Accordingly, four of the five most frequent traumatic events among children were of a non-interpersonal nature, such as losing a close person (84.3 %), being deprived of food (40 %) and experiencing a natural disaster (36.1 %), whereas only few children experienced sexual violence (7.3%) or were injured by weapon (1.3%). Studies reporting high prevalence rates of PTSD among refugee children (e. g. Morgos et al., 2008; Rothe et al., 2002; Thabet et al., 2004) generally noted high exposure to severe interpersonal violence as well. However, while lower exposure to pre-migration violent conflict may particularly explain the lower rate of PTSD in our sample, it may only partially account for the lower prevalence of emotional and behavioural problems, which have been shown to be related strongly to current displacement-related stressors (Heptinstall et al., 2004). A third explanation refers to the fact that the majority of children in our sample had fled to the Tanzanian camps together with at least one parent and all were currently living with both parents/caregivers.

While it is well established that the separation from close family members during forced displacement is a risk factor for refugee children`s mental health, the continuous presence of at least one caregiver appears to be an important protective factor (Fazel et al., 2012; Masten & Narayan, 2012). Notwithstanding the unexpectedly low prevalence of PTSD among children, 43% of all children indicated that their PTSD symptoms caused problems for them at home, at school, with peers or in their development. This finding suggests that it is important to also take into account functional impairment in relation to PTSD symptoms even if children may not fulfill criteria for a full-blown PTSD diagnosis (Angold et al., 1999; Carrion et al., 2002).

For parents, the one-month prevalence rates of about 30% for PTSD lie at the lower boundary of the wide range of rates typically observed among adult refugees living in refugee camps in East-Africa (e. g. Kamau et al., 2004; Neuner et al., 2004; Onyut et al., 2009) and the Middle East (Acarturk et al., 2017; Alpak et al., 2015; Mahmood et al., 2019). Given the high lifetime exposure to on average 17 and 21 traumatic events for mothers and fathers respectively, these rates can be considered rather low. For example, in a study with Sudanese refugees in a Ugandan camp, the pooled prevalence of PTSD among persons experiencing as many traumatic events as the mothers and fathers in our sample on average was about 55% and 80% respectively (Neuner et al., 2004). The timing of trauma exposure may explain the rather low prevalence rates of current PTSD. For about 44% of mothers and about 51% of fathers, the index traumatic event(s) used to assign PTSD diagnosis had happened more than 10 years ago. Thus it can be expected that remission of PTSD symptoms had occurred for a substantial number of parents in our sample. This fits with the finding of very high rates of general psychological distress including depression and anxiety symptoms among parents within the past week, which are at the upper boundary of the range reported by other studies in refugee camps (Bapolisi et al., 2020; Bjertrup et al., 2018; Feyera et al., 2015; Mahmood et al., 2019; Riley et al., 2017). These extremely high rates are likely to reflect the uncertainty, passivity and daily hardships of life in the camps (Ben Farhat et al., 2018; Rasmussen et al., 2010; Riley et al., 2017)

Moving from the estimation of separate prevalence rates for children and parents to a family-based analytical approach, latent class analyses revealed that children with high levels of PTSD symptoms and functional impairment were most likely to live in families in which both parents suffered from high levels of PTSD symptoms. When only one parent was affected, children`s risk of morbidity was much smaller. This finding underscores the importance of considering the whole family context when examining risk and resilience among trauma-exposed populations (Betancourt & Khan, 2008; Punamäki et al., 2017). Moreover, it emphasizes the usefulness of a dimensional approach towards PTSD symptoms in order to better identify both children with full-blown and subthreshold PTSD. There are several explanations for the observed pattern of familial traumatization. Besides a potential genetic and epigenetic vulnerability (Duncan et al., 2018; Lehrner & Yehuda, 2018), offspring of traumatized parents have also been shown to be exposed to a higher level of lifetime adversities (Brand et al., 2011).

Based on the descriptive findings of the first article, the second article examined the role of the proximal processes child maltreatment and the parent-child relationship as potential mechanisms underlying the intergenerational transmission of psychopathology. The findings showed that both maternal and paternal psychopathology was associated with child psychopathology above and beyond children`s exposure to war-related trauma, but the underlying mechanisms appear to differ.

For mothers, the indirect effect through children`s more insecure attachment representations of their relationship with mothers and higher levels of maltreatment is well in line with studies with non-refugee (Lovejoy et al., 2000; van Ee, Kleber, & Jongmans, 2016) and refugee families (Bryant et al., 2018; Sim, Bowes, et al., 2018) indicating that offspring may be at an increased risk of developing psychopathology through maladaptive parenting. The assessment of parenting and psychopathology through children`s self-report in our study provides valuable support for this interpretation. Our findings are also consistent with previous studies demonstrating links between parental and child psychopathology in refugee camps (Betancourt, Yudron, et al., 2012; Meyer, Steinhaus, et al., 2017; Miller, 1996), but our study is the first to examine potentially underlying mechanisms in such a context. It further adds to the extant body of research documenting the detrimental impact of child maltreatment on children`s mental health across a variety of cultures and contexts (e. g. Hecker et al., 2014; Kim & Cicchetti, 2009; Lansford et al., 2005). Consistent with previous research with mostly young children and observational measures (Martins & Gaffan, 2000; van Ee, Kleber, & Jongmans, 2016), the link between maternal psychopathology and children`s more insecure attachment representations suggests that traumatized and/or depressed mothers may be impaired in their ability to engage in the parent-child relationship, resulting in children`s insecure attachment patterns. When children realize that their mother is unable or unwilling to meet their attachment needs, they may adapt to this in ways that actually trigger maltreatment, for example by avoidance of the mother or increased negativity (Cummings & Davies, 1994). In line with the view that child maltreatment constitutes essentially a pathogenic parent-child relationship (Valentino, 2017), the observed indirect effect thus suggests a relational vicious cycle: An insecure attachment to a mother suffering from psychopathology may put children at an increased risk of experiencing recurrent maltreatment by mothers, which in turn may reinforce negative representations of the mother and self.

For fathers, the direct association between their own and children`s psychopathology is in line with a growing body of research from non-refugee populations (Barker et al., 2017; Kane & Garber, 2004; Lambert et al., 2014). However, our study is the first to show this link in refugee families living in refugee camps. Contrary to previous research (van Ee et al., 2013; S. Wilson & Durbin, 2010) and to our hypotheses, fathers` psychopathology was not significantly associated with children`s attachment representations and maltreatment. This finding may reflect a more subordinate role of fathers in parenting compared to mothers, which is consistent with the notion that in Burundian culture mothers are the primary agents of children`s socialization (Song et al., 2014). However, the non-significant association between maltreatment by fathers and children`s psychopathology may also

imply that abusive acts by fathers may be considered as more acceptable by children, for example due to patriarchal value systems (Gershoff, 2002). Moreover, the relation between more insecure attachment representations of fathers and lower levels of children`s psychopathology, which was equivalent to a small effect, suggests that fathers do have an important role in children`s lives. The different patterns of associations for mothers and fathers are consistent with a previous study with a clinical sample of Dutch children showing that maternal psychopathology was indirectly related to child psychopathology through increased parenting stress, whereas paternal and child psychopathology were directly related even after taking parenting stress into account (Weijers et al., 2018). While these and our findings suggest that relational and parenting factors may be particularly important in explaining the association between mothers` and children`s mental health, other mechanisms may be more relevant in fathers and children, for example a stronger genetic component or observational learning (Samuelson et al., 2017; Weijers et al., 2018).

While the previous manuscripts had established the important role of parental factors for children`s mental health, the third manuscript examined associations between maltreatment by parents, youth`s psychopathology and their cognitive, specifically memory functioning. Psychopathology (internalizing problems, PTSD symptoms and posttraumatic cognitions) mediated the association between maltreatment and short-term/working memory capacity, whereas maltreatment was directly related to long-term memory deficits. The finding for short-term and working memory is in line with Attentional Control Theory (Eysenck et al., 2007), which postulates that internal psychopathological symptoms such as worrisome and ruminative cognitions interfere with the attentional resources required to solve cognitive tasks. The relative stronger effect of psychopathology on working compared to short-term memory is also consistent with the assumption of this theory that the degree of interference will be more pronounced in tasks demanding more attentional resources, which had also been found in other studies (e. g. Eysenck et al., 2005; Franklin et al., 2010). Our findings also add to a growing body of research showing visuospatial short-term and working memory deficits in clinical and community samples of non-refugee youth with internalizing problems (e. g. Moran, 2016; Owens et al., 2012). However, except for one recent study (Chen et al., 2019), ours is the first to examine links between psychopathology and memory functioning in a refugee context.

In addition to the overall context, our study markedly differs from previous studies investigating the role of maltreatment for memory functioning (e. g. Augusti & Melinder, 2013; De Bellis et al., 2010; Yasik et al., 2007) in our use of a non-clinical sample of youth with low levels of PTSD and ongoing exposure to maltreatment, our dimensional rather than categorical conceptualization of maltreatment and psychopathology and our investigation of different memory functions. This makes it difficult to compare our findings with these studies, which have also produced inconsistent results regarding the role of psychopathology for memory functioning in maltreated children. However, our findings suggest that it may depend both on the level of psychopathology and on the specific memory function in question. From a neurobiological viewpoint, the pattern of indirect

and direct effects for short-term/working and long-term memory are in line with the underlying neural substrates: Both psychopathology and short-term/working memory are mediated by prefrontal brain regions (Chai et al., 2018; Macdonald et al., 2016), whereas retrieval from long-term memory is mainly processed by the hippocampus in the temporal lobe (K. Wilson et al., 2011).

In conclusion, the findings of the third manuscript imply that refugee youth`s exposure to maltreatment by parents may not only impair their mental health, but it may also undermine their memory functioning. Given that memory functioning has been shown to predict academic outcomes (Alloway & Alloway, 2010; Bull et al., 2008), maltreatment may thus contribute to perpetuating a vicious cycle in which youth get stuck in poverty, which may in turn promote their own use of violence against family and community members (Cilliers, 2018; van IJzendoorn et al., 2020).

While the previous manuscripts focused on factors contributing to children`s and adolescents` risk and resilience within the family microsystem, the fifth and final manuscript also considered the role of other individual, microsystem and exosystem factors for youth`s mental health. As shown by the initial systematic review of the available evidence, some of these factors such as coping strategies and friendships had only been investigated in studies with refugee youth in high-income countries. Higher exposure to violence on all ecological levels was related to higher levels of PTSD symptoms and internalizing problems, which is well in line with ecologically informed research with non-refugee and other conflict-affected children (e. g. Cummings et al., 2012; Lynch & Cicchetti, 1998; Saile et al., 2016). This suggests that the violent camp environment may be a source of continuous trauma for youth (Vossoughi et al., 2018). Current violence by mothers appears to be particularly detrimental to their well-being as it was also related to more externalizing problems and less prosocial behavior. This may be explained by mechanisms of social learning of antisocial and aggressive behavior through mothers` direct interaction with their children (Mueller-Bamouh et al., 2016; Silke et al., 2018). The finding that war-related and community violence were not related to externalizing problems and to more prosocial behavior is inconsistent with previous studies with war-exposed samples (Dubow et al., 2009; Hecker et al., 2015; Keresteš, 2006). However, this may be considered a marker of resilience and reflect an adaptive attitude with potential rewards by other community members in times of conflict (Gneezy & Fessler, 2012; Staub & Vollhardt, 2008).

In contrast to previous studies with refugee youth (Khamis, 2019; Seglem et al., 2014), a higher self-reported use of engagement coping strategies such as problem solving or cognitive restructuring in everyday stressful situations was associated with higher levels of PTSD symptoms and internalizing problems. The nature of the situations the children had to cope with, which often dealt with experiences of violence by family members, teachers or peers or not having enough to eat, may explain this. Children may have perceived these situations as uncontrollable and thus engaging too much with them may have been detrimental rather than protective for their mental health, as also suggested by other studies (Elklit et al., 2012; Woltin et al., 2018).

Children`s high quality friendships appeared to be a protective and promotive factor for their mental health, which is in line with previous studies with non-refugee (Criss et al., 2002; Yearwood et al., 2019) and refugee children in high-income countries (Fazel et al., 2012). This suggests that children`s supportive relationships with friends provide an important social resource that may not only buffer the impact of previous trauma and current stressors, but also promote prosocial behavior through offering active learning opportunities (Silke et al., 2018). The positive association between the quality of mothers` social network and children`s prosocial behavior may be explained by similar social learning mechanisms with mothers as prosocial role models (Markiewicz et al., 2001). However, the finding that mothers` social network quality was not related to children`s mental health problems may suggest that in highly impoverished neighborhoods such as refugee camps, mothers may rely on other assets or coping skills to manage adversities in order to support their children`s mental health (Caughy et al., 2003).

In sum, the findings of the final manuscript emphasize the importance of considering multiple socio-ecological factors and their relation to refugee children`s mental health. Exposure to pre-migration war-related violence and to post-migration violence within the family and community appear to increase children`s mental health risk, whereas high-quality friendships seem to constitute an important protective resource. The counterintuitive findings regarding engagement coping and prosocial behavior underscore the need to take into account the specific camp context and potentially adaptive responses to violence.

### 5.3.2 Implications for future research

The reported findings of the systematic review and the empirical study with Burundian refugee families have important implications for future research aiming to investigate the mental health of refugee children and adolescents. On a general note, the systematic review shows that there is a high need for studies with refugee youth living in refugee camps and other settings in low- and middle-income countries. We demonstrate that it is practically and logistically feasible to conduct a study with a substantially large sample of families in the midst of a complex and volatile displacement setting. Therefore, we would like to encourage other researchers not to refrain from planning and conducting studies in refugee camps and other refugee settings in low- and middle-income settings given sufficient security and stability in the respective region. For such projects, we advocate creative and economic research strategies such as the application of a systematic and pragmatic approach, which may provide representativity of a specific population in a given location, and the recruitment and training of research assistants from the local refugee community, which may increase participants` trust and promote the contextual appropriateness of the assessment.

An essential implication of our findings is that future studies should strive to look beyond factors related to the individual child and also include other persons and factors within children`s social ecology in order to take into account the complex and multifactorial nature of mental health risk

and resilience among refugee youth. In particular, our findings underscore the importance of applying a family systems approach. Thus future studies should involve both parents or caregivers and other significant others within the family microsystem, for example siblings and grandparents. The socio-ecological perspective offers a useful theoretical framework for future studies to investigate how more distal displacement-related factors such as poverty, discrimination, community violence and social support impact on the proximal family system and the individual child (Miller & Rasmussen, 2017). Within the family microsystem, it is important to investigate the interactive role of factors and proximal processes for children`s well-being, for example how the relationship to one family member may moderate the impact of another family member`s psychopathology on child outcomes.

While cross-sectional studies generate valuable evidence on refugee youth`s mental health, future studies should aim to implement prospective longitudinal designs with regular assessments of predictor and outcome variables of interest and appropriate analytical approaches such as cross-lagged panel and latent growth modeling in order to examine potential causal mechanisms underlying risk and resilience. For instance, this way it would be possible to elucidate the factors that causally increase refugee children`s risk of experiencing ongoing violence within their families. Such designs will probably be easier to implement in high-income countries, where refugee children and their families may be assessed shortly after their arrival and then at regular intervals in the post-migration phase. However, it might also be possible to conduct such a study in refugee camps given the protracted nature of most refugee crises nowadays. This would require close collaboration with local authorities and NGOs as well as a careful consideration of research ethics.

Furthermore, future research should not only focus on negative aspects of refugee youth`s mental health, i. e. psychopathology, but also on outcomes reflecting resilience such as prosocial behavior and attitudes, self-esteem, hope and future expectations. In a similar vein, it will be useful to examine also other areas of adjustment including cognitive functioning and academic outcomes. In doing so, the predominant focus on refugee youth`s maladjustment and deficits should be enriched by a stronger consideration of their adaptive capacities (B. J. Ellis et al., 2017).

From a methodological point of view, future studies should aim to apply rigorous assessment methods such as structured clinical interviews and multiple informants in order to increase the validity of findings. Assessing children`s mental health and family-related factors through their self-report not only acknowledges children`s agency and the value of their perspectives, it may also help to reduce biases related to distressed caregivers` reports of their parenting and children`s well-being (Ringoot et al., 2015). To further ensure this, future studies may also develop and validate observational measures to assess proximal processes within children`s microsystems, for example the quality of relationships with parents or peers. Moreover, researcher should aim to increase the ecological validity of their investigations ideally by using instruments that had been validated for the cultural background of the refugee populations and/or by making efforts to qualitatively evaluate their appropriateness for the given context by local stakeholders (Hall, Puffer, et al., 2014).

## 5.3 Implications for interventions

### 5.3.1 Systematic review of risk and protective factors

A general implication of these findings is that prevention and intervention approaches should integrate multiple factors across refugee children`s social ecology and life history, i.e. peri- and post-migration (Eruyar, Huemer, et al., 2018; Fazel & Betancourt, 2018; Hodes & Vostanis, 2019). As targeting individual risk factors in isolation neglects that children are embedded in and constantly interact with their social environment, this will likely not lead to an overall and lasting improvement of their mental health and well-being. Any practical effort should be based on a thorough and careful assessment of children`s symptoms, experiences and living contexts (Fazel, 2018). Children`s pre-migration experiences of war- and conflict-related violence are powerful predictors of their mental health and should be addressed by evidence-based trauma-focused approaches such as narrative exposure therapy for children and adolescents (KIDNET; Ruf et al., 2010) and trauma-focused cognitive behavioral therapy (TF-CBT; Cohen et al., 2016). However, the findings showed that refugee children`s adjustment in the host country is also significantly shaped by post-migration factors. Parents` own mental health problems pose an ongoing risk for children`s well-being, which appears to be mediated by an increased tendency towards maladaptive and violent parenting behaviors. This suggests that prevention and intervention should aim to integrate families as much as possible. Approaches that focus on teaching parents more appropriate and positive parenting strategies may hold promise, but it is important to also address sources of parents` own distress (Fazel & Betancourt, 2018). Therefore, parallel treatment of caregivers may be indicated based on prior thorough assessment of their mental health problems and needs. According to recent systematic reviews of the current evidence, cognitive-behavioral interventions with a trauma-component are most beneficial with regard to PTSD and depression (Barbui et al., 2020; Turrini et al., 2019). While interventions involving caregivers or other family members in separate individual sessions are already a step in the right direction, joint sessions with family members may be important as they take into account that families most often have shared experiences of trauma and also face resettlement stressors together. For example, TF-CBT comprises conjoint parent-child sessions which aim at creating a joint trauma narrative for child and parent (Cohen et al., 2016). There is a pressing need for developing, implementing and evaluating family-focused interventions for refugee children`s mental health in the future.

The systematic review further suggests that schools can play a potentially important role in providing mental health support for refugee children, at least in high-income countries, for a number of reasons. They can give newly arrived children a sense of belonging in an unfamiliar world and foster positive relationships with peers (Fazel & Betancourt, 2018), both important protective factors according to the review. Schools are also places where a large part of children`s acculturation in the host society takes place, which may be harnessed to support children with adopting aspects of the new culture while maintaining bonds to their culture of origin. Moreover, schools are positioned at the

interface of different ecological levels, i.e. the individual child, the family and peer microsystems, and the wider community. School-based interventions may actively engage parents to provide them with practical and social support, strengthen parent-child relationships and reduce family-related acculturative stress. At the same time, schools may be adequate settings to prevent and reduce prejudices and discrimination towards refugee youth by promoting inter-group contact (Engberg, 2004). Existing interventions made use of the easy accessibility of refugee children at schools and treated mental health problems focusing mainly on verbal processing of traumatic experiences (Tyrer & Fazel, 2014), but rarely capitalized on these potentially important school-related factors.

The findings also call for efforts on a policy level to support refugee youth`s well-being and prevent mental health problems. Above all, the global community should strive to prevent children`s exposure to war and conflict and subsequent displacement in the first place by early non-violent prevention in areas of armed conflict. Unfortunately, this seems as difficult as unrealistic given the number of current conflicts in the world. In the wake of uprooting and flight, policy makers should seek alternatives to long-term camp settlement in protracted refugee situations, which appears to be related to worse mental health outcomes in refugee youth. Moreover, obviously harmful practices such as detention should be refrained from. In addition, there are a number of post-migration factors that may be directly modifiable by policy makers, particularly in high-income countries. For example, governments should prioritize quick and non-bureaucratic reunification of unaccompanied minors with close relatives and in the meantime place them in settings characterized by high support and supervision rather than leave them to themselves in large-scale reception centers. The potential negative mental health impact of feelings of uncertainty and uncontrollability related to the asylum process could be reduced through swift yet careful and transparent resolution of asylum claims. Structural policies that focus on improving refugee children`s language skills and educational progress from an early age can be assumed to benefit children`s acculturation and thus their well-being. Finally, in line with its socio-ecological perspective, the systematic review suggests that programs favoring refugee parents` adjustment and well-being, for example increasing their occupational opportunities or their integration into host societies, will also have a positive indirect impact on their offspring.

### 5.3.2 An intervention model for Burundian refugee children in Tanzanian camps

Our studies revealed several important insights that should form the base for the planning and delivery of interventions aiming to improve the mental health of Burundian refugee children living in Nyarugusu, Nduta and Mtendeli. These implications mirror in many ways those of the systematic review, but require a careful consideration of and adaptation to the specific context of the camps. Our assessment of a representative sample of children living in the camps with both parents or caregivers revealed low prevalence rates of PTSD (ca. 6%) and emotional and behavioral problems (11 – 15% depending on child- or parent-report) among youth. The vast majority appears to be doing quite well

despite high levels of exposure to prior and ongoing adversity, suggesting the presence of factors contributing to children`s resilience within their social ecology. For example, it may indicate that formal and informal resilience-building activities already implemented within the camps, e.g. child-friendly spaces or religious groups, are working well. At the same time, this points to the importance of using available resources to identify those children really in need of more specialized support with mental health problems.

Furthermore, our findings suggest that those children with clinical and subthreshold levels of PTSD appear to live in traumatized family systems. While the studies indicated that children`s cumulative exposure to traumatic events is a powerful predictor of their mental health, both parents` or caregivers` psychopathology and proximal processes, particularly maltreatment by parents, seem to adversely affect youth`s mental health and cognitive functioning above and beyond trauma exposure. The findings further indicate that the mother-child relationship may play an important role in children`s ongoing victimization within their families, yet also relationships with fathers appear to be relevant for children`s well-being. Therefore, it is important that prevention and intervention approaches address children`s exposure to previous trauma, but also include family-level factors as ongoing sources of risk and resilience.

Based on these central findings, we propose a mental health service model for Burundian refugee children and their parents living in the Tanzanian camps. The model is based on the Inter-Agency Standing Committee (IASC) Guidelines for Mental Health and Psychosocial Support developed by the World Health Organization (2007) and related stepped care models for refugee and conflict-affected children (Eruyar, Huemer, et al., 2018; Jordans et al., 2010). The common idea underlying these approaches is that mental health and psychosocial care is provided on multiple layers, which can be illustrated in form of a pyramid. Although these layers are ideally put in place concurrently, they are hierarchically organized, from the provision of basic services and security at the bottom through broad-scale resilience-building activities targeting communities and low-level interventions provided by non-specialists to specialized services focusing on individuals suffering from severe mental health problems at the top of the pyramid (Inter Agency Standing Committee (IASC), 2007; Jordans et al., 2010).

However, in view of the low prevalence of mental health problems among youth in the camps and the important role of exposure to trauma as well as family-related factors for those that are affected, we argue that the multi-layered service model should be slightly adapted for our specific context. In order to meet children`s mental health needs in the Tanzanian camps, the targeting of available resources by identifying children with clinically relevant mental health problems and providing them with trauma- and family-focused interventions needs to be prioritized over broad-scale psychosocial interventions. The adapted model does not imply that interventions targeting contextual and social factors, the pyramid`s base in the original multi-layered model, are not important. In contrast, an ecological perspective requires displacement-related stressors to be addressed as they may

have direct and indirect impacts on families and children. However, stronger focus should be placed on identifying those children suffering from severe mental health problems, who should then receive focused mental health care. Such a targeting is also important given evidence of negative treatment effects for subgroups of children in areas of armed conflict (Jordans et al., 2016). For instance, in unstable and stressful settings, universal school-based programs may also undermine the natural recovery of children suffering from clinically relevant symptoms of PTSD, depression and anxiety and thus be harmful in fact (Ertl & Neuner, 2014; Tol et al., 2014).

Considering the limited specialist resources for mental health care in the camps (only two trained psychologists work for IRC in each camp), a crucial element on all layers of the proposed model is task-shifting, i.e. the transfer of skills from mental health professionals to non-specialists such as community workers, teachers and nurses (Hodes & Vostanis, 2019; Silove et al., 2017). This approach is cost-effective, sustainable and increases the potential for broad dissemination of interventions (Fazel, 2018; Silove et al., 2017). Moreover, as our study demonstrated the important role of parental factors for children`s mental health, the involvement of parents or caregivers at all levels is another essential feature of the model. The model is graphically displayed in Figure 3. The individual layers of the model and possible interventions at each layer are described in more detail in the following.

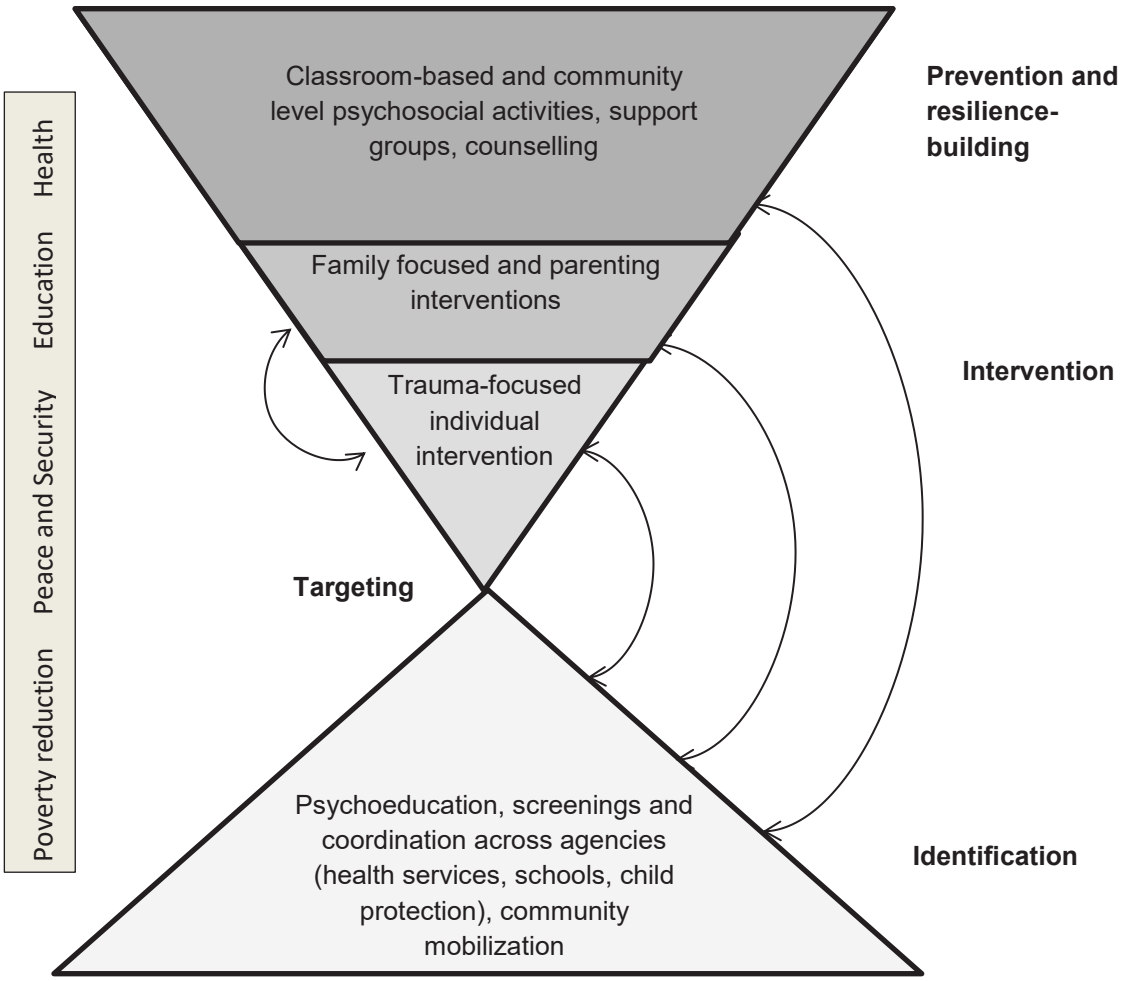


*Figure 3.* Multi-layered mental health service model for the Tanzanian refugee camps (adapted from Jordans et al. (2010))

**Identification**

The base layer comprises all activities that aim at identifying those children who are suffering from severe mental health problems. This requires a broad approach and a close-meshed collaboration between different organizations and services, e.g. education, child protection, physical and mental health care. At this stage it is also crucial to improve families` and children`s access to available mental health services and target potential barriers (Jordans et al., 2010). For example, providing psychoeducation to the community, preferably in larger group settings, may help to increase awareness of mental health problems and reduce possible stigma. Through these outreaches, community members can learn about existing services and possible concerns with attending them can be addressed. These broad community sensitization activities can be easily disseminated as they can be carried out by trained non-professionals from the refugee communities, ideally community leaders who are widely respected and trusted. The consideration of cultural idioms and expressions of distress can increase communities` understanding and make it easier for them to identify children suffering from problems. Moreover, working together with existing informal resources providing psychosocial support, e.g. traditional healers, religious groups or community elders, can be helpful in identifying and referring children in need of treatment. As a part of the research project, we had conducted a small survey on the use of existing psychosocial services and alternative resources among the families in the camps. It showed that about 53% of the children were not aware of the organizations providing psychosocial support. Although 47% percent were able to name specific organizations, only 6% reported to have utilized their services. Although about 70% of mothers and fathers reported to be aware of existing services in the camps, only about one third indicated to have utilized them. These figures demonstrate the importance of increasing youth`s awareness of services and reducing barriers to access particularly in parents who are mainly responsible for initiating contact with organizations on behalf of their children.

Another activity in the first layer is screening children for mental health problems including PTSD symptoms, internalizing and externalizing problems, which needs to be implemented in as many settings as possible. Task-shifting is essential at this stage. Mental health professionals can train teachers, community mobilizers, nurses and social workers to conduct these screenings in their respective settings, closely monitor and supervise them. It is important that screening instruments are locally validated (Hall, Puffer, et al., 2014). For the Burundian context, the brief, 7-item Child Psychosocial Distress Screener has been validated for the use with children and teachers (Jordans et al., 2008) and Kirundi versions of established screeners for depression and PTSD administered by lay interviewers have shown good psychometric properties (Ventevogel et al., 2014). In addition, prior to broad implementation, the reliability of the screenings has to be assessed through clinical interviews conducted by professionals.

Furthermore, our finding that traumatized children are likely to live in traumatized family systems suggests that these children could be identified through their parents who, according to our

survey, attend available mental health and psychosocial services at a higher rate compared to children. When a mother or father presents with high levels of PTSD symptoms, it can be useful to also assess their children and spouse for PTSD symptoms. This could be done via screenings with the parent seeking initial contact, but should be followed by an assessment of children themselves as parents` report may be biased by their own mental health problems. Conversely, when a child is screened positive for PTSD for instance at school or at hospital, there is a high probability that both parents are also traumatized and that the child faces ongoing developmental risks due to the increased levels of maltreatment in these families and functionally impaired parents` potentially diminished ability to meet children`s needs. This also underscores the importance of close collaboration and coordination between different organizations and services.

**Intervention**

The identification of children and adolescents in need of intervention enables an effective and efficient targeting of available resources on the next layer of interventions. Our studies show that refugee children`s cumulative exposure to war- and non-war-related traumatic experiences is a powerful predictor of their psychopathology including PTSD symptoms and internalizing problems. However, our findings also suggest that family-level risk factors, i.e. parents` psychopathology and the proximal processes of attachment and child maltreatment, are related to children`s psychopathology above and beyond war trauma. Moreover, maltreatment by parents, which may represent one of the most amenable risks for children`s well-being in the wake of armed conflict (Miller & Jordans, 2016), is linked to memory deficits both directly and indirectly through mental health problems with potential long-term negative consequences for children`s academic progress and socioeconomic well-being. In view of these findings, we emphasize the need for both trauma-focused interventions and family-level interventions taking into account parents` well-being and aiming at reducing child maltreatment. In line with an ecological systems perspective, we argue that all these factors need to be addressed instead of focusing on individual factors in isolation as these risk factors pile up and interact to shape children`s development and well-being (Garbarino & Kostelny, 1996; Reed et al., 2012). As such, interventions that target multiple factors at once in a holistic manner may be preferable, but at the same time it is crucial not to prioritize quantity over quality. Just as on the layer aiming at identification, the lack of mental health specialists requires task-shifting at this stage. Interventions that can be provided by non-specialist facilitators without cost- and time-intensive training may be most suitable. In general, the choice of intervention and its focus should be based on a more detailed assessment of the identified children by a mental health specialist.

With regard to trauma-focused interventions, narrative exposure therapy (NET) and its adaptation for children (KidNET) have been shown to be effective in reducing PTSD symptoms among refugee and war-affected children and adults in low- and middle-income settings (Robjant & Fazel, 2010). It is a short and pragmatic treatment that can be provided by trained lay counsellors even without a mental health background and it can be easily disseminated in low-resource settings through

a “train-the-trainer” approach (Jacob et al., 2014; Neuner et al., 2008). TF-CBT (Cohen et al., 2016) may be another promising intervention in this setting. This treatment model has the advantage that it also includes parents and caregivers through individual and joint parent-child sessions and addresses several risk factors identified by our studies, for example supporting children and parents in processing their own and joint traumatic experiences, improving the parent-child relationship and teaching parenting skills that may prevent child maltreatment (Cohen et al., 2016). TF-CBT has been evaluated as a group-based and culturally modified intervention provided by local facilitators in randomized controlled trials with war-affected adolescents in DRC Congo showing reductions in PTSD symptoms, internalizing and externalizing problems compared to wait-list controls (McMullen et al., 2013; O’Callaghan et al., 2013). However, parenting involvement in these studies was limited. Although a group format implies an efficient use of resources and may be beneficial through normalizing problems and providing peer support, the creation of trauma narratives should be done in individual sessions to avoid vicarious traumatization within the group (McMullen et al., 2013).

Based on the assessment of the child after identification, it may be appropriate to tailor the intervention to the individual child`s specific problem areas. Here a common elements approach may be indicated, which allows to combine different treatment elements in a flexible manner depending on the child`s needs and addresses not only PTSD symptoms stemming from prior trauma, but also emotional and behavioral problems related to daily stressors (Murray et al., 2018). Caregivers can be included in the treatment and be taught parenting skills in individual sessions. Such a common elements approach delivered by lay counsellors has been evaluated in a non-controlled study with refugee youth living in Somali refugee camps showing decreases in PTSD symptoms, internalizing and externalizing problems as reported by youth and caregivers and improvements in youth-reported well-being (Murray et al., 2018). However, as our findings suggest, highly traumatized and/or distressed parents may still be in need of treatment as their own mental health can continuously undermine their interactional and parenting skills. If an initial assessment reveals that parents predominately suffer from general psychological distress, depression and anxiety rather than trauma-related symptoms, low-intensity interventions such as Problem Management Plus (PM+) developed by the WHO may be indicated (Dawson et al., 2015). PM+ takes into account the scarcity of resources in refugee camps as it can be delivered by non-specialists in a group format and is currently being evaluated in resource-poor refugee camp settings (Akhtar et al., 2020; Sijbrandij et al., 2017).

While the inclusion of parents in some sessions of child-focused treatments is important, a stronger focus on parenting may be warranted in order to effectively counter child maltreatment in refugee camps and its negative consequences for children`s psychosocial and cognitive functioning. A RCT of a 10-session group-based parenting intervention delivered by lay facilitators in post-conflict Liberia led to a reduction in caregiver-reported use of harsh punishment and an increase in positive parent-child interactions as reported by caregivers and children at 1-month follow-up, but did not actually include children (Puffer et al., 2015). A similar intervention with Burmese migrant families

including children in separate group sessions with following joint parent-child activities reported positive effects on the quality of parent-child relationships and family functioning (Puffer et al., 2017). Our findings suggest that the mother-child relationship may be an important target for the prevention of child maltreatment in the participating families. Therefore, the contextual and developmental adaptation and evaluation of existing relational/attachment-based interventions that have demonstrated effectiveness in reducing child maltreatment in Western samples may be promising (Toth et al., 2013; Valentino, 2017). For the camp context, these should be brief, independent of technical equipment and ideally be delivered by non-professionals without costly and time-consuming training (Valentino, 2017). While available parenting interventions in low-resource settings described above focus on teaching parents knowledge and skills, interventions additionally addressing parents` well-being may be fruitful in refugee settings. A recent RCT with Syrian refugee parents living in Lebanon tested the effectiveness of a group-based parenting support intervention containing four sessions each to reduce parents` distress and improve their well-being on the one hand and teach parenting knowledge and skills on the other hand (Miller et al., 2020). The intervention group demonstrated increased parental warmth and well-being, decreased harsh parenting and distress as well as improved parent-reported child well-being compared to a wait list control group, but the stability of these effects remains to be shown (Miller et al., 2020).

On the one hand, it is desirable that interventions are multi-modal to avoid that relevant risk factors for children`s mental health are targeted in a piecemeal fashion and children and families are overwhelmed by receiving several interventions at once. On the other hand, the lay providers of interventions should not be overwhelmed by having to learn many different treatment elements. Therefore, a specialized training approach may be useful in which all providers are trained in activities related to identification, e. g. psychoeducation and screening, while they receive more specialized training in certain interventions, e. g. parent- or child-focused, and be flexibly consulted depending on the needs of a specific child and family. In any case, the task-shifting to lay providers from the refugee communities in the camps will benefit them and their families economically by providing them with an income and personally through the meaningfulness of their work.

In general, our findings suggest that fathers shape their children`s mental health and should therefore be engaged in family-level and parenting interventions despite policy- and cultural-level barriers prioritizing women as primary agents in children`s upbringing (Doyle et al., 2014; Panter-Brick et al., 2014). The above mentioned parenting support intervention (Miller et al., 2020) explicitly targeted both mothers and fathers and showed that it was feasible to engage men by applying several strategies: scheduling sessions in a way that they do not conflict with income-generating activities, emphasizing the intervention focus on personal well-being and incorporating fathers` feedback in the implementation of the intervention, among others. The high prevalence of psychological distress among the fathers in our sample and our impressions during the recruitment and data collection

process suggest that these strategies may also be effective to engage Burundian fathers in the refugee camps.

Furthermore, prevention and intervention approaches should not give refugee families the impression that they are imposed on them by organizations. It is therefore important to emphasize at all stages that it is their decision to participate and to communicate the content, goals, risks and benefits of programs in a transparent and comprehensible manner (Acharya et al., 2017). In this context, a participatory approach involving children`s and families` views and perspectives in the development, implementation and evaluation of interventions is essential (Betancourt et al., 2015; de Jong et al., 2015). This also serves the cultural adaptations of interventions by taking into account cultural concepts of parenting and mental health (Eruyar et al., 2020; Miller et al., 2020). In the Burundian context, for example, the local idioms *akabonge*, a set of depression-like symptoms, *ihahamuka*, comprising PTSD-related reactions to traumatic experiences, and *ibisigo/ibisazi*, which may include psychotic-like symptoms and extreme aggression, are widespread (Familiar et al., 2013; Irankunda et al., 2017; Ventevogel et al., 2013). Finally, it is an ethical, professional and scientific duty that the effectiveness and contextual applicability of all prevention and intervention approaches be rigorously evaluated prior to dissemination to ensure that they do good rather than do harm (Allden et al., 2009; Wessells, 2009).

**Prevention and resilience-building**

The layer at the top of the inverted pyramid comprises broad-scale community-level preventive activities that aim at promoting children`s well-being and strengthening their resilience. Here it is important to work with existing sources of children`s and adolescents` resilience in their environment (de Jong et al., 2015; Jordans et al., 2010). For example, the majority of youth (more than 60%) talked to their close friends, prayed and engaged in music or other leisure activities when they had problems according to our survey on formal and informal sources of support. This suggests that activities building on these resources, for example the organization of sports contests, drumming and dancing sessions or praying groups, may effectively support their well-being and adjustment. An overall positive effect of such joint activities is to strengthen peer relationships, which our findings suggest to be an important protective and promotive factor for children`s mental health. A suitable setting may be child friendly spaces, which are already implemented in the camps and provide a safe environment for children. A meta-analysis on the impact of child-friendly spaces in humanitarian settings in Ethiopia, Uganda, Iraq, Jordan, and Nepal observed an overall positive effect of these facilities on younger children`s (6 to 11 years) psychological well-being (Hermosilla et al., 2019). However, child-friendly spaces did not have an impact on adolescents found and appeared to be ineffective in connecting younger and older children to wider community resources. Here schools may provide more appropriate settings to also engage families and communities as structured psychosocial activities, e.g. cooperative games, music or psychodrama, can be combined with activities focusing on psychoeducation and community sensitization (Jordans et al., 2010). For example, Jordans et al.

(2013) conducted a 2-session psychoeducation intervention delivered by lay community counsellors for groups of parents of children who had screened positive for emotional and behavioral problems at school in Burundi. The intervention group showed a short-term effect in reducing child-reported externalizing problems among boys compared to the control group. Group-based psychosocial interventions with children may also be implemented at this stage. However, broad interventions at this point, whether at school or in another setting, should not contain elements aiming at reducing mental health problems, for example through creating trauma narratives, given the potential for harmful intervention effects (Jordans et al., 2016). Still such interventions may have a secondary effect also on mental health problems. The evaluation of a 8-week gender-differentiated group intervention for Syrian refugee adolescents and their Jordanian non-refugee peers offering activities related to fitness, arts and crafts, vocational and technical skills showed a beneficial impact in the intervention group on measures of psychosocial well-being as well as internalizing and externalizing problems compared to a wait-list control group (Panter-Brick et al., 2018).

Consistent with the ecological perspective, activities focusing on strengthening parents` well-being will also be likely to indirectly benefit children. Besides talking to their spouses about problems, mothers and fathers indicated to talk to close friends (42% and 48.5%), engage in prayers (56% and 52%), talk to religious leaders (33% and 40%) and engage in music or other leisure activities (35% and 46%) as main coping strategies. This suggests that activities similar to those for youth may contribute to promoting their resilience, pointing to the potential of programs jointly addressing children, parents and the wider community. Another study connected to this research project showed that parents` PTSD symptoms and general distress were negatively related to their social capital, i.e. the frequency with which they attended community meetings and participated in communal works as well as the number of people they could turn to in case of economic problems (van der Haer et al., 2020). While the direction of this association cannot be established due to the cross-sectional assessment, this finding suggests that programs aiming to strengthen social capital may have a positive impact on individuals` and ultimately also families` well-being. For example, community-based sociotherapy has been developed in a similar cultural context in post-genocidal Rwanda and aims at strengthening social capital through regular group sessions that are led by trained facilitators and may offer space to discuss community-level and personal issues, engage in joint activities such as games or exercises and provide mutual practical support (Richters et al., 2008). This program can be rolled out on a large scale with over 40 groups of 10 to 15 participants each running at the same time (Scholte et al., 2011). Preliminary evaluation in a quasi-experimental study in Rwanda suggests a positive impact of sociotherapy on both social capital and mental health (Scholte et al., 2011; Verduin et al., 2014). However, such an intervention needs to be closely tailored to the actual context and group, making a standardized approach difficult. Moreover, defining the limits of which experiences can and should be safely disclosed and shared in groups may be problematic. In general, as on the layer of focused

interventions addressing mental health problems, programs and interventions at the layer of prevention and resilience-building require careful evaluation of their feasibility and effectiveness.

**Contextual factors**

The ecological perspective posits that in order to achieve sustainable and comprehensive reductions of risks for and improvements of Burundian refugee children`s well-being contextual factors related to living in the camps need to be addressed as well through structural activities (Miller & Rasmussen, 2017). These range on a continuum from international and governmental policies on refugee liberties and funding of humanitarian support to concrete practical efforts targeting child protection, poverty, housing, health and education. A particular focus should be on preventing exosystem and macrosystem risk factors for children`s ongoing exposure to violence within the family and community. Another study connected to this research project found that families` lower household income was related to higher levels of mothers` self-reported violence against children (Hecker et al., 2020). This suggests that policies allowing refugees to work inside and outside the camps as well as livelihood programs teaching vocational skills may be fruitful to reduce economic and psychological strain on families and parents (Bermudez et al., 2018; Miller & Rasmussen, 2017). In a similar vein, a higher educational level of fathers was related to a lower child-reported use of violence against children (Hecker et al., 2020). This implies that programs which support parents in pursuing further education in the camps may also benefit families and children. Our findings suggest that ongoing violence within the camp community poses a source of continuous trauma and thus a significant mental health risk. Besides the psychosocial interventions strengthening community cohesion described above, structural measures to reduce this risk could be to prevent potential conflicts by considering ethnic, political and social differences in the planning of camp zones, increasing housing quality and lighting in the camp, e.g. through solar panels, and implement neighborhood watches focusing on prevention and mediation of conflicts. Moreover, the provision of alternative sources of energy would protect particularly girls and women from becoming victims of sexual and physical violence while travelling long distances to seek firewood. Informal conversations with refugees in the camps revealed that instances in which members of the Imbonerakure were able to enter the camps without any problems and continued to harass people left them in a state of constant fear. This calls for strict action by authorities to fight corruption among camp administrators and police and better protection of the camps` invisible borders. However, this should be accompanied by policies increasing refugees` freedom of movement so that the image of the camps as prisons is not being reinforced. Normative beliefs about the perpetration and disclosure of violence against children (Bermudez et al., 2018; Fletcher et al., 2018) could be addressed in the context of community-sensitization interventions aiming to identify at-risk children. Notwithstanding the potential benefits of the structural interventions just described, it can be argued that the implementation of sustainable alternatives to long-term camp settlement, which focus on refugees` integration into host societies by

granting them the rights and necessary resources to work and move in the host country, should be prioritized (Feldman, 2007).

## 6. Limitations

The findings of the empirical studies have to be interpreted in the light of several limitations. The cross-sectional research design precludes any causal interpretations of the observed associations. Most relations between relevant study variables are likely to be bidirectional, particularly those involving proximal processes such as maltreatment and parent-child attachment and children`s psychopathology. While following up children and families amidst a complex and rapidly developing refugee crisis poses an enormous practical and logistical challenge, longitudinal studies are highly needed to advance our understanding of the risk and protective factors that shape children`s mental health and development in refugee camps. Although our combination of a systematic and a random sampling approach resulted in a large sample that can be considered representative of Burundian refugee families including both parents/caregivers living in the Tanzanian camps, the generalizability to refugee families living with a different cultural background and/or living in other settings is limited. On a similar note, the findings may not be generalizable to unaccompanied children or children living in single-caregiver families in the camps. Moreover, as we included only the oldest child in primary school age, it is unclear whether the findings would also apply to younger children in families. Future studies using a family-systems approach towards refugee children`s mental health should aim to also include siblings and extended family members.

Our conceptualization and assessment of mental health was based on diagnostic classifications and ontologies originating in Western cultures and we did not consider local idioms of distress. Although we assessed the cultural appropriateness of the study instruments and their translations in Kirundi during qualitative workshops with our local assistants, the study instruments have not been validated in Burundian culture. This refers in particular to our cut-off criteria for PTSD diagnoses and screening for other mental health problems. However, we are aware of the importance of cross-cultural validations in camp settings (Hall, Puffer, et al., 2014) and the caveats associated with applying norms and cutoffs derived from Western populations to non-Western samples (Ehntholt & Yule, 2006). Although we generally noted a high readiness of both children and parents to report on intimate and sensitive topics, we cannot rule out reporting biases such as social desirability and under-reporting of symptoms and experiences, the more so as Burundian culture highly values keeping problems private (Ventevogel et al., 2014). Finally, with the exception of child maltreatment and community violence, we did not systematically assess children`s and parents` exposure to other displacement-related stressors such as poor housing, lack of material resources and discrimination, which may be important sources of distress in camp settings (Miller & Rasmussen, 2017).

## 7. Conclusions

The goal of this research was to shed light on the mental health and adjustment of children who have been neglected in two respects: first, the mental health of refugee children and adolescents living in refugee camps in low- and middle-income settings has received minimum attention by research (Frounfelker et al., 2020; Reed et al., 2012). Second, the fate of Burundian refugees living in Tanzanian camps has been widely neglected by media, humanitarian aid and politics (Norwegian Refugee Council, 2020). Our findings suggest that the great majority of Burundian refugee children in Tanzania is quite resilient despite their exposure to significant past and ongoing adversity, thereby correcting the tendency to view all refugee children as "traumatized" and in need of treatment (Silove et al., 2017). The results provide further support for the importance of a socio-ecological perspective on refugee children`s mental health, which considers multiple risk and protective factors within children`s social environment in addition to war-related violence (Catani, 2018; Miller & Rasmussen, 2017) . The paramount role of children`s most proximal context, their family, is documented by the complex interplay of parents` psychopathology, proximal processes (parent-child relationship and child maltreatment) and child outcomes (mental health and cognitive functioning). In the context of war-related trauma and structural adversities of camp-life, these family-level factors may represent the most amenable sources of risk for children`s mental health and development (Miller & Jordans, 2016). Future studies investigating the mental health, cognitive and psychosocial functioning of refugee children and adolescents should strive to apply a socio-ecological approach, include families and, if feasible, implement longitudinal study designs. Based on our findings, we proposed a mental health service model for Burundian youth in the camps, taking into account the actual need for specialized support, the scarcity of resources and the importance of the family context for children`s well-being. While we hope that a durable and sustainable solution to the Burundian refugee crisis aiming to restore and maintain the refugees` safety, peace and dignity will soon be found, these suggestions may inform practical work and ultimately benefit the well-being of youth and families in Nyarugusu, Nduta and Mtendeli camps.

## 8. References

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# 9. Manuscripts of the cumulative dissertation

## 9.1 Manuscript 1: A systematic review of socio-ecological factors contributing to risk and protection of the mental health of refugee children and adolescents


### Abstract

In the past decade, millions of children and adolescents have been forced to flee from protracted or newly erupted violent conflicts. Forcibly displaced children are particularly vulnerable for developing mental health problems. However, a timely and systematic review of the current evidence is lacking. We conducted a systematic review of factors contributing to the mental health of refugee children across different socio-ecological levels (individual, family, community, sociocultural). We systematically searched the databases Medline, PsycINFO, Web of Science, and Cochrane for English studies published in peer-reviewed journals between August 2010 and May 2020. Of the 2413 identified studies, 63 were included in the analyses. Only 24 studies were considered to be of high quality. Pre-migration individual (risk: exposure to war-related trauma, female gender) and post-migration family factors (risk: parental mental health problems and impaired parenting, protective: family cohesion) currently have the best evidence base. Post-migration community (protective: school connectedness, support by peers) and sociocultural factors (risk: discrimination and acculturative stress, protective: integrative acculturation) have gained some support in high-income settings. Prevention and intervention approaches should integrate factors across different socio-ecological levels. More longitudinal studies and research in low- and middle-income countries are needed to advance our knowledge on causal mechanisms behind factors contributing to refugee youth`s mental health.


*Keywords*: refugee children, mental health, risk, resilience, ecological

## Introduction

According to the latest report of the United Nation High Commissioner for Refugees (UNHCR), the global number of people forcibly displaced by persecution, conflict and organized violence has increased from 43.3 million in 2009 up to 70.8 million in 2018 (UNHCR, 2019). This population consists of 25.9 million refugees, who fled across national borders, 41.3 million internally displaced people (IDP) and 3.5 million asylum seekers (UNHCR, 2019). Within the past decade, a number of new conflicts have erupted, e.g. civil wars in Syria and South Sudan as well as the Rohingya crisis, while protracted crises such as in Afghanistan, Somalia, and the Democratic Republic of Congo continue to displace millions of people. About 85% of all refugees flee to neighboring countries, which are often low- and middle-income countries (LMIC) (UNHCR, 2019). In fact, the four countries hosting the largest numbers of refugees in 2018 were Turkey, Pakistan, Uganda and Sudan (UNHCR, 2019). This means that only a small number of refugees embark on the often long journey to high-income countries (HIC), e.g. Europe, North America, and Australia. In the European Union, the highest numbers of refugees, mostly from Syria, Afghanistan and Iraq, arrived in 2015 and 2016 with about 1.3 million asylum applications in each year (Eurostat, 2020).

Children and adolescents below 18 years of age make up about half of the worldwide refugee population (UNHCR, 2019). They have to face the atrocities of conflict-related violence and the numerous hardships of flight and resettlements during crucial phases of their physical, emotional, social and cognitive development. This makes youth particularly vulnerable to mental health problems following war, uprooting and flight (Reed et al., 2012). Accordingly, prevalence rates of up to 53% for posttraumatic stress disorder (PTSD), up to 33% for depression and up to 32% for anxiety disorders have been reported for young refugees resettled in European countries (Kien et al., 2019). A systematic review focusing on refugee youth living in refugee camps reports similar peak rates for depression and anxiety, and rates for PTSD of up to 87%, yet there was large variation in prevalence rates of mental health problems across studies (Vossoughi et al., 2018). Although the prevalence of mental health problems is high in refugee children and adolescents, it is important to note that a substantial number of refugee children does not develop mental health problems and is able to adjust to the new living situation. This finding has stimulated research on the notion of resilience in war-affected children, which refers to good developmental outcomes despite exposure to significant adversity (Luthar et al., 2001). The identification of factors that contribute to risk and resilience in displaced children provides the foundation for any effort to support these children`s healthy development (Fazel et al., 2012).

From a socio-ecological perspective (Bronfenbrenner, 1979), child development is viewed as a dynamic process arising from complex interactions between different levels of the social ecology (e. g. individual, family, school, community, society). Such a framework has been applied to conceptualize not only the stressful experiences that refugee children face, but also the protective resources they may

draw on (Betancourt & Khan, 2008; Elbedour et al., 1993; Reed et al., 2012). Factors contributing to risk and protection can further be classified according to their temporal occurrence within the refugee experience, i.e. pre-, peri, and post-migration (Lustig et al., 2004). In their home countries, youth are often exposed to severe interpersonal violence. During their flight, they may experience detention, deprivation of food or separation from their guardians. In the host country, refugee children continue to face many challenges, in part depending on where they resettle. While the conditions in HIC may ensure safety from external harm and provide basic necessities, youth may struggle to cope in an often completely different society and culture. They have to learn a new language, may face discrimination by peers or encounter bureaucratic obstacles related to school and their asylum process. In LMIC, refugee children often resettle in large refugee camps with high levels of violence, bad sanitary conditions, lack of food and material resources and overcrowded housing. Independent of the specific setting, all these daily post-migration stressors represent a significant risk for refugees` mental health and wellbeing over and above pre-migration traumatic experiences (Li et al., 2016; Miller & Rasmussen, 2010).

The most comprehensive systematic reviews of factors contributing to refugee children`s mental health to date have been conducted by Fazel and colleagues (2012) for children in HIC and by Reed and colleagues (2012) for children in LMIC. Both reviews included studies that had been published before July 2010. Since then research has advanced and various studies focusing on refugee children's mental health and factors that influence psychological outcomes have been published. However, a comprehensive systematic review that synthesizes and evaluates the essential results and implications of these studies is lacking. Several systematic and narrative reviews have been recently published, but these mostly focused on specific subpopulations, e.g. Syrian or unaccompanied refugee children (Mitra & Hodes, 2019; Mohwinkel et al., 2018; Yaylaci, 2018), particular mental health outcomes, e.g. PTSD and depression (El Baba & Colucci, 2018; Reavell & Fazil, 2017; Tam et al., 2017), or specific factors, e.g. placement type (O'Higgins et al., 2018) or acculturative stressors (d'Abreu et al., 2019). Other reviews adopted a broader focus (Eruyar, Huemer, et al., 2018; Hodes & Vostanis, 2018), yet did not apply systematic methods including rigorous selection criteria or evaluate the quality of included studies. In this systematic review, we systematically investigate the factors contributing to risk and protection of the mental health of refugee children and adolescents from a socio-ecological perspective.

## Methods

### Study selection

The electronic databases Medline, PsycINFO, Web of Science, and Cochrane were systematically searched for studies in English that were published in peer-reviewed journals between August 2010 and May 2020. The following search terms were used: ("asylum seeker" or "refugee" or "displaced

person" or "migrant") and ("child" or "adolescent" or "young" or "minor" or "teenage" or "youth") and ("psychiatr*" or "psycholog*" or "psychosocial" or "mental" or "wellbeing" or "adaptation" or "adjustment" or "emotion" or "behaviour" or "behavior" or "trauma" or "traumatic" or "PTSD" or "posttraumatic stress" or "internalizing" or "externalizing" or "anxiety" or "depression") and ("resilience" or "protective factor" or "modifying factor" or "recovery" or "outcome" or "risk factor" or "vulnerability factor"). Moreover, reference lists of previous related reviews and key studies were manually reviewed to identify additional studies. Studies were selected based on the following inclusion and exclusion criteria, all of which had to be fulfilled:

Criterion A: The study investigated the mental health of refugee or internally displaced children in HIC or LMIC. Studies about other topics than refugee mental health, e.g. politics, general health care, physical health, or child maltreatment, were excluded.

Criterion B: The mean age of study participants was 18 years or younger. Studies with older refugees were excluded.

Criterion C: The study had a cross-sectional or longitudinal design and presented quantitative data with a minimum sample size of 50 participants. Qualitative studies were not eligible for inclusion. Similarly, other kinds of empirical studies, e.g. intervention or validation studies, and scientific works, e.g. reviews or commentaries, were excluded.

Criterion D: The study assessed factors contributing to refugee children`s mental health. Studies reporting only prevalence rates of mental health problems without investigating potential factors of influence were excluded.

Criterion E: The majority of participants were directly exposed to war and flight. Studies with children whose parents were refugees and who were born in the host country, and studies with non-refugee samples such as immigrants or non-displaced children in conflict zones were excluded.

Criterion F: The study applied a statistical analysis that theoretically allowed for the control of potentially confounding factors, e.g. age, gender and time since displacement, on refugee children`s mental health, e. g. (M)ANCOVA, regression analysis or structural equation modeling. However, studies were not required to actually control for potentially confounding variables. Studies using only bivariate correlational analyses or simple group comparisons to draw inferences about contributing factors were excluded.

After the removal of duplicates, the titles and abstracts of the remaining articles were screened for eligibility according to these criteria in a hierarchical manner from criteria A to E. Most studies were excluded for several reasons, but were attributed to the category of the highest unmet criterion. Figure 1 graphically displays the study selection process.

The large variability and lack of consistency across studies in terms of research designs, study samples, relationships and outcomes assessed, all of which have been shown to be influential confounds in research on refugee children`s mental health (Fazel et al., 2012; Kien et al., 2019; Vossoughi et al., 2018), precluded a meta-analysis of the data. However, as we aimed to provide a

comprehensive overview of the recent developments in research on refugee children`s mental health, we adopted a broad focus and did not pose limits on certain factors, samples or outcomes. Therefore, we opted for a detailed narrative synthesis of the included studies.

**Quality appraisal**

We used the Systematic Assessment of Quality in Observational Research (SAQOR) system to evaluate the quality of the studies to be included in the systematic review. SAQOR was developed to assess the quality of observational studies in the field of psychiatry within six domains: sample, control/comparison group, quality of exposure/outcome measures, follow-up, distorting influences and reporting domains (Ross et al., 2011). Each domain is further broken down into sub-criteria, for instance the 'sample' domain includes the criteria representativeness of the population, clearly stated source of sample, explicitly stated sampling method, sample size/power calculation and inclusion/exclusion criteria. The presence of each criterion is rated as 'yes' (satisfied), 'no' (not satisfied), 'unclear' or 'not applicable'. The entire domain is evaluated as 'adequate` if a minimum of 3 out of 5 criteria are fulfilled or otherwise as 'inadequate'. A final quality level (high, moderate, low) is determined based on the assessments of the six domains.

To increase the flexibility and sensitivity of the rating system with regard to the specific type of study, we adapted SAQOR according to its use by Betancourt and colleagues (2013) in their systematic review on the psychosocial adjustment and mental health in former child soldiers: the 'control/comparison group' domain was only considered for those studies that actually included such a group and the 'follow-up' domain was only required for longitudinal studies. Given certain methodological and practical challenges inherent to research with conflict-affected populations in often unstable settings we considered the criterion 'representativeness' within the sample domain met if a randomized sample was chosen from a base population across multiple sources (i.e. refugee camps, schools). Following Betancourt et al. (2013), the quality of longitudinal studies was rated 'high' if at least four out of five (without comparison group) or five out of six domains (with comparison group) were rated as adequate; for observational studies, at least three out of four (without comparison group) and four out of five (with comparison group) adequate domains were required for a rating of 'high' quality. 'Moderate' quality was assigned to longitudinal studies with 2 (without comparison group) or 3 adequate domains (with comparison group) and to observational studies with two adequate domains. Longitudinal studies rated inadequate in four or more domains and observational studies rated inadequate in three or more domains were considered 'low' quality. Two of the authors independently conducted the quality ratings.

## Results

**Characteristics of the included studies**

Out of the 63 selected studies, 41 were conducted in HIC and 22 were conducted in LMIC according to the World Bank classification (World Bank, 2019). The refugee children came from 53 different

countries: Africa (21 countries), Asia (17), Middle and South America (10) and Eastern Europe (5). The most frequent countries of origin were Syria, Iraq, Afghanistan, Iran, Burma, Somalia, South Sudan, and Eritrea. In total, 15 studies included unaccompanied refugee minors (URM). The majority of studies had a cross-sectional one-group design, 7 cross-sectional studies included a comparison group and 12 studies had a longitudinal one-group design. Table 1 shows a detailed description of the included studies.

**Results of quality appraisal**

Of the 63 studies, 13 were rated as 'low' quality, 26 as 'moderate' quality, and 24 as 'high' quality. The two independent raters agreed in the overall rating of 42 studies and resolved disagreements in the other 21 studies through discussions. Studies deemed 'low' quality were retained in the systematic review in order to provide a comprehensive and unbiased view of the evidence base. The results of the quality appraisal are displayed in detail in Supplementary Tables A1-A3.

**Study findings**

The findings are structured according to the different levels of the socio-ecological framework (individual, family, community, society and culture), similar to previous systematic reviews (Fazel et al., 2012; Reed et al., 2012) The findings of the individual studies are displayed in Supplementary Table B.

## Individual level

**Exposure to trauma.** About half of the studies (n = 31) investigated the association between pre-migration exposure to war-related traumatic events and children`s mental health. Cumulative exposure to traumatic events was related to higher levels of mental health problems, including PTSD, depression, anxiety, and externalizing problems in most studies (e. g. Bronstein et al., 2012; Jensen et al., 2019; Lincoln et al., 2016; Müller, Büter, et al., 2019; Vervliet, Meyer Demott, et al., 2014). A few studies looked at singular traumatic events and found that particularly those involving severe interpersonal violence (Nasıroğlu et al., 2018; Sapmaz et al., 2017) and family members as victims (Çeri & Nasiroğlu, 2018; Gormez et al., 2018) were associated with worse mental health outcomes. Studies that did not report a consistent association between traumatic exposure and psychopathology often indexed trauma exposure by single items or trauma types (Beiser & Hou, 2016; Flink et al., 2013; Nasiroğlu & Çeri, 2016; Oppedal & Idsoe, 2012). Longitudinal studies with URM indicated that pre-migration trauma continued to impact their mental health years after arrival in the host country (Jensen et al., 2019; Keles et al., 2016b; Vervliet, Lammertyn, et al., 2014). The role of post-migration trauma has only been assessed in two studies: Trauma exposure after arrival was not associated with mental health problems in one study (Jensen et al., 2019), whereas an increase in stressful life events after arrival predicted an increase in PTSD symptoms in another study (Jensen et al., 2014). However, as the authors of the latter study note, events classified as occurring after arrival may have included pre-migration events that were not recalled or reported before.

**Physical, psychological or developmental disorders.** There has been scant investigation of the impact of pre-existing health and developmental conditions on refugee children`s mental health. In a study with Syrian refugee children, the effect of war exposure on PTSD was strongest for highly sensitive children with low levels of childhood adversities, whereas sensitivity did not moderate the effect of war on PTSD for children with high childhood adversities (Karam et al., 2019). Variants of the monoamine oxidase A (MAOA) gene in Syrian boys were associated with decreases in psychosocial distress over time (Clukay et al., 2019). This link was most pronounced in children with either low trauma exposure or high resilience. Children`s poorer physical health as rated by parents was related to more emotional and behavioral problems (Lau et al., 2018), while children with a positive history of a psychiatric disorder were more likely to receive a psychiatric diagnosis than children with a negative history (Sapmaz et al., 2017). Longitudinal studies suggest that refugee minors` depressive symptoms represent a risk factor for the development of later PTSD symptoms (Müller, Gossmann, et al., 2019; Smid et al., 2011).

**Time since displacement.** Evidence on the association between length of stay in the host country and mental health is inconsistent. Seven studies, six of which were conducted in HIC, found that longer duration of time spent in the host country was related to lower levels of mental health problems and higher well-being (Correa-Velez et al., 2010; Goosen et al., 2014; Khamis, 2019; Lincoln et al., 2016; Müller, Gossmann, et al., 2019; Oppedal & Idsoe, 2012, 2015). A recent longitudinal study reported an amelioration of PTSD, depression and anxiety symptoms from baseline to follow-up assessment 1 year later (Müller, Gossmann, et al., 2019). Other longitudinal studies with URM provide evidence for a chronic trajectory of mental health problems (Jakobsen et al., 2017; Jensen et al., 2014, 2019; Keles et al., 2016b; Vervliet, Lammertyn, et al., 2014). Two studies conducted in refugee camps suggest that an increased length of stay in camp settings was associated with exacerbated mental health problems (Braun-Lewensohn & Al-Sayed, 2018; Nasıroğlu et al., 2018).

**Age and gender.** The findings regarding age are inconsistent. The evidence is largely based on studies with older children and adolescents above 11 years of age and there is very limited information on young and middle childhood. In studies including adolescents until the age of 18, youth aged 16 and older had higher levels of internalizing problems (Braun-Lewensohn & Al-Sayed, 2018; Meyer, Yu, et al., 2017; Smid et al., 2011). Older URM were also more likely to develop late-onset PTSD (Smid et al., 2011), probably due to their higher exposure to traumatic experiences, an association also found in a number of other studies (Eruyar, Maltby, et al., 2018; Müller, Büter, et al., 2019; Oppedal & Idsoe, 2015). In a sample of refugee youth ranging from 13 to 27 years of age (mean 18.9), older age was related directly to fewer conduct problems, but indirectly to more depressive symptoms through less host culture competence and more outgroup hassles (Oppedal & Idsoe, 2012). Children who arrived in the Netherlands at an older age, i.e., between 4 and 11 or between 12 and 17 rather than in the first three years of life, had an increased risk of mental distress as recorded by asylum health services (Goosen et al., 2014). A study with repatriated adolescents between 11 and 18 years found that, for

children who had a residence permit in the host country, peer problems decreased with age, whereas the opposite was true for children without a residence permit in the host country (Zevulun et al., 2018). Notwithstanding, other studies with predominantly adolescents samples found that older age was a protective factor for internalizing problems (Ahmad et al., 2015; Lau et al., 2018; Park et al., 2017) and a substantial number of studies did not find associations between youth`s age and mental health outcomes (Betancourt, Salhi, et al., 2012; Buchanan et al., 2018; Giordano et al., 2019; Jensen et al., 2019; Tozer et al., 2018; Vervliet, Meyer Demott, et al., 2014).

The evidence for gender differences yields a more consistent picture. Eleven studies found that girls were at a higher risk of internalizing problems than boys (e. g. Ahmad et al., 2015; Betancourt, Salhi, et al., 2012; Çeri & Nasiroğlu, 2018; Keles et al., 2016b; Meyer, Steinhaus, et al., 2017; Oppedal & Idsoe, 2015). Girls were also more likely to have higher levels of PTSD symptoms in a number of studies (Beni Yonis et al., 2019; Braun-Lewensohn & Al-Sayed, 2018; Elklit et al., 2012; Jensen et al., 2019). Six studies found no differences between girls and boys regarding PTSD (Giordano et al., 2019; Karam et al., 2019; Khamis, 2019) and other mental health problems (Lau et al., 2018; Samara et al., 2019; Tozer et al., 2018). One study found male gender to be associated with a higher PTSD risk (Gormez et al., 2018). Three studies corroborate evidence that boys are at an increased risk for externalizing problems (Çeri & Nasiroğlu, 2018; Eruyar et al., 2020; Oppedal & Idsoe, 2012). There is also some evidence for an interaction of age and gender. In pre-pubertal children, boys had a higher risk for mental health problems than girls, whereas in adolescents, girls were at a higher risk (Goosen et al., 2014; Wiegersma, Stellinga-Boelen, & Reijneveld, 2011). In a study with Syrian children in a Turkish camp, gender differences in depression were observed only in children 13 or older, which was attributable to significantly lower levels of depression in older compared to younger boys (Oppedal et al., 2018).

**Education and academic performance.** A longer period of schooling was associated with fewer PTSD symptoms (Müller, Büter, et al., 2019) and fewer self- and parent-rated emotional and behavioral problems (Wiegersma et al., 2011). A higher educational level of South Sudanese adolescents in a Ugandan camp was associated with fewer anxiety symptoms (Meyer, Yu, et al., 2017). Minors reporting 3 or fewer years of education were significantly more likely to develop late-onset PTSD in a longitudinal study (Smid et al., 2011). Two Australian studies found that better self-perceived (Correa-Velez et al., 2010) and parent-reported school performance (Lau et al., 2018) were linked to higher psychological wellbeing and fewer emotional and behavioral problems respectively. In an Australian study (Tozer et al., 2018), fewer years of schooling prior to arrival was associated with higher levels of depression in bivariate, but not multivariate, analysis and in a longitudinal study education level did not predict PTSD symptoms and other mental health problems (Jensen et al., 2014).

**Personal resources.** Mental health and well-being are likely to be influenced by the way refugee children cope in the aftermath of war and flight. A study with Syrian children who resettled in Jordan

and Lebanon found that coping through acquiring social support and trying to think differently about events was associated with fewer PTSD symptoms (Khamis, 2019), while a higher use of the emotion regulation strategy of cognitive reappraisal differentiated North Korean youth with consistently low levels of depressive symptom from those whose depressive symptoms deteriorated over a one year period (Park et al., 2019). However, greater use of problem-focused coping strategies was related to PTSD in Bosnian adolescents who were waiting for their asylum decisions (Elklit et al., 2012), which suggests that engaging too much with problems and circumstances that cannot be actively changed may increase youth`s psychological symptoms. On the other hand, avoiding the engagement with problems and distressing emotions through behavioral and cognitive efforts has also been found to be associated with the presence of PTSD (Elklit et al., 2012; Khamis, 2019) and higher levels of depressive symptoms (Lee et al., 2020; Park et al., 2019). However, the association between avoidant coping and PTSD disappeared when controlling for the avoidance symptoms related to PTSD in one study (McGregor et al., 2015). Children`s appraisals of their life circumstances and their future appear to be important as well. A higher sense of coherence, a personal resource reflecting individuals` ability to cope with and make meaning of adverse events, was associated with lower levels of PTSD symptoms, internalizing and externalizing problems (Braun-Lewensohn & Al-Sayed, 2018). In the same study, higher hopeful expectations for the future were related to children`s fewer externalizing problems, whereas future-oriented wishes were not linked to mental health outcomes. Youth experiencing more control over their life also reported higher levels of psychological and physical well-being (Correa-Velez et al., 2010). Other more practical personal resources, such as physical activity (Lau et al., 2018) as well as instrumental and social competence (Beiser & Hou, 2016) were not associated with adolescents` emotional and behavioral problems.

A number of studies investigated the role of protective personal resources using different conceptualizations of resilience. Lower resilience conceptualized as an individual`s perceived ability to bounce back from stress was related to higher levels of depression in North-Korean youth in two cross-sectional (Kim et al., 2015; Park et al., 2017) and one longitudinal study (Park et al., 2019) and influenced whether a longer stay as an asylum seeker was associated with more or fewer emotional problems (Sleijpen et al., 2019). Higher levels of resilience viewed as a set of interpersonal and intrapersonal strengths were related to higher levels of well-being (Khawaja et al., 2017; Tozer et al., 2018), while resilience assessed as protective factors on different socio-ecological levels predicted reductions in Syrian children`s psychosocial stress over time (Clukay et al., 2019).

## Family level

**Family composition.** Youth who were separated from immediate family members had higher levels of PTSD symptoms than youth who stayed in Australia with all their immediate family members (McGregor et al., 2015). Both previous and current separation from the nuclear family was associated with a diagnosis of PTSD (Mace et al., 2014). Children in an US detention center who had been

separated from their mothers had higher levels of mother-rated emotional and behavioral problems compared to children who had not been separated from their mothers (MacLean et al., 2019). Having left one parent behind in the country of origin was associated with more self- and teacher-reported emotional and behavioral problems in a Dutch study (Wiegersma et al., 2011). The only study comparing unaccompanied and accompanied youth found that being unaccompanied was associated with a higher exposure to traumatic events and with more externalizing problems (Müller, Büter, et al., 2019). Although the integrity of the whole family unit appears to be crucial, other findings indicate that the presence of at least one biological parent is already protective (Correa-Velez et al., 2010; Lau et al., 2018; Meyer, Steinhaus, et al., 2017).

Evidence regarding the role of parental loss is inconsistent. In two studies in LMIC, adolescents who had lost one or both parents were more likely to have PTSD (Beni Yonis et al., 2019) and higher levels of internalizing problems (Meyer, Yu, et al., 2017). In a study with URM shortly after their arrival in Belgium and Norway, the death of one or both parents was not associated with mental health outcomes (Vervliet, Meyer Demott, et al., 2014). Household size did not seem to be associated with mental health problems in two studies (Beni Yonis et al., 2019; Meyer, Yu, et al., 2017), but a smaller family size was associated with more parent- and teacher-rated emotional and behavioral problems of adolescents resettled in the Netherlands (Wiegersma et al., 2011).

**Family functioning and parental mental health.** A more positive, i.e. warm and stable, family climate was associated with lower levels of anxiety for Palestinian adolescents living in refugee camps in Jordan (Ahmad et al., 2015). Higher connectedness, i.e. perceived understanding, care and respect, by the family predicted lower levels of internalizing problems in displaced Chechen youth, particularly in boys (Betancourt, Salhi, et al., 2012). A family environment that encouraged the direct expression of emotions was related to a decreased risk for PTSD in Syrian children (Khamis, 2019).

Supporting evidence for the role of refugee parents` wellbeing for their children`s mental health has been found by 10 studies in both HIC and LMIC (e. g. Beiser & Hou, 2016; Bryant et al., 2018; Meyer, Steinhaus, et al., 2017; Sim et al., 2018). For instance, higher caregiver distress was prospectively associated with higher levels of internalizing and externalizing problems in Eritrean adolescents living in a camp in Ethiopia (Betancourt, Yudron, et al., 2012). In a study with Syrian parent-child dyads living in Turkey, parental psychopathology was not related to children`s PTSD symptoms, but to higher levels of parent- and child-reported emotional and parent-reported behavioral problems (Eruyar, Maltby, et al., 2018). Poorer caregiver mental health and lower family functioning were associated with more internalizing and externalizing problems in young displaced Colombian children, but not in non-displaced children (Flink et al., 2013). While these studies focused on parent-child dyads and mostly mothers, a study with Syrian families who resettled in the USA found only mothers`, but not fathers` psychopathology to be associated with children`s anxiety symptoms (Javanbakht et al., 2018).

Two studies investigating a potential mechanism underlying these associations suggested that parents` own exposure to war trauma and post-migration stressors were associated with higher levels of parental mental health problems, which in turn were related to more negative parenting behaviors (e. g. harsh parenting), which in turn negatively impacted their children`s mental health (Bryant et al., 2018; Sim et al., 2018). In further support of this, children and adolescents` self-reported experiences of maltreatment by parents were associated with higher levels of mental health problems including PTSD (Karam et al., 2019), depression (Lee et al., 2020; Meyer, Steinhaus, et al., 2017; Meyer, Yu, et al., 2017), anxiety (Meyer, Steinhaus, et al., 2017; Meyer, Yu, et al., 2017) and attention deficit hyperactivity disorders symptoms (Lee et al., 2020). An insecure attachment to mothers and fathers as perceived by Syrian children was related to higher levels of PTSD symptoms, general mental health and conduct problems (Eruyar et al., 2020), whereas a positive mother-child relationship was related to lower levels of anxiety for Palestinian adolescents living in camps (Ahmad et al., 2015). Parenting styles perceived as negative, i.e. low in emotional warmth and support, harsh, rejecting and controlling, were associated with higher levels of internalizing and externalizing problems (Eruyar et al., 2020; Lau et al., 2018; Smetana & Ahmad, 2018). In contrast, positive, i.e. supportive and emotionally warm parenting was linked to lower levels of emotional and behavioral problems (Lau et al., 2018; Smetana & Ahmad, 2018; Zevulun et al., 2018).

**Household assets and parental education.** While no study has systematically assessed preflight socioeconomic status (SES), findings suggested that post-migration SES could be particularly relevant in very poor settings: in an Ethiopian camp, the possession of valuable household assets, i.e. a radio and cattle, was associated with lower levels of adolescents` internalizing problems (Betancourt, Yudron, et al., 2012). In a study in an Ugandan camp, higher SES conceptualized as lower household hunger, caregiver employment status and number of valuable household assets was related to lower levels of adolescents` depression (Meyer, Steinhaus, et al., 2017). In resource-poor settings, such as refugee camps, low SES may also be an indirect risk factor for children`s wellbeing as it increases their risk to be engaged in child labor, which was associated with higher levels of depression (Meyer et al., 2020). Fathers` current unemployment was associated with an increased risk of a psychiatric disorder in refugee children living in a Turkish city (Sapmaz et al., 2017). Having a less educated father was linked to higher levels of children`s emotional problems in one study (Çeri & Nasiroğlu, 2018), whereas no independent association between parents` level of education and child mental health outcomes was found in other studies (Beiser & Hou, 2016; Beni Yonis et al., 2019; Sapmaz et al., 2017).

## Community level

### Social support

Social support can be provided by various persons within children`s social ecology, e.g. by family members, friends, teachers or other adults within the community, and thus operates both on the micro-

and exosystem. Although a number of studies investigated associations between social support and refugee children`s adjustment, they varied considerably in their conceptualization and assessment of social support. Studies that assessed social support in general and did not differentiate between sources of support produced mixed findings, with some studies reporting no independent associations with mental health problems (Elklit et al., 2012; Flink et al., 2013; Jensen et al., 2019) and others presenting links between general social support and higher wellbeing (Correa-Velez et al., 2015; Khawaja et al., 2017) as well as lower levels of depression (Oppedal et al., 2018). One study differentiated between the type of support and found that lower psychological, but not practical support by family, friends and other people predicted North Korean youths` depression (Park et al., 2017). Some studies separately investigated the role of social support provided by family members, peers and community members. Lower support by mentors and peers, but not by the family, increased the risk of PTSD and depression (mentors) as well as anxiety (mentors and peers) after stressful life events (Sierau et al., 2018). In another study, social support within the family was not significantly associated with unaccompanied and accompanied minors mental health, whereas social support in the host country was related to lower levels of anxiety symptoms (Müller, Büter, et al., 2019). In a study with URM in Norway (Oppedal & Idsoe, 2015), both support from family and friends were associated with lower depression levels directly (family) and indirectly through promoted acculturation (family and friends). Connectedness with the family appeared to be more important in protecting displaced Chechen adolescents from internalizing problems than connectedness with peers and adult community members (Betancourt, Salhi, et al., 2012). Caregiver-rated ethnic and religious community support was not associated with children`s emotional and behavioral problems in an Australian study (Lau et al., 2018).

**Neighborhood quality.** Caregiver-perceived neighborhood friendliness and safety were not associated with children`s emotional and behavioral problems in an Australian study (Lau et al., 2018). Similarly, poor neighborhood quality as perceived by refugee youth in Canada was not related to their internalizing and externalizing problems (Beiser & Hou, 2016). In refugee camps, the existence of and access to NGO`s services may benefit the livelihoods of communities and families and thus children`s adjustment. Caregiver-perceived access to health services was associated with lower levels of youth`s internalizing and externalizing program in an Ethiopian camp and for youth who were satisfied with an education program offered by an NGO, the association between caregiver distress and adolescents` mental health problems was weaker compared to those who were not satisfied (Betancourt, Yudron, et al., 2012). However, receiving aid from organizations was not associated with mental health problems in Syrian adolescents living in an European refugee camp (Braun-Lewensohn & Al-Sayed, 2018). Housing quality was not associated with children`s psychopathology in two studies (Beni Yonis et al., 2019; Betancourt, Salhi, et al., 2012).

**School and peer relationships.** Schools can play a vital role for the adjustment and wellbeing of resettled refugee children and youth, as they not only provide opportunities of learning and academic

progress, but also constitute the context in which a major part of socialization and acculturation processes take place. Feeling accepted and supported by teachers and fellow students at school was associated with lower levels of aggressive behavior (Beiser & Hou, 2016), emotional dysregulation (Khamis, 2019) and psychological distress (Tozer et al., 2018) and with higher levels of wellbeing (Khawaja et al., 2017; Tozer et al., 2018). On the other hand, perceived discrimination by teachers and peers was related to more emotional and behavioral problems in one study (Beiser & Hou, 2016) and being bullied by peers at school was associated with lower levels of self-esteem (Samara et al., 2019) and happiness (Correa-Velez et al., 2010). The importance of having supportive and understanding friends for children`s mental health was underlined by findings from two studies (Correa-Velez et al., 2010; Samara et al., 2019).

### Society and culture

**Post-migration difficulties.** Higher cumulative exposure to daily hassles was associated with URMs` higher levels of PTSD symptoms, internalizing and externalizing problems as well as somatization 5 years after their arrival in Norway (Jensen et al., 2019). In a longitudinal follow-up of URM in Belgium, the number of daily stressors, particularly experiences of discrimination, increased over time and predicted PTSD symptoms, depression and anxiety 18 months after arrival, over and above the effects of pre-migration war exposure (Vervliet, Lammertyn, et al., 2014). Apart from these direct effects, two studies found cross-sectional evidence for an indirect effect of post-migration difficulties on refugee children`s mental health by increasing parental psychopathology and subsequently negative parenting behaviors (Bryant et al., 2018; Sim et al., 2018). With the exception of one study (Sim et al., 2018), accumulated daily hardships and their relations to youth`s mental health have not been investigated in LMIC where refugees often live in camp settings with precarious living conditions such as widespread violence, poverty and bad sanitary conditions (Reed et al., 2012).

**Acculturation**. A number of studies from HIC investigated the role of sociocultural adaptation and its relation to refugee children`s mental health using the concept of acculturation. While its definition and assessment have stirred controversy (Oppedal & Idsoe, 2012), the studies generally supported the idea that acculturation refers to the dynamic process of psychological and behavioral change that arises from a prolonged confrontation with a new culture`s norms, customs and values (Berry, 2005). Higher levels of integration into the host society, i.e. adopting aspects of the new culture while maintaining values and practices of the original culture, were associated with lower levels of depression and anxiety (Tozer et al., 2018) as well as with higher levels of well-being (Khawaja et al., 2017; Tozer et al., 2018) in refugee youth resettled in Australia. Increased competence, i.e. knowledge and skills about interpersonal behaviors and underlying values, regarding both host and heritage culture, was related to lower levels of depression in URM in Norway (Oppedal & Idsoe, 2012, 2015). Support from family and co-ethnic friends was associated with ethnic competence, while support from Norwegian friends was related to host culture competence (Oppedal & Idsoe, 2015). A higher social status of the

family within the broader Australian community (Correa-Velez et al., 2010), but also a stronger ethnic identity (Correa-Velez et al., 2015), were linked to refugee youth`s well-being and happiness respectively. While a balance between adaptation to the host and heritage culture appears to be associated with better mental health, marginalized (disengaging both from host and heritage culture) and separated (maintaining high levels of heritage culture/identity while avoiding contact with the host culture/society) acculturation styles were associated with higher levels of depression in Somali adolescents resettled in the USA (Lincoln et al., 2016).

Learning the host country`s dominant language is a crucial part of sociocultural adaptation. Poorer German language proficiency was related to higher levels of PTSD and depression symptoms (Müller, Büter, et al., 2019) and better perceived English skills were associated with higher self-esteem and school adjustment (Buchanan et al., 2018). However, two studies did not find an association between children`s proficiency in the host language and their adjustment (Correa-Velez et al., 2015; Gormez et al., 2018).

Part of the acculturation process may be exposure to a number of stressful experiences for refugee children and youth, such as conflicts with family and in-group members, discrimination and ethnic identity crisis (Keles et al., 2016a). More severe family-related acculturative hassles, such as being criticized for codes (e. g. clothes, behaviors) adopted from the host culture and having to translate for parents were associated with higher levels of PTSD symptoms and depression, particularly in youth with a marginalized acculturation style (Lincoln et al., 2016). Higher perceived discrimination was related to higher levels of depression (Oppedal & Idsoe, 2015) and lower levels of self-esteem and school adjustment (Buchanan et al., 2018) as well as lower happiness (Correa-Velez et al., 2015). Higher cumulative acculturation stress was associated with higher levels of depression in cross-sectional studies (Keles et al., 2016a; Kim et al., 2015) and with an increase in depression symptoms over time in a longitudinal study with unaccompanied minors in Norway (Keles et al., 2016b). A decrease in acculturative stressors was related to a decrease in depressive symptoms over time in the latter study. No study has investigated acculturation-related factors in LMIC.

**Resettlement location.** Refugee camps are one of the most common displacement settings for refugees worldwide, particularly in LMIC. However, only 9 studies were actually conducted in camp contexts and no study assessed whether children currently residing in a camp were at greater risk for mental health problems than children living in other forms of accommodation. Living in a camp (Beiser & Hou, 2016; Lau et al., 2018) and duration of stay in a camp (Elklit et al., 2012) before coming to a HIC were not related to youth`s emotional and behavioral problems and PTSD. Living in proximity to ongoing war and/or in poorly developed regions may perpetuate children`s feelings of insecurity and helplessness. The prevalence of PTSD was higher among Syrian adolescents living in a Jordanian city close to the Syrian border with limited access to jobs, health and education compared to those living in a more distant and industrialized city (Beni Yonis et al., 2019). In a similar vein, rates of PTSD were higher among Syrian youth living in Lebanon compared to Jordan, which is probably

attributable to relatively higher levels of post-migration stressors (e.g. discrimination, bad sanitary conditions, and restrictive living arrangements) in Lebanon (Khamis, 2019). However, in a study with internally displaced Chechen youth perceived insecurity in the region of resettlement was not related to internalizing problems (Betancourt, Salhi, et al., 2012). Not being satisfied with life in Turkey was associated with more conduct problems in one study with Syrian children (Çeri & Nasiroğlu, 2018), but no independent association with children`s mental health was found in another study (Gormez et al., 2018). For asylum-seeking children who had returned to Kosovo and Albania, living in a rural or urban area was not related to emotional and peer problems (Zevulun et al., 2018).

**Ethnic origin.** African-born youth reported higher levels of well-being than youth from other regions in a Australian study (Correa-Velez et al., 2010). In another study, parents of children with African origin reported more emotional and behavioral problems for their children than children from the Middle East and Eastern Europe in a Dutch study (Wiegersma et al., 2011). In a database study of accompanied asylum seeking children in the Netherlands (Goosen et al., 2014), children from Iran had the highest and children from Iraq the lowest risk of mental distress recorded by medical services. Belonging to a visible minority (e.g. Afghan, Sri Lankan) was associated with more emotional problems reported by refugee youth resettled in Canada (Beiser & Hou, 2016). Repatriated children who belonged to the Ethnic Roma minority faced a lower quality of child rearing environment, which was linked to more internalizing problems (Zevulun et al., 2018).

**Placement type and immigration process.** The comparability of findings regarding the asylum process is limited due to country-specific regulations. However, the type and quality of living arrangements as well as the outcome of the asylum decision appear to be particularly important with regard to refugee youth`s mental health and wellbeing. Studies with URM suggest that staying in settings characterized by lower supervision and support, e.g. living independently or in large-scale reception centers, is associated with higher levels of PTSD, depression and anxiety when compared to settings with more support and supervision, e.g. foster care or living groups (Bronstein et al., 2012; Jakobsen et al., 2017; Smid et al., 2011). A Norwegian longitudinal study found that URM who were assessed as 18 years or older and were subsequently placed in low-support adult reception centers had higher levels of psychological distress at follow-up assessments compared to youth who remained in high-support reception centers for youth (Jakobsen et al., 2017). However, the type of living arrangements was not associated with Afghan URMs` emotional and behavioral problems when controlling for age, pre-migration trauma and length of stay in the UK (Bronstein et al., 2013). Post-migration detention is a form of placement that seems to be especially harmful to children's wellbeing. Both past and current mandatory detention was associated with an increased likelihood of PTSD, depression and anxiety (Mace et al., 2014) and children who were detained on a small island on their way to Australia had significantly higher levels of parent-rated emotional and behavioral problems than children living in a community setting in Australia (Zwi et al., 2018). Evidence about the influence of changes in the living situation within the host country is inconsistent. A high annual

relocation rate was associated with an increased risk for mental distress particularly in children who had experienced violence and whose mother had PTSD or depression (Goosen et al., 2014). However, the number of relocations was not related to emotional and behavioral problems as reported by children themselves, parents, and teachers in another study (Wiegersma et al., 2011).

The time spent waiting for the asylum decision is marked by great uncertainty about the future and constant fear of deportation. Increased length of stay as an asylum seeker in the Netherlands was associated with adolescents` lower levels of life satisfaction and individual resilience (Sleijpen et al., 2019). In another study, time until determination of asylum status was not related to URMs` externalizing problems (Bronstein et al., 2013). Two longitudinal studies found that minors whose asylum applications had been rejected between assessments (compared to those who were granted asylum) had significantly higher levels of PTSD symptoms and externalizing problems (Müller, Gossmann, et al., 2019) as well as depression and anxiety symptoms (Jakobsen et al., 2017; Müller, Gossmann, et al., 2019). Asylum status was not associated with children and adolescents` mental health problems in two cross-sectional studies, which was explained by the unequal distribution by the respective variable (Bronstein et al., 2012) and the potentially higher relevance of other context variables such as maternal mental health and family size (Wiegersma et al., 2011). Having a permanent visa was related to higher levels of wellbeing in a Australian study (Tozer et al., 2018), while a stable residence permit in the host country was related to a higher-quality child rearing environment and in turn lower levels of internalizing problems in repatriated children (Zevulun et al., 2018).

## Discussion

Within the past decade, an unprecedented number of people, of which many are minors, have been forced to flee their homes due to ongoing and emerging violent conflicts and wars in the world. Researchers have responded to the need to better understand which factors contribute to the mental health and well-being of vulnerable refugee youth by conducting various new studies. Table 2 summarizes the contributing factors identified by this systematic review across different socio-ecological levels (individual, family, community, society/culture) and stages of the refugee experience (pre-. peri- and post-migration).

Several limitations of the recent research studies have to be taken into account when interpreting the findings: first, there is a lack of evidence on pre- and peri-migration factors, particularly on the family, community and societal level, as well as the role of experiences during flight and migration. Second, there are few studies from LMIC and particularly refugee camps. While this may be due to the ethical and practical challenges related to conducting research in these settings (Reed et al., 2012), it means that findings do not encompass the lived realities of most refugees worldwide. Third, the current evidence is largely based on cross-sectional studies without comparison groups, which preclude firm conclusions on the direction of associations between presumed factors of

influence and outcomes. Fourth, the studies are very heterogeneous in the applied research designs, measures and target refugee populations, thereby making it difficult to draw unifying conclusions. For instance, some studies used instruments that were specifically created or adapted for the study context, whereas others applied established measures that were not validated for the samples` cultural background.

Notwithstanding these limitations, our synthesis of the individual findings provides useful information by strengthening the evidence base for some established factors and shedding light on hitherto underexplored factors. Our findings corroborate previous evidence establishing children`s exposure to pre-migration trauma as significant individual-level factor contributing to the risk of developing mental health problems (Fazel et al., 2012; Reed et al., 2012). This is in line with the building block effect of trauma (Neuner et al., 2004), which specifies a dose-response relation between the number of traumatic event types and the severity of PTSD and other trauma-related psychopathology. While girls have been identified at heightened risk for internalizing symptoms before (Fazel et al., 2012; Reed et al., 2012), the more recent studies also provide evidence for female gender as contributing to the risk for PTSD. A newly found factor contributing to resilience is a longer period of pre-migration schooling, underscoring the pivotal role of education for the well-being and development of conflict-affected children (Nicolai & Triplehorn, 2003). Our review suggests several individual-level factors contributing to risk (internalizing symptoms, avoidant coping) and protection (better perceived school performance, individual resilience) in the post-migration phase. However, these are based on a small number of studies solely from HIC.

The new evidence on family-level factors strengthens the view that the family constitutes a powerful source of both risk and resilience to the mental health and wellbeing of conflict-affected children (Betancourt & Khan, 2008). In particular, a link between parents` own mental health problems and refugee children's mental health has been found across a variety of cultural and socioeconomic settings. The mechanisms underlying this intergenerational transmission of psychopathology remain to be elucidated in refugee families. This review provides preliminary evidence for the mediating role of maladaptive parenting behaviors, which goes along with research on other conflict-affected populations documenting the complex interplay between war trauma, family violence and children`s mental health problems (Catani, 2018). However, some studies show the protective nature of a cohesive and supportive family environment for refugee youth`s mental health after resettlement in the host country, which has also been found in previous reviews (Fazel et al., 2012). In line with previous reviews (El Baba & Colucci, 2018; Fazel et al., 2012), being separated from family members before and during flight constitutes a factor contributing to refugee youth`s risk . However, there is a lack of studies comparing accompanied and unaccompanied youth and investigating the role of family separations in LMIC.

Evidence on post-migration community-level and on sociocultural factors comes almost exclusively from HIC, precluding the generalizability of these findings beyond these settings. In line

with previous reviews (d'Abreu et al., 2019; Fazel et al., 2012), higher exposure to acculturative stressors in the host country, in particular perceived discrimination, was associated with worse mental health outcomes for refugee youth. In keeping with research with non-refugee immigrant youth (Abu-Rayya & Sam, 2017), an integrative acculturation style, i.e. being engaged both in the host and heritage culture, appears to be associated with refugee youth`s higher wellbeing. Even though discrimination and other acculturation stressors may be particularly salient in HIC whose culture is often quite different from the home countries of most refugees, studies from LMIC with seemingly similar cultures of refugees and host societies would be valuable. Discrimination may be also prevalent in contexts where refugee and host communities compete for scarce resources. Relatedly, the nature of daily stressors differs for refugee youth in these contexts and consist rather in a severe lack of material resources and ongoing threats to safety (Reed et al., 2012). In terms of factors contributing to protection, the review expands the evidence base for an important role of school connectedness and self-reported support by peers for refugee youth (Fazel et al., 2012). In line with specialized systematic reviews (Mitra & Hodes, 2019; O'Higgins et al., 2018), being placed in living arrangements characterized by lower support, e.g. semi-independent care or reception centers, puts URM at an increased risk for mental health problems compared to more supportive arrangements, e.g. foster care. Unsurprisingly, acceptance of asylum claims in the host country appears to be protective, marking the end of a period of uncertainty and offering a long-term perspective.

Placing the current evidence in the wider context of clinical psychological research with children and adolescents, it can be noted that the contributing factors on the family and community level such as parental mental health problems, maladaptive parenting and peer support are for the most part well in line with established evidence from non-refugee populations (Lambert et al., 2014; McLeod et al., 2007). On the one hand, this supports a universal perspective on refugee children`s development and well-being and emphasizes the importance of proximal socio-ecological contexts, particularly the family. On the other hand, our systematic review is the first to establish the importance of these factors for the mental health of refugee children. In fact, they may be particularly salient in this population given the consistently higher prevalence rates of mental health problems found in adult refugees compared to the general population (Silove et al., 2017). Besides more or less universal factors, our review also identified a number of factors that can be considered unique for the context of refugee children and adolescents, at least those resettling in HIC, such as acculturation, discrimination, placement type (for URM) and the asylum decision. Overall, our systematic overview emphasizes the joint consideration of a range of universal and specific contributing factors across the pre-, peri- and post-migration phases and different ecological contexts in order to understand mental health risk and resilience of refugee youth.

**Recommendations for future research**

Future studies should aim to expand the evidence base for the factors identified by this and previous systematic reviews. This way the status of factors with inconsistent evidence should be clarified (e.g.

age, time since displacement) and potentially relevant factors that have been understudied so far should be examined (e.g. refugee youth`s attribution of events, intra-familial communication, genetic and biological factors, neighborhood characteristics, ideological and religious beliefs). Most importantly, studies should strive to use longitudinal designs to elucidate causal pathways between socio-ecological factors and refugee youth`s mental health and adjustment at different stages of their experience and development. While it may be extremely difficult to track children across their flight journey, studies could include children shortly after their arrival at a camp or reception center and prospectively assess post-migration factors and mental health at multiple regular follow-ups. In doing so, it will be important to record the relevant predictor and outcome variables at each time point and model complex research designs such as cross-lagged panel and latent growth models to examine causal mechanisms of change. Among the reviewed studies, positive examples for longitudinal and rather complex designs are the high-quality study by Smid and colleagues (2011), which combined multinomial regression and path analysis to examine the interplay of individual-level (trauma exposure, age, and internalizing symptoms) and socio-cultural (supervision) variables in shaping PTSD symptomatology over time, as well as the study by Keles et al. (2016b), which used a person-based approach to identify pre-migration (trauma exposure and gender) and post-migration (acculturative stressors) risk factors for long-term trajectories of depression symptoms among URM. The inclusion of comparison groups, for example accompanied and unaccompanied minors, repatriated and non-repatriated youth, children in refugee camps and in community settings, is also important. Ultimately, the validity and generalizability of research findings depend both on the psychometric quality and the cultural applicability of the used assessment instruments. Researchers should aim to strike a balance between using established measures that enhance comparability between studies and taking into account culture-bound mental health concepts to improve the cultural applicability of measures. Finally, more research in LMIC and particularly in refugee camps is needed to adequately represent the experience realm of the vast majority of refugee youth worldwide.

**Practical implications**

Factors on multiple socio-ecological levels contribute to risk and resilience among refugee youth. Consequently, practical efforts aiming to support this vulnerable group`s mental health should be integrated across these levels and target several factors. Existing interventions and challenges related to the delivery and implementation of mental health services for refugee youth in HIC and LMIC have been reviewed and discussed recently (Eruyar, Huemer, et al., 2018; Fazel & Betancourt, 2018; Hodes & Vostanis, 2018). At this point we briefly present what we consider direct practical implications of the contributing factors with the best current evidence base.

The pervasive impact of pre-migration war trauma calls for trauma-focused treatments such as narrative exposure therapy for children (Ruf et al., 2010) and trauma-focused cognitive behavioral therapy (Unterhitzenberger et al., 2019). Early screening for mental health problems and established factors contributing to mental health risk shortly after resettlement and regular follow-ups for

vulnerable children could help to quickly introduce children to existing service programs and prevent the development of late-onset disorders. On a policy level, governments and international organizations should make any effort to protect children from exposure to violent conflicts and wars in the countries of origin if international agreements such as the United Nation`s Convention on the Rights of the Child shall have any meaning. On a family level, the findings further suggest parents` mental health and parenting as key targets for interventions, which need to be tailored both to the cultural background of families and to the demands of the specific setting. Moreover, fast reunification of youth with their parents and other family members needs to be prioritized by authorities and organizations. Within children`s exosystem, schools are not only important in terms of formal learning, but they are also hubs for social relationships with peers and friends. Educational authorities should consider activities and programs in the school setting that encourage social support and cohesion among peers. The post-migration challenges refugee youth and their families face in HIC may often be directly modifiable by policy makers. This includes, for example, the provision of high-support living arrangements for unaccompanied youth as well as the swift, yet careful and transparent, resolution of asylum claims. The potentially beneficial impact of an integrative acculturation style may be promoted through targeted activities on a family, school and community level, which aid refugee youth to adopt elements of the host culture and at the same time maintain bonds to their heritage culture`s traditions and values.

**Limitations of review**

First, owing to the marked heterogeneity of included studies in terms of the study designs, populations and measures used, we were not able to conduct a meta-analysis of the evidence. Second, we only included quantitative studies in our review. However, we emphasize that qualitative research is important to gain further insights into refugee youth`s perspectives and to capture aspects that may be missed by quantitative approaches. Third, although our strict application of inclusion and exclusion criteria probably increased the validity of the findings, we also had to exclude studies with interesting findings.

**Conclusions**

Exposure to violent conflict, flight and the challenges of resettlement can adversely affect refugee youth`s mental health and well-being. However, risk and resilience is determined by a complex interplay of various factors in youth`s socio-ecological environment at different stages of their life experience. Although research has provided valuable insights, there is still much to learn about the conditions that shape refugee children`s adjustment. More longitudinal studies that take into account moderating and mediating factors on different contextual levels are needed. In the meantime, evidence on established factors contributing to risk (exposure to war-related violence, female gender, caregivers` mental health problems and parenting, acculturative stress and discrimination) and protection (family cohesion, school connectedness, peer support, integrative acculturation style) has to be transferred to practice by developing and evaluating interventions and by informing policy. This

serves both to prevent detrimental long-term consequences to the well-being of refugee youth and to contribute to peaceful and prosperous societies characterized by diversity, solidarity and mutual respect.

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**Tables and Figures**

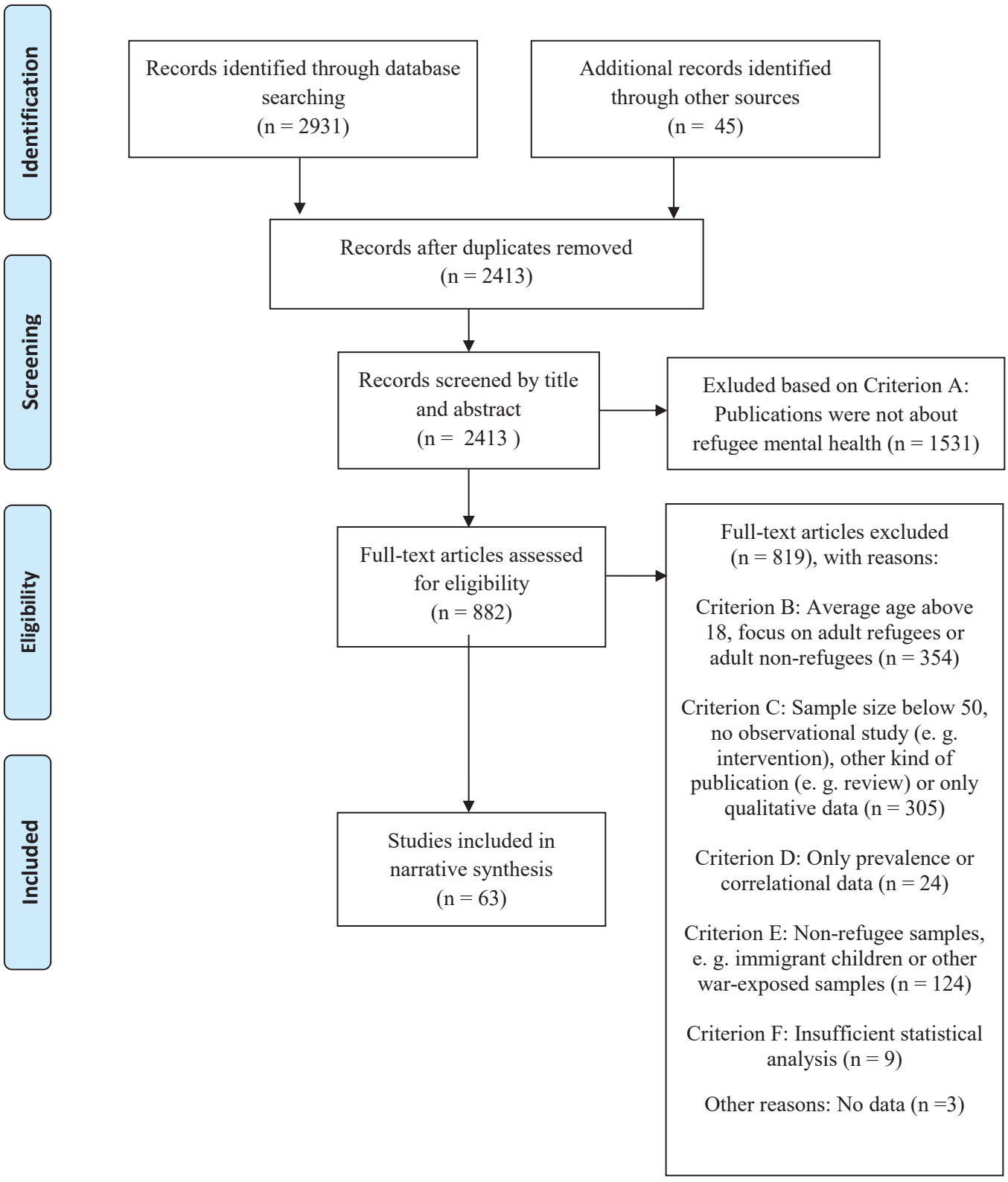


*Figure 1*. Flow diagram of the study selection process. Template from Moher, Liberati, Tetzlaff and Altman (2009).

**Table 1:** Description of included studies

| Authors (year) | Study site | Study population | Age in years (mean) | Domain assessed Socio-ecological/Temporal | Measurements |
|---|---|---|---|---|---|
| Ahmad et al. (2015) | Jordan | 491 Palestinian refugee youth in a refugee camp | 14-17 (15) | Individual, family/pre- and peri-migration | Adapted measures of maternal control, knowledge, solicitation, parent-child relationship and norm-breaking, family climate and secretiveness with mothers, SCARED |
| Beiser & Hou (2016) | Canada | 152 refugee and 326 immigrant mother-child-dyads | 11-13 | Individual, family, community, society/pre-, peri- and post-migration | Self-developed and adapted scales for emotional problems, aggressive behavior and other study variables |
| Beni Yonis et al. (2019) | Jordan | 1773 Syrian refugee adolescents | 12-18 (14.5) | Individual, family, society/pre- and peri-migration | Culturally adapted version of CPSS |
| Betancourt et al. (2012) | Ethiopia | Caregiver-child dyads in a refugee camp (T1: 168 adolescents, 162 caregivers T2: 153 adolescents, 152 caregivers) | 11-18 | Family, community/peri-migration | Adapted version of YSR and CBCL, HSCL-25, multidimensional scale of perceived social support, self-developed items |
| Betancourt et al. (2012) | Russia | 183 Internally displaced Chechen youth | 10-17 (13.6) | Individual, family, community, society/pre- and peri-migration | YSR, adapted school connectedness scale, self-devised questions |
| Braun-Lewensohn & Al-Sayed (2018) | Unspecified refugee camp in Europe | 110 Syrian refugee adolescents | 12-18 (15.5) | Individual, family, community, society/pre- and peri-migration | YSR, SOC, self-developed scales for other study variables |
| Bronstein et al. (2012)<br>Bronstein et al. (2013) | UK | 222 male Afghan URM | 13-18 (16.3) | Individual, society/pre- and post-migration | SLE, RATS, categorial indicators for asylum and care status<br><br>SLE, HSCL-37A |
| Bryant et al. (2018) | Australia | 394 refugee caregivers of 639 children | 5-18 (12) | Family, society/pre-and post-migration | HTQ, PTSD-8, SDQ parent report, Postmigration Stressor Index (self-developed), warmth scale of Child Rearing Questionnaire, hostility scale of Early Chilhood Longitudinal Study of Children |
| Buchanan et al. (2018) | Australia | 106 refugee youth and 223 non-refugee immigrant youth | Refugees: 13-21 (16.8) Immigrants: 13-18 (15.4) | Individual, society/pre- and post-migration | RSES, adapted scales for school adjustment, perceived discrimination and language proficiency |
| Çeri & Nasiroğlu (2018) | Turkey | 77 Syrian refugee minors | 7 to 17 (12.1) | Individual, family/pre- and post-migration | SDQ parent-report, self-devised questions for other study variables |
| Clukay et al. (2019) | Jordan | Syrian refugee youth in urban centers (T1: 399. T2: 263, T3: 157) | 12-18 (14.3) | Individual/pre-migration | TEC, PSS, Human Distress and Human Insecurity, AYMH, SDQ, CRIES-8, CYRM, genetic analysis |
| Correa-Velez et al. (2010)<br>Correa-Velez, et al. (2015) | Australia | 97 refugee youth from 11 different countries (Wave 1)<br>Wave 1: 120<br>Wave 5: 51 | 11-19 (mean 15.1)<br>Wave 5: 18-27 (22.8) | Individual, family, community, society/pre- and post-migration | Subjective well-being measure (WHOQOL-BREF), adapted scales for other study measures, purposive-built items for subjective health and happiness, RSES |

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| Elklit et al. (2012) | Denmark | 119 Bosnian refugee youth | 15-27 (18.5) | Individual, community/pre-, peri- and post-migration | HTQ, CSQ, CSS |
| Eruyar et al. (2018)<br>Eruyar et al. (2020) | Turkey | 263 Syrian child-parent dyads<br>322 Syrian refugee children | 8-18 (11.6) | Individual, family/pre- and post-migration | SDQ parent- and self-report, GHQ-12, PSI, SLE, CRIES-8<br>CRIES-8, SDQ, Security Scale, Egna Minnen Betraffande Uppfostran for Children |
| Flink et al. (2012) | Colombia | Primary caretakers of 279 internally displaced and non-displaced children | 2-6 (4.2) | Individual, family, community/pre- and post-migration | CBCL, GHQ-12, K-SADS-PL PTSD traumatic event checklist, general functioning scale of family assessment device (FAD), categorical indicator of social support |
| Giordano et al. (2019) | Italy | 271 Syrian and Palestinian children in transit to Northern Europe | 6-14 (10) | Individual (trauma exposure)/pre-migration | CWTQ, PTSRC, SDQ parent report, CYRM-28 |
| Goosen et al. (2014) | Nether-lands | 8047 accompanied asylum-seeking children | 4-17 | Individual, family, society/pre-, peri- and post-migration | Electronic database indicators, International Classification of Primary Care codes |
| Gormez et al. (2018) | Turkey | 218 Syrian refugee children | 9-15 (12) | Individual, society/pre- and post-migration | Self-developed tool for traumatic events, UCLA-PTSD-RI, SCAS, SDQ |
| Jakobsen et al. (2017) | Norway | Male URM from Afghanistan, Somalia, Algeria and Iran (T1: 138, T2: 101, T3: 84, T4: 69) | 14-20 (15.22) | Individual, family, society/pre- and post-migration | HSCL-25, SLE, HTQ |
| Javanbakht et al. (2018) | USA | 53 Syrian refugee families (mostly with 2 parents) with 131 children | 6 to 17 (11) | Family/post-migration | UCLA-PTSD-RI, SCARED, PCL-C, HSCL-25 |
| Jensen et al. (2014)<br>Jensen et al. (2019) | Norway | URM<br>(T1: 93, T2: 75)<br>(T1: 95, T2: 78, T3: 47) | T1: 13.8<br>T2: 16.5<br>T3: 20.0 | Individual, family, community, society/pre- and post-migration | HSCL-37A, CPSS, SLE, Self-developed check list for postmigration trauma, DSSYR, FSSQ |
| Karam et al. (2019) | Lebanon | 549 Syrian refugee children and adolescents | 7-17 (11.9) | Individual/pre-migration | UCLA-PTSD-RI, self-developed war exposure checklist, ISPCAN Child Abuse Screening Tool, self-developed list of childhood adversities, Highly Sensitive Child Questionnaire |
| Keles et al. (2015)<br>Keles et al. (2016) | Norway | 895 URM with a permanent residence permit<br>(T1: 918, T2: 580, T3: 229) | 18.6<br>18.8 -19.17 | Individual, community, society/pre- and post-migration | CES-D, YCC Hassles Battery, self-developed scales for host and heritage culture competence, self-developed premigration trauma checklist |
| Khamis (2019) | Lebanon, Jordan | 1000 Syrian refugee children | 7-18 (11.30) | Individual, family, community, society/pre- and post-migration | Trauma Exposure Scale, structured clinical interview for PTSD DSM-IV Criteria, DERS-SF, KidCope, Family Environment Scale, School Environment Scale |
| Khawaja et al. (2017) | Australia | 221 refugee and immigrant youth (55.8% refugees) | 11-18 (14.9) | Individual, community, society/post-migration | SCWBS, Acculturation and Resilience Scale, Psychological Sense of School Membership, Support Functions Scale |
| Kim et al. (2015) | South Korea | 144 North Korean refugee youth | 13-21 (18.20) | Individual, society/pre- and post-migration | HSCL-25, UCLA PTSD-RI DSM-IV, ASC, self-developed Ego Resiliency Scale |
| Lau et al. (2018) | Australia | 426 caregivers of 694 refugee children and adolescents | 5-17 | Individual, family, community/pre-, peri- and post-migration | SDQ-parent and child versions, self-developed items for study variables in individual, family, school and community domains |
| Lee et al. (2020) | South Korea | 157 North Korean refugee youth | 13-26 (18.7) | Individual, family/pre- and post-migration | ACE questionnaire, ERQ, CES-D, Conners-Wells Adolescent Self-Report Scale-Short Form |
| Lincoln et al. (2016) | USA | 135 Somali adolescent refugees | 11-20 (15.4) | Individual, society/pre- and post-migration | Behavioral Acculturation Scale from LIB, Family Hassles Subscale of Acculturative Hassles Inventory, WTSS, UCLA-PTSD-RI, DSRS |

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| Mace et al. (2014) | Australia | 332 refugee children reviewed by a health service | 4-17 (9.58) | Family, Society/pre- and peri-migration | Revised health-screening questionnaire for new patients at the Refugee Health Service |
| MacLean et al. (2019) | USA | 425 immigrant children held at US detention centers and their mothers (UCLA self-report data for 150 children) | 4-17<br>UCLA data: 13.4 | Family/peri-migration | SDQ parent report, UCLA-PTSD-RI |
| McGregor et al. (2015) | Australia | 50 resettled refugee youth from 16 different countries | 12-21 (16.6) | Individual, family/pre- and peri-migration | CPSS, CCSC, YES-R |
| Meyer, Steinhaus et al. (2017)<br>Meyer et al. (2020) | Uganda | 463/470 South Sudanese caregiver-adolescent dyads in two camps | 13-17 (14.6) | Individual, family, society/pre- and peri-migration | IPSCAN Child Abuse Screening, SCARED, MFQ-C, HSCL-25, purposive-built questions for socioeconomic status and child labour |
| Meyer, Yu et al. (2017) | Rwanda, Uganda | 129 Congolese and 471 South Sudanese refugee adolescents in three camps | 13-17 | Individual, family/pre and peri-migration | SCARED, MFQ-C, SDQ |
| Müller, Büter et al (2019)<br>Müller, Gossmann et al. (2019) | Germany | 30 accompanied and 68 unaccompanied refugee minors<br>1-year-follow-up (T2: 72) | 16.3<br>17.3 | Individual, family, society/pre-. peri- and post-migration | CATS, HSCL-37A, ERSS |
| Nasiroğlu & Çeri (2016)<br>Nasiroğlu et al. (2018) | Turkey | 55 Yazidi refugee children and their parents (46 families)<br>136 Yazidi refugee children | 6-17 (11) | Individual, family/pre- and peri-migration | K-SADSPL-T |
| Oppedal & Idsoe (2012)<br>Oppedal & Idsoe (2015) | Norway | 566 URM<br>895 URM | 13-27 (18.9)<br>18.6 | Individual, family, community, society/pre- and post-migration | Adapted scales for conduct problems, CES-D, purposive-built items for impact of war-related trauma, acculturation hassles, perceived discrimination and social support, Host and Heritage Culture Competence Scale for Adolescents |
| Oppedal et al. (2018) | Turkey | 285 Syrian children in a refugee camp | 12.5 | Individual, family, community/pre- and post-migration | CDI, SLE, Social Provisions Scale |
| Park et al (2017) | South Korea | 136 North Korean adolescent refugees | 12-24 (18.5) | Individual, family, community/pre- and post-migration | CDI, AUDIT, CRIES, Aggression Questionnaire, BRS, purposive-built questions for social support |
| Park et al. (2019) | South Korea | North Korean adolescent refugees (T1: 174, T2 (1-year-follow-up): 108 | 13-26 (17.8) | Individual, family, community/pre- and post-migration | CES-D, ERQ, RSES, BRS, purposive-built questions for social support |
| Samara et al. (2019) | UK | 149 refugee children and 120 non-refugee British-born children | 6-16 | Family, community/post-migration | Satisfaction with Life Scale, CPSS, Coopersmith Self-Esteem Inventory, Cambridge Hormones and Moods Friendship Questionnaire, Popularity Questionnaire, self-developed scale for bullying and victimization, SDQ parent (below 11) and child version, Psychosomatic and Health Questionnaire |
| Sapmaz et al. (2017) | Turkey | 89 refugee children | 5-18 (10) | Individual, family/pre- and post-migration | K-SADSPL-T, SDQ parent (over 11) and child versions |
| Sierau et al. (2019) | Germany | 105 male URM living in group homes | 14-19 (17.3) | Individual, family, community/pre- and post-migration | MSSI, PCL-5, PHQ-9, GAD-7, SSS-8, SDQ |
| Sim et al. (2018) | Lebanon | 291 Syrian refugee children`s | 2-12 (7.4) | Family/post-migration | TEC, HESPER, PCL-C, DASS, PARQ,, Discipline Module of UNICEF`s Multiple |

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|---|---|---|---|---|---|
| | | mothers | | | Indicator Cluster Survey, SDQ |
| Sleijpen et al (2019) | Nether-lands | 117 refugee adolescents and 138 Dutch peers | 12-17 (14.3) | Individual/pre- and post-migration | CRIES, SDQ, Satisfaction with Life, Resilience Scale |
| Smetana & Ahmad (2018) | Jordan | 277 Iraqi, 275 Syrian and 331 Palestinian refugee youth | 15.01 | Individual, Family/pre- and post-migration | Adapted measures of adolescents` war exposure and norm-breaking, mothers` and fathers` support, knowledge, behavioral and psychological control, harsh punishment, BSI-18 |
| Smid et al. (2011) | Nether-lands | URM (T1: 920, T2: 582) | 11-17.5 | Individual, society/pre- and post-migration | HSCL-25, SLE, RATS |
| Tozer et al. 2018) | Australia | 93 refugee students at a special English language school | 12-18 (15.5) | Individual, community, society/pre- and post-migration | HSCL-25, SCWBS, PSSM, AARS, R-MATS |
| Vervliet et al. (2014a) | Norway, Belgium | 307 URM (risk factor analysis only for the 291 males) | 14-18 (16.13) | Individual, family/pre-migration | HSCL-37A, SLE; RATS, HTQ |
| Vervliet et al. (2014b) | Belgium | URM (T1: 103, T2: 79, T3: 77) | Mean 16.00 at T3 | Individual, family, community, society/pre- and post-migration | HSCL-37A, SLE, RATS, DSSYR |
| Wiegersma, et al. (2011) | Nether-lands | 297 asylum-seeking children in reception centers | 4-16 (9.9) | Individual, family, society/pre-. peri- and post-migration | SDQ parent, child and teacher versions, medical files |
| Zevulun et al. (2017) | Kosovo, Albania | 106 repatriated asylum-seeking children | 11-18 (14.4) | Individual, family, community, society/post-migration | BIC-Q, SDQ child report |
| Zwi et al. (2018) | Australia | Asylum-seeking children in detention (48) and in community (38) | 4-15 (8.4) | Society /peri-migration | SDQ parent-version |

*Note:* Studies that are based on largely the same sample are listed in one row, URM, unaccompanied refugee minors. Instruments: AARS, Adult Acculturation and Resiliency Scale; ACE, Adverse Childhood Experiences; ASC, Acculturation Stress Scale; AUDIT, Alcohol Use Disorders Identification Test; AYMH, Arab Youth Mental Health Scale; BIC-Q, Best Interests of the Child-Questionnaire; BSI-18, Brief Symptom Inventory; CATS, Child and Adolescent Trauma Screen; CBCL, Child Behavior Checklist; CCSC, Children's Coping Strategies Checklist–Revision 1; CRIES, Children`s Revised Impact of Events Scale; CPSS, Child Posttraumatic Stress Disorder Symptom Scale; CYRM, Child and Youth Resilience Measure; CDI, Children's Depression Inventory; CES-D, Center for Epidemiologic Studies Depression Scale for adolescents; CSQ, Coping Style Questionnaire; CSS, Crisis Support Scale; CSSI-8, Children's Somatization Inventory Short form; CWTQ, Childhood War Trauma Questionnaire; DASS, Depression Anxiety and Stress Scale; DSRS, Depression Self-Rating Scale; DSSYR, Daily Stressors Scale for Young Refugees; DERS-SF, Emotion Regulation Scale Short Form; ERSS, Everyday Resources and Stressors Scale; FSSQ, Duke-UNC Functional Social Support Questionnaire; GAD-7, Generalized Anxiety Disorder Scale; GHQ-12, General Health Questionnaire 12-item; HESPER, Humanitarian Emergency Settings Perceived Needs Scale; HSCL-25/37A, Hopkins Symptom Checklist; HTQ, Harvard Trauma Questionnaire; K-SADS-PL(-T), Kiddie Schedule for Affective Disorders and Schizophrenia - Present and Lifetime Version (- Turkish); LIB, Language, Identity and Behavioral Acculturation Scale; MFQ-C, Mood and Feelings Questionnaire Child Self Report; MSSI, Multi- Sector Social Support Inventory; PARQ, Parental Acceptance Rejection Questionnaire; PCL-5/C, PTSD Checklist (Civilian); PHQ-9, Patient Health Questionnaire; PSI, Parenting Stress Index; PSS, Perceived Stress Scale; PSSM, Psychological Sense of School Membership; PTSD-8, Post-Traumatic Stress Disorder–8 items; PTSRC, Post-Traumatic Stress Reaction Checklist – Child Version; RATS, Reactions of Adolescents to Traumatic Stress; R-MATS, Resilience Questionnaire for Middle-Adolescents in Township Schools; RSES, Rosenberg Self-Esteem Scale; SCARED, Screen for Child Anxiety Related Emotional Disorders; SCAS, Spence Children's Anxiety Scale; SCWBS, Stirling Children's Well-being Scale; SDQ, Strength and Difficulties Questionnaire; SLE, Stressful Life Events Questionnaire; SOC, Sense of Coherence Scale; SSS-8, Somatic Symptoms Scale; TEC, Traumatic Events Checklist of HTQ; UCLA-PTSD-RI, University of California at Los Angeles Posttraumatic Stress Disorder Reaction Index; WTSS, War Trauma Screening Scale; WHOQOL-BREF, World Health Organization Quality of Life-Bref, YCC, Youth, Culture and Competence Study Hassles Battery; YES-R, Youth Experience Scale for Refugees; YSR, Youth Self-Report.

**Table 2:** Factors contributing to risk and protection of refugee children`s mental health according to socio-ecological context and stage in the refugee phase

| | Individual | Family | Community | Society/Culture |
|---|---|---|---|---|
| **Pre-migration** | Exposure to war-related traumatic events (risk)[22 (25)]<br><br>Being female (risk for internalizing symptoms and PTSD)[14 (21)]<br>Being male (risk for externalizing symptoms)[3 (3)]<br><br>**Longer period of schooling (protective)[6]** | **Loss of a parent (risk)[2]** | | |
| **Peri-migration** | **Length of current stay in a refugee camp (risk)[2]** | Separation from immediate family members (risk)[4 (3)]<br><br>**Socioeconomic status in a refugee camp (protective)[2]** | | **Detention (risk)[2]** |
| **Post-migration** | **Depression and anxiety symptoms (risk)[2]**<br><br>**Better perceived school performance (protective)[2]**<br><br>**Avoidant coping strategies (risk)[4]**<br><br>**Individual resilience (protective)[6]** | **Living with at least one biological parent (protective)[2]**<br><br>Parental mental health problems (risk)[10 (2)]<br><br>**Negative parenting behaviors (risk)[5]**<br>**Parental abuse (risk)[4]**<br><br>Family cohesion (protective)[4 (3)]<br><br>**Warm parent-child relationship (protective)[3]** | Support by peers (protective)[2 (4)]<br><br>**Close relationships with friends (protective)[2]**<br><br>School connectedness (protective)[4 (3)]<br><br>**Cumulative exposure to daily stressors (risk)[5]** | Perceived discrimination (risk)[4 (3)]<br><br>**Integrative acculturation style (protective)[6]**<br>**Exposure to acculturation stressors (risk)[4]**<br><br>**Resettlement in a poor region (risk)[2]**<br><br>**Low-support living arrangements (risk for unaccompanied minors)[3]**<br>**Asylum granted in host country (protective)[4]** |

Note: Only factors that were found in at least two studies are shown. Factors not included in the previous reviews by Fazel and colleagues (2012) and Reed and colleagues (2012) are highlighted in bold. The numbers indicate the number of studies that found the respective factor in the current review (without brackets) and in the reviews by Fazel and colleagues (2012) and Reed and colleagues (2012) (with brackets).

Supplementary Table A1: Results of quality appraisal of included studies

| Reference | SAQOR domains | | | | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Sample | | | | | | | | Comparison group | | | | Exposure and Outcome Measurement | | | | Follow up | | | Distorting Influences | | | | Data reporting | | | Quality |
| | Representative | Source | Method | Power Calculation | Inclusion Criteria | Sum | Inclusion | Identifiable | Source | Matched or Randomized | Statistical control | Sum | Exposure | Outcome | Sum | Number lost | Reasons for loss | Sum | Demo-graphics | Trauma exposure | Other | Summary | Missing Data | Clarity Accuracy | Sum | |
| Ahmad, Smetana & Klimstra (2014) | N | Y | N | N | N | I | N/A | N/A | N/A | N/A | N/A | N/A | Y | Y | A | N/A | N/A | N/A | Y | N | Y | A | N | Y | I | M |
| Beiser & Hou (2016) | N | Y | Y | N | Y | A | Y | Y | Y | N | N | A | Y | Y | A | N/A | N/A | N/A | Y | Y | Y | A | N | Y | I | H |
| Beni Yonis, Khader, Al-Akour & Alfaqih (2019) | Y | Y | Y | Y | N | A | N/A | N/A | N/A | N/A | N/A | N/A | N | N | I | N/A | N/A | N/A | Y | N | N | I | N | Y | I | L |
| Betancourt et al. (2012) | Y | Y | Y | N | Y | A | Y | N | N | N | N | N | Y | Y | A | N/A | N/A | N/A | Y | N | Y | A | N | Y | I | M |
| Betancourt, Yudron, Wheaton & Smith-Fawzi (2012) | N | Y | Y | Y | Y | A | N/A | N/A | N/A | N/A | N/A | N/A | Y | Y | A | Y | Y | A | Y | N | Y | A | Y | Y | A | H |
| Braun-Lewensohn & Al-Sayed (2018) | N | N | Y | N | Y | I | N/A | N/A | N/A | N/A | N/A | N/A | N | N | I | N/A | N/A | N/A | Y | Y | Y | A | N | Y | I | L |
| Bronstein, Montgomery & Dobrowolski (2012) | N | Y | N | N | Y | I | N/A | N/A | N/A | N/A | N/A | N/A | Y | Y | A | N/A | N/A | N/A | Y | Y | N | A | N | Y | I | H |
| Bronstein, Montgomery & Ott (2013) | N | Y | Y | N | Y | A | N/A | N/A | N/A | N/A | N/A | N/A | Y | Y | A | N/A | N/A | N/A | Y | Y | Y | A | N | Y | I | H |
| Bryant et al. (2018) | Y | Y | Y | N | Y | A | N/A | N/A | N/A | N/A | N/A | N/A | Y | Y | A | Y | N | I | Y | N | N | I | Y | Y | A | M |
| Buchanan, Abu-Rayya, Kashima, Paxton & Sam (2017) | N | Y | Y | N | N | I | Y | Y | Y | N | Y | A | Y | Y | A | N/A | N/A | N/A | Y | N | Y | A | N | Y | I | M |
| Çeri & Nasiroğlu (2018) | N | Y | Y | N | N | I | N/A | N/A | N/A | N/A | N/A | N/A | N | N | I | N/A | N/A | N/A | Y | Y | N | A | Y | N | I | L |
| Clukay et al. (2019) | N | Y | N | N | N | I | N/A | N/A | N/A | N/A | N/A | N/A | N | N | I | Y | N | I | Y | Y | Y | A | Y | Y | A | L |
| Correa-Velez, Gifford & Barnett (2010) | N | Y | Y | N | N | I | N/A | N/A | N/A | N/A | N/A | N/A | Y | Y | A | Y | N | I | Y | N | Y | A | Y | Y | A | M |
| Correa-Velez, Gifford & McMichael (2015) | N | Y | N | N | N | I | N/A | N/A | N/A | N/A | N/A | N/A | Y | Y | A | Y | N | I | Y | N | Y | A | Y | Y | A | M |
| Elklit, Lasgaard & Palic (2012) | N | Y | N | N | N | I | N/A | N/A | N/A | N/A | N/A | N/A | Y | N | I | N/A | N/A | N/A | Y | Y | Y | A | Y | Y | A | M |
| Eruyar, Maltby & Vostanis (2017) | N | Y | Y | N | N | I | N/A | N/A | N/A | N/A | N/A | N/A | Y | Y | A | N/A | N/A | N/A | Y | Y | N | A | N | Y | I | M |
| Eruyar, Maltby & Vostanis (2020) | N | Y | Y | N | N | I | N/A | N/A | N/A | N/A | N/A | N/A | Y | Y | A | N/A | N/A | N/A | Y | N | N | I | N | Y | I | L |
| Flink et al. (2013) | N | Y | Y | N | N | I | Y | Y | Y | N | Y | A | Y | Y | A | N/A | N/A | N/A | Y | Y | Y | A | N | Y | I | M |
| Giordano, Cipolla, Ragnoli & Bruno (2019) | N | Y | Y | N | Y | A | N/A | N/A | N/A | N/A | N/A | N/A | Y | Y | A | N/A | N/A | N/A | Y | Y | N | A | N | Y | I | H |
| Goosen, Stronks & Kunst (2013) | Y | Y | Y | N | Y | A | N/A | N/A | N/A | N/A | N/A | N/A | N | N | I | N | N | I | Y | N | Y | A | N | Y | I | L |
| Gormez et al (2017) | N | Y | N | N | N | I | N/A | N/A | N/A | N/A | N/A | N/A | N | N | I | N/A | N/A | N/A | Y | Y | Y | A | N | N | I | L |
| Jakobsen, Meyer-DeMott, Wentzel-Larsen & Heir (2017) | Y | Y | Y | N | N | A | N/A | N/A | N/A | N/A | N/A | N/A | Y | N | I | Y | Y | A | Y | Y | Y | A | Y | Y | A | H |
| Javanbakht, Rosenberg, Haddad & Arfken (2018) | N | Y | Y | N | N | I | N/A | N/A | N/A | N/A | N/A | N/A | Y | Y | A | N/A | N/A | N/A | N | N | N | I | Y | Y | A | M |
| Jensen, Skardalsmo & Fjermestad (2014) | N | Y | N | N | N | I | N/A | N/A | N/A | N/A | N/A | N/A | Y | N | I | Y | Y | A | Y | Y | Y | A | Y | Y | A | M |

Note: N, no (criterion not fulfilled); Y, yes (criterion fulfilled); N/A, not applicable

Supplementary Table A2: Results of quality appraisal of included studies

| Reference | SAQOR domains | | | | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Sample | | | | | | | | Comparison group | | | | Exposure and Outcome Measurement | | | Follow up | | | Distorting Influences | | | | Data reporting | | | Quality |
| | Representative | Source | Method | Power Calculation | Inclusion Criteria | Sum | Inclusion | Identifiable | Source | Matched or Randomized | Statistical control | Sum | Exposure | Outcome | Sum | Number lost | Reasons for loss | Sum | Demo-graphics | Trauma exposure | Other | Summary | Missing Data | Clarity Accuracy | Sum | |
| Jensen, Skar, Andersson & Birkeland (2019) | Y | Y | N | N | N | I | N/A | N/A | N/A | N/A | N/A | N/A | N | N | I | Y | Y | A | Y | N | Y | A | N | Y | I | M |
| Karam et al (2019 | N | Y | Y | N | N | I | N/A | N/A | N/A | N/A | N/A | N/A | N | N | I | N/A | N/A | N/A | Y | Y | Y | A | N | Y | I | H |
| Keles, Friborg, Isdoe, Sirin & Oppedal (2015) | Y | Y | Y | N | Y | A | N/A | N/A | N/A | N/A | N/A | N/A | N | N | I | N/A | N/A | N/A | Y | N | N | I | N | Y | I | L |
| Keles, Friborg, Isdoe, Sirin & Oppedal (2016) | Y | Y | Y | N | Y | A | N/A | N/A | N/A | N/A | N/A | N/A | Y | Y | A | Y | Y | A | Y | N | Y | A | N | Y | I | M |
| Khamis (2019) | Y | Y | Y | N | N | A | N/A | N/A | N/A | N/A | N/A | N/A | N | Y | I | N/A | N/A | N/A | Y | N | Y | A | Y | Y | A | H |
| Khawaja, Ibrahim & Schweitzer (2017) | N | Y | Y | N | N | I | N/A | N/A | N/A | N/A | N/A | N/A | Y | Y | A | N/A | N/A | N/A | N | Y | Y | A | N | Y | I | L |
| Kim, Cho & Kim (2015) | Y | Y | Y | N | N | A | N/A | N/A | N/A | N/A | N/A | N/A | Y | Y | A | N/A | N/A | N/A | Y | Y | N | A | N | Y | I | H |
| Lau et al. (2018) | Y | Y | Y | N | Y | A | N/A | N/A | N/A | N/A | N/A | N/A | N | N | I | N/A | N/A | N/A | Y | Y | Y | A | N | Y | I | H |
| Lee et al. (2019) | N | Y | Y | N | N | I | N/A | N/A | N/A | N/A | N/A | N/A | Y | Y | A | N/A | N/A | N/A | Y | N | N | I | N | Y | I | L |
| Lincoln, Lazarevic, White & Ellis (2016) | N | Y | Y | N | Y | A | N/A | N/A | N/A | N/A | N/A | N/A | Y | Y | A | N/A | N/A | N/A | Y | N | N | I | Y | Y | A | M |
| Mace, Mulheron, Jones & Cherian (2014) | N | Y | Y | N | Y | A | N/A | N/A | N/A | N/A | N/A | N/A | N | N | I | N/A | N/A | N/A | N | N | Y | A | N | Y | I | M |
| MacLean et al. (2019) | N | Y | Y | N | Y | A | N/A | N/A | N/A | N/A | N/A | N/A | Y | Y | A | N/A | N/A | N/A | Y | Y | N | A | Y | N | I | L |
| McGregor, Melvin & Newman (2015) | N | Y | Y | N | Y | A | N/A | N/A | N/A | N/A | N/A | N/A | Y | Y | A | N/A | N/A | N/A | Y | Y | Y | A | Y | Y | A | L |
| Meyer, Steinhaus, Bangirana, Onyango-Mangen & Stark (2017) | Y | Y | Y | N | Y | A | N/A | N/A | N/A | N/A | N/A | N/A | Y | Y | A | N/A | N/A | N/A | Y | N | Y | A | N | Y | A | H |
| Meyer, Yu, Hermosilla & Stark (2017) | Y | Y | Y | N | N | A | N/A | N/A | N/A | N/A | N/A | N/A | Y | Y | A | N/A | N/A | N/A | Y | N | Y | A | Y | Y | A | H |
| Meyer et al. (2020) | Y | Y | Y | N | Y | A | N/A | N/A | N/A | N/A | N/A | N/A | Y | Y | A | N/A | N/A | N/A | Y | N | Y | A | Y | Y | A | H |
| Müller, Büter, Rosner & Unterhitzensberger (2019) | N | Y | Y | N | N | I | N/A | N/A | N/A | N/A | N/A | N/A | Y | Y | A | N/A | N/A | N/A | Y | Y | Y | A | N | Y | I | M |
| Müller et al. (2019) | N | Y | Y | Y | N | A | N/A | N/A | N/A | N/A | N/A | N/A | Y | Y | A | Y | Y | A | Y | Y | Y | A | Y | Y | A | H |
| Nasiroğlu & Çeri (2016) | N | Y | Y | N | Y | A | N/A | N/A | N/A | N/A | N/A | N/A | N | N | I | N/A | N/A | N/A | Y | Y | N | A | N | N | I | M |
| Nasiroğlu, Çeri Erkormaz & Semerci (2018) | N | Y | N | N | Y | I | N/A | N/A | N/A | N/A | N/A | N/A | N | N | I | N/A | N/A | N/A | Y | Y | Y | A | N | Y | I | L |
| Oppedal & Isdoe (2012) | Y | Y | Y | N | Y | A | N/A | N/A | N/A | N/A | N/A | N/A | Y | Y | A | N/A | N/A | N/A | Y | Y | Y | A | N | Y | I | H |
| Oppedal & Isdoe (2015) | Y | Y | Y | N | Y | A | N/A | N/A | N/A | N/A | N/A | N/A | Y | Y | A | N/A | N/A | N/A | Y | Y | Y | A | Y | Y | A | H |
| Oppedal, Özer & Sirin (2018) | N | Y | Y | N | Y | A | N/A | N/A | N/A | N/A | N/A | N/A | N | Y | I | N/A | N/A | N/A | Y | Y | Y | A | N | Y | I | M |
| Park, Lee & Jeon (2017) | N | Y | Y | N | N | I | N/A | N/A | N/A | N/A | N/A | N/A | Y | Y | A | N/A | N/A | N/A | Y | N | Y | A | N | Y | I | M |
| Park et al. (2019) | N | Y | Y | N | N | I | N/A | N/A | N/A | N/A | N/A | N/A | N | N | I | Y | N | I | Y | N | N | I | N | Y | I | L |
| Samara, Asam, Khadaroo & Hammuda (2019) | N | Y | N | N | Y | I | Y | Y | Y | N | N | A | N | N | I | N/A | N/A | N/A | Y | N | Y | A | N | Y | I | L |
| Sapmaz et al. (2017) | N | Y | Y | Y | N | A | N/A | N/A | N/A | N/A | N/A | N/A | N | N | I | N/A | N/A | N/A | Y | Y | Y | A | N | N | I | M |
| Sierau, Schneider, Nesterko & Glaesmer (2018) | N | Y | Y | N | Y | A | N/A | N/A | N/A | N/A | N/A | N/A | Y | Y | A | N/A | N/A | N/A | N | Y | N | I | N | Y | I | M |
| Sim, Bowes & Gardner (2018) | N | Y | Y | N | N | I | N/A | N/A | N/A | N/A | N/A | N/A | Y | Y | A | N/A | N/A | N/A | N | Y | Y | A | Y | Y | A | H |
| Sleijpen, van der Aa, Mooren, Laban & Kleber (2019) | N | Y | Y | N | N | I | Y | Y | Y | N | Y | A | Y | Y | A | N/A | N/A | N/A | N | Y | Y | A | Y | Y | A | H |
| Smetana & Ahmad (2017) | N | Y | Y | N | N | I | N/A | N/A | N/A | N/A | N/A | N/A | N | N | I | N/A | N/A | N/A | Y | Y | Y | A | Y | Y | A | M |
| Smid et al. (2011) | Y | Y | Y | N | Y | A | N/A | N/A | N/A | N/A | N/A | N/A | Y | Y | A | Y | Y | A | Y | Y | Y | A | Y | Y | A | H |
| Tozer, Khawaja & Schweitzer (2017) | N | Y | Y | Y | N | A | N/A | N/A | N/A | N/A | N/A | N/A | Y | Y | A | N/A | N/A | N/A | Y | N | Y | A | N | Y | I | H |
| Vervliet et al (2014) | N | Y | Y | N | Y | A | N/A | N/A | N/A | N/A | N/A | N/A | Y | N | I | N/A | N/A | N/A | Y | Y | N | A | N | Y | I | M |

Note: N, no (criterion not fulfilled); Y, yes (criterion fulfilled); N/A, not applicable

Supplementary Table A3: Results of quality appraisal of included studies

| Reference | SAQOR domains | | | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Sample | | | | | | | | Comparison group | | | | Exposure and Outcome Measurement | | | Follow up | | | Distorting Influences | | | | Data reporting | | | Quality |
| | Representative | Source | Method | Power Calculation | Inclusion Criteria | Sum | Inclusion | Identifiable | Source | Matched or Randomized | Statistical control | Sum | Exposure | Outcome | Sum | Number lost | Reasons for loss | Sum | Demo-graphics | Trauma exposure | Other | Summary | Missing Data | Clarity Accuracy | Sum | |
| Vervliet, Lammertyn, Brokaert & Derluyn (2014) | N | Y | Y | N | N | I | N/A | N/A | N/A | N/A | N/A | N/A | Y | Y | A | Y | Y | Y | Y | N | Y | A | N | Y | I | M |
| Wiegersma, Stelinga-Boelen & Reijneveld (2012) | N | Y | Y | N | Y | A | N/A | N/A | N/A | N/A | N/A | N/A | Y | N | I | N/A | N/A | N/A | Y | Y | Y | A | N | Y | I | H |
| Zevulun, Post, Zijlstra, Kalverboer & Knrth (2017) | N | Y | Y | N | Y | A | N/A | N/A | N/A | N/A | N/A | N/A | Y | N | I | N/A | N/A | N/A | Y | N | Y | A | N | Y | I | M |
| Zwi, Mares, Nathanson, Tay & Silove (2018) | N | Y | Y | N | Y | A | Y | Y | Y | N | N | A | Y | N | I | N/A | N/A | N/A | Y | N | Y | A | N | Y | I | M |

Note: N, no (criterion not fulfilled); Y, yes (criterion fulfilled); N/A, not applicable

Supplementary Table B**:** Findings of individual studies included in the systematic review by socio-ecological level

| Individual level | |
|---|---|
| **Exposure to premigration war-related violence** | |
| Braun-Lewensohn & Al-Sayed (2018), Bronstein et al. (2012, 2013), Eruyar et al. (2018), Giordano et al. (2019), Gormez et al. (2018), Jensen et al. (2014, 2019), Karam et al. (2019), Keles et al. (2015, 2016), Khamis (2019), Kim et al. (2015), Lincoln et al. (2016), Müller et al. (2019a), Oppedal et al. (2018), Sierau et al. (2018), Sleijpen et al. (2019), Smid et al. (2011), Vervliet et al. (2014a, b) | Cumulative exposure to war-related traumatic events was associated with higher levels of a range of mental health problems, particularly posttraumatic stress disorder (PTSD), but also depression, anxiety and externalising problems |
| Çeri & Nasiroğlu(2018), Gormez et al. (2018), Nasiroğlu et al. (2018), Oppeda & Isdoe (2015), Sapmaz et al. (2017) | Single traumatic events, particularly those involving interpersonal violence, were associated with a higher risk of mental health problems (PTSD, depression, anxiety, externalizing problems, any psychiatric diagnosis) |
| Beiser & Hou (2016), Braun-Lewensohn & Al-Sayed (2018), Clukay et al. (2019), Flink et al. (2013), Nasiroğlu & Çeri (2016), Oppedal & Isode (2012) | Exposure to war-related violence was not associated with mental health problems or only one type of mental health problems |
| **Physical, psychological and developmental conditions** | |
| Clukay et al. (2019) | Variants of the monoamine oxidase A (MAOA) gene were associated with decreases in perceived psychosocial stress over time depending on the level of trauma exposure and resilience |
| Karam et al. (2019) | Higher sensitivity was associated with the presence of PTSD and moderated the effect of war exposure on PTSD at low and middle levels of childhood adversity |
| Lau et al. (2018) | Better parent-reported physical health was associated with better emotional and behavioral adjustment |
| Müller et al. (2019b) | Baseline symptoms of anxiety and depression predicted symptom levels at follow-up and baseline depression symptoms predicted PTSD symptom levels at follow-up |
| Park et al. (2017) | Alcohol-related problems were associated with depression |
| Sapmaz et al. (2017) | Children with a history of a psychiatric disorder were more likely to have a current psychiatric diagnosis |
| Smid et al. (2011) | Depression and anxiety symptoms reported 1 year after resettlement fully mediated the relation between exposure to pre-migration trauma and the development of late-onset PTSD 2 years after resettlement |
| **Time since displacement** | |
| Correa-Velez et al. (2010), Goosen et al. (2014), Khamis (2019), Lincoln et al. (2016), Müller et al. (2019b), Oppedal & Isdoe (2012, 2015), | Longer time in the host country was associated with lower mental health problems and higher wellbeing |

| | |
|---|---|
| Braun-Lewensohn & Al-Sayed (2018), Bronstein et al. (2013), Gormez et al. (2018), Nasiroğlu et al. (2018), Sleijpen et al. (2019), Smid et al. (2011) | Longer time in the host country was associated with higher levels of mental health problems |
| Betancourt et al. (2012a), Buchanan et al. (2018), Elklit et al. (2012), Flink et al. (2013), Jakobsen et al. (2017), Jensen et al. (2014, 2019), Keles et al. (2015, 2016), Tozer et al. (2017), Vervliet et al. (2014b), Wiegersma et al. (2011) | Length of stay in the host country was not associated with mental health and wellbeing; mental health problems did not change significantly over time or only to a small extent (longitudinal studies) |
| **Age** | |
| Braun-Lewensohn & Al-Sayed (2018), Correa-Velez et al. (2010), Goosen et al. (2014), Khamis (2019), Meyer et al. (2017b), Nasiroğlu & Çeri (2016), Nasiroğlu et al. (2018), Oppedal & Isdoe (2012), Smid et al. (2011), Zevulun et al. (2017) | An older age was associated with higher levels of maladjustment (mental health problems, lower wellbeing) |
| Ahmad et al. (2015), Lau et al. (2018), Lincoln et al. (2016), Park et al. (2017), Samara et al. (2019), Zevulun et al. (2017) | An older age was associated with lower levels of mental health problems |
| Betancourt et al. (2012a), Bronstein et al. (2013), Buchanan et al. (2018), Çeri & Nasiroğlu (2018), Correa-Velez et al. (2015), Eruyar et al. (2020), Giordano et al. (2019), Jensen et al. (2019), Keles et al. (2015, 2016), Meyer et al. (2017a), Müller et al. (2019a), Oppedal & Isdoe (2015), Sapmaz et al. (2017), Tozer et al. (2017), Vervliet et al. (2014a, b) | Age was not associated with mental health problems and indicators of wellbeing |
| Goosen et al. (2014), Oppedal et al. (2018), Wiegersma et al. (2011) | Age and gender interacted in increasing the risk of mental health problems |
| **Gender** | |
| Ahmad et al. (2015), Beiser & Hou (2016), Beni-Yonis (2019), Betancourt et al. (2012a), Braun-Lewensohn & Al-Sayed (2018), Çeri & Nasiroğlu (2018), Elklit et al. (2012), Eruyar et al. (2018), Jensen et al. (2019), Keles et al. (2015, 2016), Meyer et al. (2017a, b, 2020), Oppedal & Isdoe (2012, 2015), | Being female was associated with higher levels of mental health problems, particularly anxiety and depression, but also PTSD |

| | |
|---|---|
| Çeri & Nasiroğlu (2018), Eruyar et al. (2019), Gormez et al. (2018), Oppedal & Isdoe (2012) | Being male was associated with higher levels of mental health problems, particularly externalising problems, but also with PTSD in one study |
| Buchanan et al. (2018), Correa-Velez et al. (2010, 2015), Giordano et al. (2019), Karam et al. (2019), Khamis (2019), Lau et al. (2018), Lincoln et al. 2016), Nasiroğlu & Cer i(2016), Nasiroğlu et al. (2018), Samara et al. (2019), Sapmaz et al. (2017), Tozer et al. (2017) | Gender was not associated with mental health problems and indicators of wellbeing |
| **Education and school performance** | |
| Correa-Velez et al. (2015), Lau et al. (2018), Mace et al. (2014), Meyer et al. (2017b), Müller et al. (2019a), Smid et al. (2011), Wiegersma et al. (2011) | Higher level of prior and current education was associated with lower levels of mental health problems |
| Correa-Velez et al. (2015), Lau et al. (2018) | Better perceived school performance was associated with lower levels of mental health problems/higher wellbeing |
| Jensen et al. (2014), Tozer et al. (2014) | Number of prior years of schooling was not associated with mental health outcomes |
| **Personal resources** | |
| Beiser & Hou (2016) | Instrumental and social competence were not associated with emotional and aggressive problems |
| Betancourt et al. (2012b) | Viewing education as important was not associated with internalising and externalising symptoms |
| Braun-Lewensohn & Al-Sayed (2018) | A higher sense of coherence was associated with lower levels of PTSD symptoms, internalising and externalising symptoms, while higher expectations were associated with fewer externalising problems; appraisal of danger was positively associated with mental health problems in the bivariate, but not multivariate analysis |
| Clukay et al. (2019) | Higher levels of resilience were associated with lower perceived psychosocial stress; reductions in perceived stress over time were highest in participants with a certain genetic variant and high levels of resilience |
| Correa-Velez et al. (2010, 2015) | A higher sense of control was associated with higher psychological wellbeing and a better subjective health status; higher self-esteem significantly predicted a better subjective health status over time |
| Elklit et al. (2012) | Greater use of problem-focused and avoidant coping strategies significantly predicted PTSD |
| Khamis (2019) | Coping through social support and cognitive restructuring was significantly associated with fewer PTSD symptoms, while greater use of avoidant strategies (e. g. social withdrawal, resignation) were positively related to PTSD symptoms |
| Khawaja et al. (2017) | Resilience partly mediated the associations between school connectedness, acculturation and social support on wellbeing in a positive direction |
| Kim et al. (2015) | Lower ego-resiliency was significantly associated with more depression and anxiety symptoms and partly mediated the association between acculturation stress and mental health |
| Lau et al. (2018) | The number of days being engaged in physical activity was not associated with emotional and behavioral problems |

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| Lee et al. (2020) | Greater use of the emotion regulation strategy of emotional suppression was related to higher levels of depressive symptoms and moderated the effect of adverse childhood experieces (child maltreatment and family dysfunctioning) on depressive and attention deficit hyperactivity disorder symptoms; greater use of the emotion regulation strategy of cognitive reappraisal did not moderate the association between adverse childhood experiences and mental health outcomes, but moderated the effect of emotional suppression on depressive symptoms |
| McGregor et al. (2015) | There was a significant positive association between the use of avoidant coping and PTSD symptoms, which disappeared when the avoidance symptoms of PTSD were controlled for |
| Müller et al. (2019a) | Lower levels of everyday resources were significantly associated with higher levels of PTSD symptoms, depression, anxiety and externalising problems |
| Park et al. (2017) | Higher levels of resilience were significanly associated with a decreased risk of depression |
| Park et al. (2019) | Youth whose depressive symptoms alleviated from T1 to T2 had higher scores in the emotion regulation strategy of expressive suppression and lower self-esteem at T1 than youth with consistently low levels of depression; youth whose depressive symptoms deteriorated from T1 to T2 had lower levels of resilience and lower scores in the emotion regulation strategy of cognitive reappraisal at T1 compared to youth with consistently low levels; youth whose depressive symptoms remained high from T1 to T2 had lower levels of resilience and self-esteem at T1 than those with consistently low levels |
| Sleijpen et al. (2019) | Individual resilience moderated the association between length of stay as an asylum seeker and emotional problems, but not between trauma exposure and PTSD symptoms |
| Tozer et al. (2018) | Higher resilience significantly predicted higher positive wellbeing, but not lower depression and anxiety |
| **Family level** | |
| **Family composition** | |
| Beni Yonis et al. (2019), Meyer et al. (2017b) | The loss of one or both parents was associated with higher levels of mental health problems; household size was not associated with mental health problems |
| Correa-Velez et al. (2010), Meyer et al. (2017a) | Living with at least one parent at home was associated with lower levels of mental health problems and higher social wellbeing |
| Goosen et al. (2014) | Single children had a higher risk of mental distress than children who were in reception with siblings |
| Lau et al. (2018) | Living with a single parent compared to two parents was not associated with emotional and behavioral problems |
| Mace et al. (2014), MacLean et al. (2019), McGregor et al. (2015), Wiegersma et al. (2011) | Separation from immediate family members was associated with worse mental health outcomes (PTSD, emotional and behavioral problems) |
| Müller et al. (2019a) | Unaccompanied refugee minors had significantly more externalising problems than accompanied minors after controlling for potential confouncers (e. g. age, length of stay, traumatic experiences) |
| Nasiroğlu & Çeri (2016) | Rank among siblings was not associated with depression |
| Vervliet et al. (2014a) | Unaccompanied minors who lost one or both parents and whose parents were alive did not differ significantly in |

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| | mental health problems |
| Wiegersma et al. (2011) | Smaller family size was significantly associated with higher parent- and teacher-reported problems |
| **Family functioning and parental mental health** | |
| Ahmad et al. (2015) | More positive family climate and a better mother-child relationship were associated with lower levels of anxiety; greater dispositional secrecy was associated with higher levels of anxiety |
| Beiser & Hou (2015), Betancourt et al. (2012b), Bryant et al. (2018), Eruyar et al. (2018), Flink et al. (2013), Javanbakht et al. (2018), Meyer et al. (2017a), Nasiroğlu et al. (2018), Sim et al. (2018), Wiegersma et al. (2011) | Higher levels of parental mental health problems were associated with higher levels of children`s mental health problems |
| Betancourt et al. (2012a) | Higher family connectedness significantly predicted lower levels of internalising problems |
| Bryant et al. (2018), Sim et al. (2018) | Parental mental health problems were associated with more negative parenting behaviours, which in turn were related to children`s mental health problems |
| Eruyar et al. (2020) | Perceived insecure attachment to mothers and fathers was associated with higher levels of PTSD symptoms, general mental health and conduct problems; parenting perceived as low in emotional warmth, rejecting and overprotective was associated with general mental health problems, conduct and emotional problems |
| Karam et al. (2019) | Parental abuse significantly predicted PTSD and moderated the association between war and PTSD in interaction with sensitivity |
| Khamis (2019) | Higher family expressiveness was significantly associated with lower PTSD and emotion dysregulation |
| Lau et al. (2018) | Parental hostility was associated with higher emotional and behavioral problems; parental warmth was associated with lower emotional and behavioral problems (trend) |
| Lee et al. (2020) | Early experiences of child maltreatment and family dysfunctioning was associated with higher levels of youth`s depression and attention deficit hyperactivity disorder symptoms |
| Meyer et al. (2017a, b) | Higher exposure to family violence was associated with higher levels of anxiety and depression |
| Sapmaz et al. (2017) | A positive history of a psychiatric disorder in the family was not associated with an increased probability of a psychiatric diagnosis in the child |
| Smetana & Ahmad (2018) | Refugee youth whose mothers had an authoritative or permissive parenting style had lower levels of internalizing problems than youth whose mothers had an authoritarian or punitive style; children of authoritative mothers reported less, and children of punitive mothers more norm breaking behavior than other youth; youth with authoritative fathers had lower levels of internalizing symptoms and norm-breaking than youth with authoritarian fathers, who in turn had better outcomes than youth with punitive fathers; youth with one or two authoritative parents had lower internalizing problems and norm breaking behavior than youth whose parents were consistent or disceprant but non-authrotiative |
| Zevulun et al. (2018) | Higher quality of the child-rearing environment was associated with lower levels of emotional and peer problems |
| **Household assets** | |
| Beiser & Hou (2016) | Having a caregiver with an universitiy degree and family income were not associated with emotional problems or |

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| | aggressive behavior; |
| Beni-Yonis et al. (2019) | The prevalence of PTSD among adolescents did not differ according to parental education and family income |
| Betancourt et al. (2012b) | Higher socioeconomic status and caregiver education were associated with lower levels of internalising problems |
| Çeri & Nasiroğlu (2018) | A lower education of fathers was associated with more emotional problems |
| Meyer et al. (2017a) | Higher socioeconomic status was associated with lower levels of depression |
| Meyer et al. (2020) | Adolescents engaging in child labor had higher odds of depressive, but not anxiety symptoms compared to adolescents not engaging in child labor |
| Sapmaz et al. (2017) | Fathers` current unemployment level and lower education (only bivariate) significantly increased the odds of a psychiatric disorder |
| **Social support** | |
| Betancourt et al. (2012a) | Higher family connectedness, but not peer and community connectedness predicted lower levels of internalising problems |
| Braun-Lewensohn & Al-Sayed (2018), Elklit et al. (2012), Flink et al. (2013), Jensen et al. (2019) | General social support was not independently associated with mental health problems |
| Correa-Velez et al. (2015) | A more supportive environment was associated with a better subjective health status |
| Khawaja et al. (2017) | General social support was associated with higher wellbeing both directly and indirectly through increased resilience |
| Lau et al. (2018) | Community support was not associated with emotional and behavioral problems |
| Müller et al. (2019a) | Social support within the family was not associated with mental health outcomes, whereas support in the host country was associated with lower levels of anxiety |
| Oppedal & Isdoe (2015) | Unaccompanied minors in contact with their family abroad indicated more family support and lower depression; family support was directly associated with lower depression and indirectly through increased ethnic cultural competence; support by norwegian and by co-ethnic friends were indirectly associated with lower levels of depressive symptoms through increased host competence and ethnic competence respectively |
| Oppedal et al. (2018) | Higher trauma exposure was associated with more social support, which in turn was associated with decreased depression |
| Park et al. (2017) | Higher psychological support by family and friends was associated with lower levels of depression |
| Park et al. (2019) | Youth whose depressive symptoms remained high from T1 to T2 had lower levels of resilience and self-esteem at T1 than those with consistently low levels |
| Sierau et al. (2018) | Unaccompanied minors with family contact considered the family as most important source of support and also reported higher peer and mentor support; lower levels of mentor and peer support, but not family support, moderated the association between stressful life events and mental health problems |

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| **Community level** | |
| **Neighborhood quality** | |
| Beiser & Hou (2016) | Poor neighborhood quality was not associated with childrens` emotional or aggressive problems |
| Beni-Yonis et al. (2019) | The prevalence of PTSD did not differ according to housing status |
| Berancourt et al. (2012a) | Internalizing problems were not associated with the quality of housing (houses/apartments vs. tents/hand-made shelters) |
| Betancourt et al. (2012b) | Caregiver perceived access to services was associated with lower levels of internalising and externalising problems; being satisified with a NGO`s education program moderated the assocation between caregiver distress and internalising problems |
| Braun-Lewensohn & Al-Sayed (2018) | Receiving aid by organizations was not associated with mental health outcomes |
| Lau et al. (2018) | Neighborhood quality was not associated with emotional and behavioral problems |
| **School and peer relationships** | |
| Beiser & Hou (2016), Khamis (2019), Khawaja et al (2017), Tozer et al. (2018) | A respectful, caring and supportive school environment was associated with lower levels of mental health problems and/or higher levels of wellbeing |
| Beiser & Hou (2016) | Perceived discrimination by peers and teachers was associated with higher levels of emotional and aggressive problems |
| Correa-Velez et al. (2010) | Stronger peer attachment was associated with higher levels of psychological, social and environmental well-being, whereas being bullied was associated with lower happiness |
| Samara et al. (2019) | Higher friendship quality was associated with fewer peer problems and a higher number of friends was associated with lower functional impairment; being bullied was associated with lower general self-esteem |
| **Society level** | |
| **Daily hassles/postmigration stressors** | |
| Bryant et al. (2018), Sim et al. (2018) | Postmigration stressors were associated with greater parental PTSD and psychological distress, which in turn was associated with harsh parenting and in turn with higher levels of children`s emotional and behavioral problems |
| Jensen et al. (2019), Keles et al. (2015), Vervliet et al. (2014b) | High levels of daily stressors were associated with high levels of mental health problems (PTSD, depression, anxiety, externalizing problems) |
| **Acculturation** | |
| Buchanan et al. (2018), Correa- Velez et al (2010, 2015), Oppedal & Idsoe (2015) | Higher levels of perceived discrimination were associated with higher levels of depression and lower levels of wellbeing and adjustment |
| Buchanan et al. (2018), Correa-Velez et al. (2010, 2015), Khawaja et al. (2017), Oppedal & Idsoe (2012, 2015), Tozer et al. (2018) | Higher alignment with both the host and heritage culture was associated with lower levels of mental health problems and higher levels of wellbeing and adjustment |

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| Correa-Velez et al. (2015), Gormez et al. (2018) | Proficiency in the host country`s language was not associated with mental health and wellbeing |
| Keles et al. (2015, 2016), Kim et al (2015) | Higher cumulative exposure to acculturation stess was associated with higher levels of depression |
| Lincoln et al. (2016) | More severe family acculturation stress was associated with higher levels of PTSD and depression; a separated and marginalized acculturation style was associated with higher levels of depression |
| Müller et al. (2019a) | Poorer German language proficiency was associated with higher levels of PTSD and depression symptoms |
| Oppedal & Isdoe (2012) | Ingroup hassles were associated with depression and conduct problems, outgroup hassles only with depression |
| **Resettlement location** | |
| Beiser & Hou (2016); Lau et al. (2018) | Living in a refugee camp prior to arrival in the host country was not associated with emotional and behavioral problems |
| Beni-Yonis et al. (2019) | The prevalence of PTSD was higher in a city close to the Syrian border compared to a city farer away from the border |
| Betancourt et al. (2012a) | Fear of insecurity in the region of resettlement was not associated with internalising problems |
| Çeri & Nasiroğlu (2018) | Not being satisfied with life in Turkey was associated with more conduct problems |
| Elklit et al. (2012) | The number of months spent in refugee camps or asylum centres was not associated with PTSD |
| Gormez et al. (2018) | Satisfaction with life in Turkey was not associated with PTSD symptoms |
| Khamis (2019) | Children who resettled in Lebanon had higher odds of having PTSD than children who resettled in Jordan |
| Zevulun et al. (2017) | Returning to a rural or urban living area was not significantly associated with emotional and peer problems |
| **Ethnic origin** | |
| Beiser & Hou (2016) | Belonging to a visible minority was associated with emotional problems |
| Correa-Velez et al. (2010) | African-born youth reported higher levels of physical, psychological and social wellbein than youth born in other regions |
| Goosen et al. (2014) | Children from Iran had a higher risk for mental distress than children from other countries, while children from Iraq had the lowest risk |
| Wiegersma et al. (2011) | Children originating from Africa had more parent-rated emotional and behavioral problems than childrem from the Near east and Eastern Europe |
| Zevulun et al. (2017) | Belonging to an ethnic minority group was associated with a lower-quality child-rearing environment which was in turn associated with more emotional and peer problems |
| **Immigration process** | |
| Bronstein et al. (2012) | Living in semi-independent accommodation was associated with higher levels of PTSD symptoms compared to living inf foster care |
| Bronstein et al. (2013) | Living arrangements were not associated with mental health outcomes when all other variables were controlled for |
| Goosen et al. (2014) | A high annual relocation rate was associated with increased incidence of mental distress especially in vulnerable children |

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| Jakobsen et al. (2017) | Placement in a low-support reception centre and refusal of asylum were associated with higher levels of psychological distress |
| Mace et al. (2014) | Both past and current mandatory detention was associated with an increased likelihood of PTSD, depression and anxiety |
| Müller et al. (2019b) | Acceptance of asylum status was associated with lower levels of PTSD and internalising problems |
| Smid et al. (2011) | Living in a setting with high supervision was associated with lower levels of depression, anxiety and PTSD |
| Tozer et al. (2018) | Having a permanent visa was associated with higher levels of positive wellbeing |
| Wiegersma et al. (2011) | Legal status and number of relocations were not associated with self-reported or multi-informant emotional and behavioral problems |
| Zevulun et al. (2017) | Having a stable residence permit in the host country was associated with a higher quality of the child-rearing environment |
| Zwi et al. (2018) | Refugee children held in detention had higher levels of emotional and behavioral problems than children living in a community setting |

## 9.2 Manuscript 2: Prevalence and co-existence of morbidity of posttraumatic stress and functional impairment among Burundian refugee children and their parents


### Abstract

**Background:** Although the family constitutes the prime source of risk and resilience for the well-being of children growing up in adverse conditions, the mental health of children living in refugee camps has rarely been investigated in conjunction with their parents` mental health. **Objectives:** To examine the prevalence of posttraumatic stress disorder (PTSD) and other mental health problems among Burundian refugee children and their parents living in Tanzanian refugee camps and to identify patterns of comorbidity among children and their parents based on PTSD symptom levels and functional impairment. **Methods:** We recruited a representative sample of 230 children aged 7-15 years and both of their parents (n=690) and conducted separate structured clinical interviews. Latent Class Analysis (LCA) was applied to identify patterns of comorbidity. **Results**: Children and parents were exposed to multiple traumatic event types. In total, 5.7% of children fulfilled DSM-5 criteria for PTSD in the past month and 10.9% reported enhanced levels of other mental health problems. 42.6% indicated clinically significant functional impairment due to PTSD symptoms. PTSD prevalence was higher among mothers (32.6%) and fathers (29.1%). LCA revealed a familial accumulation of PTSD symptoms as children with high symptom levels and impairment were likely to live in families with two traumatized parents. **Conclusions:** Although the number of children who need support for trauma-related mental health problems was relatively low, taking into account parental trauma could aid to identify at-risk children with elevated PTSD symptom levels and impairment even in the face of existing barriers to mental health care access for children in refugee camp settings (e. g. lack of targeted services, prioritization of managing daily stressors).


*Keywords:* refugee children, posttraumatic stress disorder, prevalence, refugee families, refugee camp

## Introduction

According to the United Nations High Commissioner for Refugees (UNHCR), the number of refugees worldwide has reached 25.4 million people, over half of whom are children (UNHCR, 2018). Refugee children face a wide range of stressful experiences, from exposure to war in their home countries through stressors during their flight to challenges related to resettlement in the host country. This all happens during a crucial phase of their development, putting them at an increased risk of developing mental health problems (Ehntholt & Yule, 2006; Reed et al., 2012). The association between children`s exposure to war events and the development of posttraumatic stress disorder (PTSD) and other psychopathology has been well established (Attanayake et al., 2009; Fazel et al., 2012). Research to date has largely focused on the mental health of refugees who resettled in high-income countries, despite four out of five refugees remaining, mostly in refugee camps, in countries neighbouring their country of origin (UNHCR, 2018). This is a major shortcoming as the precarious living conditions in refugee camps can increase the risk for children's mental health problems above and beyond the experiences of uprooting and flight (Miller & Rasmussen, 2010). Moreover, refugee camps are generally located in close proximity to ongoing war, which can lead to a state of chronic threat (Miller, 1996).

Studies with adult refugees living in camps indicate prevalence rates between 30% and 55% for PTSD (Neuner et al., 2004; Riley et al., 2017; Tekin et al., 2016)and between 10% and 89% for other mental health problems (de Jong et al., 2000; Riley et al., 2017; Tekin et al., 2016). A recent systematic review (Vossoughi et al., 2018) on the mental health of youth in refugee camps reported large variations across studies for the prevalence of PTSD (0-87%), depressive symptoms (35-90%) and anxiety (0-35%). While these varying prevalence rates can be attributed to methodological differences and the cultural heterogeneity of study samples, factors such as differences in the degree of exposure to traumatic events, ongoing daily stressors, or a combination thereof also play a role (Vossoughi et al., 2016). Therefore, it is important to combine children`s prior experiences of conflict-related violence and their ongoing exposure to chronic stressors to better understand the mental health of children living in refugee camps (Miller & Jordans, 2016).

A socio-ecological framework (Bronfenbrenner, 1979) has been applied to conceptualize the different stressors affecting refugee children`s mental health across different time points (pre-, peri- and post-migration) and multiple levels of the social ecology, i.e. the individual, family, community and society (Betancourt & Khan, 2008; Reed et al., 2012). As the nuclear family constitutes the most proximal layer to the child, it is a powerful source of both risk and resilience for children`s mental health (Betancourt & Khan, 2008; Punamäki et al., 2017). For instance, perceived parental support and family cohesion can protect refugee children from developing psychopathology (Fazel et al., 2012), whereas parents` own trauma can impair their parenting and, in turn, children`s mental health (Timshel et al., 2017). Refugee children`s stress reactions also appear to be related to their mothers` ability to cope with displacement (Ajdukovic & Ajdukovic, 1993; Ekblad, 1993).Investigating refugee

children`s mental health detached from their family not only falls short of a comprehensive picture of this vulnerable group`s wellbeing, but also ignores children`s embeddedness in their immediate social environment.

Consequently, it is of utmost importance to also assess the mental health of their guardians to identify risks for children's well-being. Refugee families often do not access available mental health services for their children despite their need, partly due to the prioritization of managing ongoing stressors (Ellis et al., 2011). Additionally, mental health services in humanitarian settings rarely target children specifically and children represent only a small proportion of their patients (Lokuge et al., 2013). Therefore, it could be promising to explore whether children in need of specialized support for trauma-related symptoms could be identified through assessing their parents` PTSD symptoms, as parents are more likely to make frequent use of available services.

Notwithstanding, the role of the family for refugee children`s mental health has not been extensively investigated, especially in low and middle income settings (Meyer et al., 2017; Reed et al., 2012; Vossoughi et al., 2018). All of the existing studies focused on only one parent, mostly the mother, despite evidence that paternal trauma can independently affect family functioning and children`s mental health (e. g. Saile et al., 2014).

The present study aims to contribute to the body of literature on trauma-related mental health problems of refugee children living in refugee camps close to ongoing conflict. Taking into account children`s embeddedness in the family, we included children and both parents in the study. We hypothesized (1) high levels of exposure to potentially traumatizing events and (2) high prevalence rates of PTSD and other mental health problems among refugee children and their parents. Based on the key role of the family context for children`s mental health in adversity (e.g. Betancourt & Khan, 2008), we hypothesized that we would (3) find patterns indicating an accumulation of morbidity within families by identifying constellations of PTSD symptomatology of children and parents. Considering the diagnostic imperative that symptoms should cause clinically significant distress or impairment, we defined morbidity in terms of PTSD symptom severity and functional impairment.

## Method

### Sampling and Procedures

The study was conducted in three refugee camps located in Western Tanzania. Nyarugusu camp hosted 68,984 refugees from Burundi, Nduta 94,501 and Mtendeli 47,296 at the time of the study (UNHCR, 2017). Participants were recruited by randomly selecting two zones in each camp. We then randomly determined a sampling direction by spinning a pen in the centre of the chosen zones. Every $6^{th}$ house or tent in this direction was selected. A family was defined as a triad of both parents or caregivers and the oldest child between 7 and 15 years (i.e. primary school age).

Data collection took place between February and May 2018. Families received a detailed oral and written explanation of the study goals, procedures, and their rights. Each family member gave

their informed consent in written form by signing with their names or fingerprints. In addition, parents gave their consent on behalf of children below age 11. Consent forms were kept strictly separated from the interview data to protect participants` anonymity. All but two selected families consented to participate in the study. The study was approved by the Ethics Commission of the University of Zurich (No. 2017.10.2) and the National Institute for Medical Research in Tanzania (no. NIMR/HQ/R.8a/Vol.IX/2632).

Structured clinical interviews were conducted individually in a discrete setting on the compound grounds of collaborating NGOs. Interviewers were three Tanzanian researchers holding a master`s degree and three research assistants from the refugee community. The research assistants were required to hold at least a secondary school or preferably a university leaving certificate, to be fluent in English and Swahili besides their native language Kirundi and to have prior work experience with an NGO within the camps. The assistants had received one week of training which was conducted by a German psychologist and his Tanzanian colleagues. The training focused on the mental health concepts underlying the interview questions, on general principles of conducting clinical interviews and on practice in form of role-plays. . As Swahili is the lingua franca in the refugee camps, the measures were translated from English to Swahili according to scientific guidelines, using blind back-translation (Brislin et al., 1973). The Tanzanian psychologists conducted the Tanzanian interviews in Swahili and the research assistant from the refugee community in Kirundi. During a pilot assessment in the first camp Mtendeli it became evident that the Swahili skills of the Burundian refugees were sometimes insufficient to fully comprehend the partly complicated mental health terms and concepts. Therefore, we decided to additionally train three interpreters from the refugee community who were required to have specific experience as interpreters, e. g. for an NGO, and otherwise fulfil the same criteria as the other research assistants. The training of interpreters had the form of a qualitative open group discussion and focused on the adequate translations of mental health terms and concepts in Kirundi and their applicability in Burundian culture as well as intensive practice in role-plays. In order to further increase the quality of interpretations, interviews were subsequently discussed with and supervised by the research team. After the interviews the families received a compensation of 8 USD.

**Participants**

The sample consisted of 230 family triads ($N$ = 690). In total, 47.4% ($n$ = 109) of the children were girls. Overall, 14.3% (n = 33) of the children were between 7 and 9 years old, 34.3% (n = 79) between 10 and 12 years old and 48.6% (n = 118) between 13 and 15 years old. All families had fled to the Tanzanian camps between 2015 and 2018 with the majority (64.0%) arriving in 2015. All families had lived in Burundi before their migration. The majority of adults (80.3%) identified the political conflicts in Burundi as main reason for their flight. Table 1 shows sociodemographic characteristics of the participating families.

**Instruments**

The individual measures were administered in the form of a structured clinical interview. Thus the questions could be reformulated in a way that is appropriate and understandable even for young children. To further ensure this, younger children were always interviewed by psychologists with great experience in research and counselling with children.

**Child measures.**

Children's exposure to traumatic events was assessed using a checklist of 35 war- and non-war-related events (e.g. natural disasters, injury, sexual assault). The measure consisted of 13 items from the UCLA Child/Adolescent PTSD Reaction Index (UCLA RI; Pynoos & Steinberg, 2013) and 22 items adapted from a checklist by Neuner et al. (2004). We calculated a sum score of lifetime exposure to traumatic experiences (range: 0-35), with higher scores indicating exposure to more traumatic event types.

PTSD symptoms were assessed using the DSM-5 Version of the UCLA RI (Pynoos & Steinberg, 2013), which has shown good psychometric properties (Steinberg et al., 2013) and has been used in a variety of cultural settings (e.g. Hermenau et al., 2011). The 31 items were rated on a 5-point Likert scale from 0 to 4. We calculated a sum score of all items (0 to 124). Internal consistency in our sample was excellent (Cronbach`s $\alpha = .90$). We established the PTSD diagnosis, including Dissociative Subtype, according to DSM-5 criteria. A symptom was deemed present if the score was $\geq 3$. Functional impairment was assessed with seven questions addressing impairment at home, at school, with peers, and developmental progression. Impairment was deemed clinically significant if one of these questions was affirmed.

Child emotional and behavioural problems were assessed using the Strengths and Difficulties Questionnaire (SDQ; Goodman et al., 2003). The SDQ comes with good psychometric properties and has been utilized internationally (Goodman et al., 2000) and in refugee settings (e.g. Panter-Brick et al., 2014). The 25 items are rated on a 3-point Likert scale (0 – 2). For analysis, we used the total difficulties score (range 0 to 40) representing the sum of all items excluding the 5 prosocial behaviour items. In the present study, the Cronbach`s Alpha for the child reported sum score was .61, for the mothers` report .69, and for the fathers` report .64.

Child maltreatment by parents was assessed with the 27-item Parent-Child Conflict Tactic Scale (CTSPC; Straus et al., 1998). Children reported on each parent`s use of neglect, emotional, and physical violence in the past year. Items were coded on a 7-point Likert scale (0=*never, 1=once, 2=twice, 4=3–5 times, 8=6–10 times, 15=11–20 times*, 25= >20 *times*). We calculated a total score by summing all item scores. Internal consistency of the total scale was $\alpha = .91$.

**Parent measures.**

Parents` lifetime exposure to traumatic experiences was assessed using a checklist of 38 war- and non-war event types that were based on the checklist by Neuner et al. (2004). We calculated a sum score of exposure to traumatic and adverse event types.

PTSD symptoms were assessed using the well-validated 20-item PTSD Check List for DSM-5 (PCL-5; Weathers et al., 2013), which has been used in various cultural settings (Kaltenbach et al., 2017; Verhey et al., 2018). Cronbach`s Alpha for the score of all items rated on a 5-point Likert scale (0–4) was .94 for mothers and .91 for fathers. We also determined the PTSD diagnoses following DSM-5 criteria. A symptom was deemed present if the score was $\geq$2. Functional impairment was assessed by three items regarding relationships or social life, ability to work, and other important parts of life. Clinically significant impairment was present if at least one item was rated $\geq$2.

The 18-item Brief Symptom Inventory (BSI-18; Derogatis, 2000) was used to assess general psychological distress. The *Global Severity Index* of distress represents the sum of all items, and ranges from 0 to 72. Internal consistency of the BSI-18 was .92 for mothers and .90 for fathers.

**Data Analysis**

Latent Class Analysis (LCA) was employed to detect familial patterns of morbidity. LCA is a statistical method to group cases into classes of an underlying latent variable based on categorical indicators (Distefano & Kamphaus, 2006). As indicators we used children's and parents' PTSD symptom severity scores, which were dichotomized by using median splits, and the impairment criterion of the PTSD diagnosis. We chose PTSD symptom severity rather than the presence or absence of the PTSD diagnosis as an indicator as it was one aim of this analysis to demonstrate that increased PTSD symptom severity levels can co-occur with functional impairment without a full-blown PTSD diagnosis to be present. We applied a median-split to dichotomize PTSD symptom severity as a recent simulation study suggested that dichotomizing according to sample-specific points of central tendency, i.e. the median, can lead to more accurate results in LCA than selecting cut points indicating the presence or absence of a certain symptom or disorder (Macia & Wickham, 2019). This also had the advantage that we did not need to use existing cut-off values for dichotomization (Kaplow et al., 2019; Weathers et al., 2013) which had been determined based on US-American samples and are most likely not applicable to our both culturally and socioeconomically very different refugee sample. We calculated all models ranging from two to seven classes. LCA was conducted in R with *poLCA* (Linzer & Lewis, 2011). We selected the appropriate number of classes by considering usefulness and interpretability and well-established model fit criteria, the Akaike Information Criterion (AIC), the Bayesian Information Criterion (BIC), the adjusted Bayesian Information Criterion (aBIC) and Bozdogan`s consistent Akaike`s Information Criterion (cAIC) (Dziak, Coffman, Lanza, & Li, 2012). The model with the smallest values on these indices is considered to be the best-fitting (Nylund et al., 2007). Simulation research suggests that aBIC and AIC perform better than the BIC and cAIC with a relatively small sample size and a low number of indicators (Dziak et al.,

2012). We also examined entropy values as a measure of classification accuracy, with higher values on a range from 0 to 1 indicating a better classification (Distefano & Kamphaus, 2006).

We then calculated a multivariate analyses of variance (MANOVAs), univariate analyses of variance (ANOVA) and post-hoc tests to examine differences between classes. Holm-Bonferroni correction (Holm, 1979) was applied for ANOVAs. All outcome variables were normally distributed following West, Finch and Curran (1995). We used Pillai`s Trace as it is most robust against violations of assumptions (Olson, 1974). For (M)ANOVAs, our metric for a small effect was $\eta^2 \geq 0.01$, for a medium effect $\eta^2 \geq 0.06$, and for a large effect $\eta^2 \geq 0.14$. All analyses used a two-tailed $\alpha = 0.05$.

## Results

### Prevalence of Traumatic Experiences

In total, 98.7% of all children ($n = 227$) reported at least one potentially traumatizing experience during their life, the majority (65.2%, $n = 150$) had experienced five or more event types with an average of 7.53 ($SD = 5.28$). The most common traumatic experiences were the *death of a close person* (84.3%) and *seeing someone who was beaten up, shot at or killed* (55.7%).

Mothers reported high numbers of traumatic event types ($M = 16.91$, $SD = 6.19$). Every woman had experienced at least one potentially traumatizing event in her lifetime, 86.5% ($n = 199$) indicated to have experienced 10 or more event types during their life, with a maximum of 30 types. On average, fathers reported $M = 20.80$ ($SD = 5.72$) potentially traumatizing event types, with 95.7% ($n = 220$) reporting 10 or more event types and almost two third (61.7%, $n = 142$) 20 or more event types with a maximum of 34. Over 80% of mothers and about 90% of fathers reported to have experienced *a dangerous flight* and *being in close proximity to combat situations and burning houses*. One fifth of all women (20.9%) reported having been *raped* or *sexually assaulted* (see Supplementary Table A and B for details).

### Prevalence of Mental Health Problems and Familial Patterns of Morbidity

Descriptive information about PTSD diagnosis and symptom severity and other mental health problems for children and parents are displayed in Table 2 (see Supplementary Table C for subscale scores). The 4-class model was supported by the aBIC, AIC and slightly higher entropy (see Table 3). This solution provided a meaningful and interpretable classification (Figure 1). In the first class, labelled *traumatized families*, every family member had a high relative probability of scoring above the median in PTSD symptom severity and being impaired by these symptoms. In the second class, termed *traumatized mothers*, mothers had a high probability of endorsing PTSD symptoms and impairment. The third class, labelled *traumatized fathers*, was characterized by families in which all fathers reported high PTSD symptom levels and impairment, mothers had a moderate and children a low probability of high PTSD levels. In the fourth class all family members had a low probability of

endorsing high symptom levels and impairment (*non-traumatized families)*. Sociodemographic characteristics of the latent classes can be found in Supplementary Table D.

The comparisons of the four classes regarding child maltreatment, family members` lifetime traumatic experiences and prevalence of PTSD diagnoses are displayed in Table 4. All univariate effects were significant and medium to large except for child maltreatment, which had a small effect ($\eta^2 = 0.05$). Traumatized families had significantly higher scores across all variables than non-traumatized families.

## Discussion

Lifetime exposure to traumatic experiences was very high in our sample. Both children and their parents had generally experienced multiple traumatic event types. We expected high rates of PTSD and other mental health problems in our sample. However, the one-month prevalence rate for PTSD of 5.7 % among children was rather low given their high number of traumatic experiences. It is comparable to the lifetime prevalence rate of 4.7% (McLaughlin et al., 2013) found in adolescents in the United States. However, it is considerably lower than the previously reported prevalence among war-affected children (Attanayake et al., 2009) and children in refugee camps (Vossoughi et al., 2018). An exception is a study that did not find any significant levels of PTSD symptoms in Guatemalan refugee children living in Mexican camps (Miller, 1996). Similar to this study, most children in our study might not have been directly exposed to potentially traumatizing events of political violence. In addition, the prevalence of interpersonal traumatic events, which are especially likely to lead to PTSD (Alisic et al., 2014), was low among children. For example, 7.4% experienced sexual violence and 1.3% were injured by weapon, whereas four of the five most frequent traumatic events were of a non-interpersonal nature, such as losing a close person (84.3%) or being deprived of food (40%). Refugee children in studies reporting high PTSD prevalence rates (e.g., Morgos, Worden, & Gupta, 2008; Thabet, Abed, & Vostanis, 2004) generally experienced high levels of severe interpersonal trauma. Another explanation is that most children in our study were not separated from their parents during their flight and all were living with two guardians. The prevalence of general psychological distress as measured by children's and parents' report in the SDQ is comparable to the rates of 10-15% found in studies with the same age group in Europe (e. g. Ravens-Sieberer et al., 2008). One-month prevalence of PTSD of parents is in the range of prevalence rates found in other studies in refugee camps (Neuner et al., 2004). However, we found higher levels of psychological distress in the parents in our sample than other studies (de Jong et al., 2000).

Four distinct classes in the LCA supported our hypothesis to find a pattern of coexistence of morbidity within families. Children in traumatized families had experienced a significantly higher number of traumatic event types. This corroborates research that established traumatic exposure as the primary risk factor for the development of mental health problems among refugee children (Fazel et al., 2012; Reed et al., 2012). The level of child-reported maltreatment was significantly higher in

traumatized families than in non-traumatized families. This is consistent with research with war-affected families in post-conflict regions (Saile et al., 2014) and with refugee families in high-income settings (Timshel et al., 2017) indicating trauma exposure as a risk factor for increased child maltreatment. An intriguing finding is that children were at highest risk to present with PTSD symptoms and functional impairment when both parents did, whereas their risk was much lower when only one parent was highly likely to suffer from PTSD symptoms.

Our study has several limitations. Due to the cross-sectional design, we cannot establish causal relationships. Although we assessed the cultural appropriateness of our items and their translations, we are aware of the importance of cross-cultural validations (Hall et al., 2014). When doing research with interpreters, the possibility that information may be lost during the translation process, e. g. due to inaccurate translations cannot be ruled out despite preventive measures such as a thorough training and continuous monitoring of interpretation quality. The results of the LCA should be interpreted with caution as the classifications are based on probability values. Moreover, using the median of PTSD symptom severity scores as a cut-off criterion for classification may ignore individuals with still relatively high values.

Nonetheless, this study is the first to assess the mental health of refugee children and both their parents living in refugee camps close to ongoing conflict. Our pragmatic sampling approach enabled us to obtain representative prevalence data on PTSD and other mental health problems. We also consider the inclusion of functional impairment as a marker of morbidity a major strength of our study. Although the prevalence of children meeting full criteria of PTSD was rather low, a substantially high number indicated symptom-related impairment. Impaired children with subthreshold PTSD symptoms should be equally monitored and considered for treatment (Carrion et al., 2002). Just as children with the full diagnosis of PTSD, these at-risk children seem to live within traumatized family systems, which has important practical implications: As in humanitarian settings, children are rarely targeted specifically by mental health services (Lokuge et al., 2013), our findings support the idea that it may be possible to identify children in need of specialized treatment for trauma-related symptoms through their parents` posttraumatic stress symptoms. This may help existing mental health care systems within camps to identify high-risk children and provide them with appropriate interventions. For instance, when parents screen positive for PTSD at mental health services, they could also report on their children’s PTSD symptoms. Future studies should continue to examine refugee children`s mental health through a socio-ecological lens and investigate how the family can affect children`s well-being in refugee camps.

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## Tables and Figures

**Table 1.** Sociodemographic characteristics of participating families

| | **Families (*N* = 230)** | | |
|---|---|---|---|
| | **Children (*n* = 230)** | **Mothers (n = 230)** | **Fathers (n = 230)** |
| Age, *M* (*SD*) | 12.11 (2.03) | 34.49 (8.48) | 41.52 (11.00) |
| Country of birth, *%* (*n*) | | | |
| Burundi | 65.7 (151) | 92.6 (213) | 90.4 (208) |
| Tanzania | 34.3 (79) | 3.9 (9) | 7.8 (18) |
| Other | 0 | 3.5 (8) | 1.7 (4) |
| Educational level, *%* (*n*)[a] | | | |
| No schooling | 12.6 (29) | 34.8 (80) | 23.0 (53) |
| Primary, class 1-3 | 49.1 (113) | 22.6 (52) | 16.6 (38) |
| class 4-6 | 38.3 (88) | 30.0 (69) | 39.2 (90) |
| Some secondary | | 11.7 (27) | 16.9 (39) |
| Completed secondary | | 0.9 (2) | 4.3 (10) |
| Relationship to child, *%* (*n*) | | | |
| Biological Parent | | 84.3 (194) | 83.0 (191) |
| Relative | | 6.0 (14) | 5.6 (13) |
| Step parent | | 3.0 (7) | 3.9 (9) |
| Foster parent | | 6.5 (15) | 7.4 (17) |
| Number of people in household, *%* (*n*)[b] | | | |
| 3 to 5 | | 15.7 (36) | |
| 6 to 9 | | 70.0 (161) | |
| ≥ 10 | | 14.3 (33) | |
| Household income p. month (USD)[b] | | | |
| No income | | 32.2 (74) | |
| Up to 20 | | 60.9 (140) | |
| ≥ 20 | | 6.9 (16) | |

[a] Parents` responses refer to their highest level achieved. [b] Information on households is averaged across parents.

**Table 2.** Prevalence of PTSD and other mental health problems among children and parents

| | Children (n = 230) | | | | Mothers (n = 230) | | | | Fathers (n = 230) | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | *%* | *n* | *M* | *SD* | *%* | *n* | *M* | *SD* | *%* | *n* | *M* | *SD* |
| PTSD Measures | | | | | | | | | | | | |
| DSM-5 diagnosis | 5.7[a] (2.2)[b] | 13(5) | | | 32.6[c] | 75 | | | 29.1[c] | 67 | | |
| Symptom severity | | | 14.59[a] | 11.33 | | | 38.51[c] | 19.31 | | | 33.04[c] | 16.51 |
| Functional Impairment | 42.6 | 98 | | | 50.9 | 117 | | | 50.4 | 116 | | |
| SDQ | | | | | | | | | | | | |
| Total difficulties score | 10.9[d] | 25 | 10.65 | 5.06 | 15.9[e] | 36 | 10.84 | 6.04 | 11.5[e] | 26 | 9.30 | 5.56 |
| BSI-18 | | | | | | | | | | | | |
| Global Severity Index | | | | | 87.4[f] | 201 | 31.21 | 16.49 | 83.9[g] | 193 | 24.53 | 14.29 |

*Note*: The SDQ values in the parent columns refer to the SDQ parent version. PTSD, posttraumatic stress disorder; SDQ, Strengths and Difficulties Questionnaire; BSI-18, Brief Symptom Inventory-18; SDQ cut-off scores are based on Goodman et al. (2000); BSI-18 cut-off scores are based on Derogatis (2000); Median scores of PTSD measures were 13.00 (children), 38.00 (mothers) and 33.00 (fathers).

[a] Assessed with the University of California at Los Angeles Child/Adolescent PTSD Reaction Index for DSM-5. [b] Prevalence of Dissociative Subtype.

[c] Assessed with the PTSD Check List for DSM-5; [d] Cut-off ≥ 18; [e] Cut-off ≥ 17; [f] Cut-off ≥ 13; [g] Cut-off ≥ 10

**Table 3.** Fit indices for latent class models

| Model | Log-likelihood | Resid. df | BIC | aBIC | AIC | cAIC | Entropy |
|---|---|---|---|---|---|---|---|
| 2 class | -886.40 | 50 | 1843.20 | 1802.00 | 1798.79 | 1856.20 | 0.67 |
| 3 class | -863.27 | 43 | 1834.87 | 1771.49 | 1766.55 | 1854.87 | 0.77 |
| **4 class** | **-852.56** | **36** | **1851.36** | **1765.79** | **1759.13** | **1878.36** | **0.78** |
| 5 class | -846.19 | 29 | 1876.53 | 1768.78 | 1760.38 | 1910.53 | 0.77 |
| 5 class | -842.98 | 22 | 1908.01 | 1778.08 | 1767.95 | 1949.01 | 0.85 |
| 7 class | -839.51 | 15 | 1939.00 | 1786.88 | 1775.03 | 1987.00 | 0.67 |

*Note:* Fit indices of the preferred 4-class model are highlighted in bold. Resid. df, Residual degrees of freedom; BIC, Bayesian Information Criterion; aBIC, adjusted Bayesian Information Criterion; AIC, Akaike Information Criterion; cAIC, Bozdogan`s consistent Akaike Information Criterion.

**Table 4.** Descriptive statistics and comparisons between latent classes

| | Latent Classes % (N) | | | | ANOVA | | Post hoc test (Games-Howell) | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | **Traumatized families (TF)** 34.4 ( 80) | **Traumatized mothers (TM)** 23.5 (47) | **Traumatized fathers (TFa)** 13.8 (37) | **Non-traumatized families (NF)** 28.3 (62) | **F** | **$\eta^2$** | **TF NF** | **TF TM** | **TF TFa** | **TM TFa** | **TM NF** | **TFa NF** |
| Child maltreatment, *M (SD)* | 102.38 (91.74) | 72.77 (90.44) | 76.76 (71.49) | 56.89 (54.76) | 3.99† | 0.05 | ** | ns | ns | ns | ns | ns |
| Traumatic events, *M (SD)* | | | | | | | | | | | | |
| Children | 10.91 (6.26) | 5.09 (2.91) | 6.05 (4.24) | 5.84 (3.31) | 23.53† | 0.24 | *** | *** | *** | ns | ns | ns |
| Mothers | 18.41 (5.61) | 17.91 (6.28) | 17.05 (7.05) | 14.16 (5.49) | 6.27† | 0.08 | *** | ns | ns | ns | * | ns |
| Fathers | 22.37 (4.86) | 19.06 (4.82) | 22.54 (6.74) | 19.05 (5.94) | 7.43† | 0.09 | ** | *** | ns | * | ns | *** |
| PTSD Diagnosis, *% (n)* | | | | | | | | | | | | |
| Children | 13.7 (11) | 0 | 0 | 1.6 (1) | $p = 0.001$ (Fisher-Freeman-Halton exact test) | | | | | | | |
| Mothers | 45.0 (36) | 51.1 (24) | 40.5 (15) | 0 | $\chi^2 = 43.51$ (3, N=226), $p < 0.001$ | | | | | | | |
| Fathers | 40.0 (32) | 8.5 (4) | 75.7 (28) | 1.6 (1) | $\chi^2 = 76.39$ (3, N=226), $p < 0.001$ | | | | | | | |

*Note:* All analyses are based on n=226. There was a large significant multivariate effect of class membership on dependent variables, Pillai`s trace = 0.44, $F$ (15, 660) = 7.46, $p$ <0.001, $\eta^2$=0.15. *M*, mean; *SD*, standard deviation; *F*, test statistic of ANOVA; $\eta^2$, effect size eta squared; ns, not significant. *$p \leq 0.05$, **$p \leq 0.01$, ***$p \leq 0.001$, †Significant after Holm-Bonferroni correction.

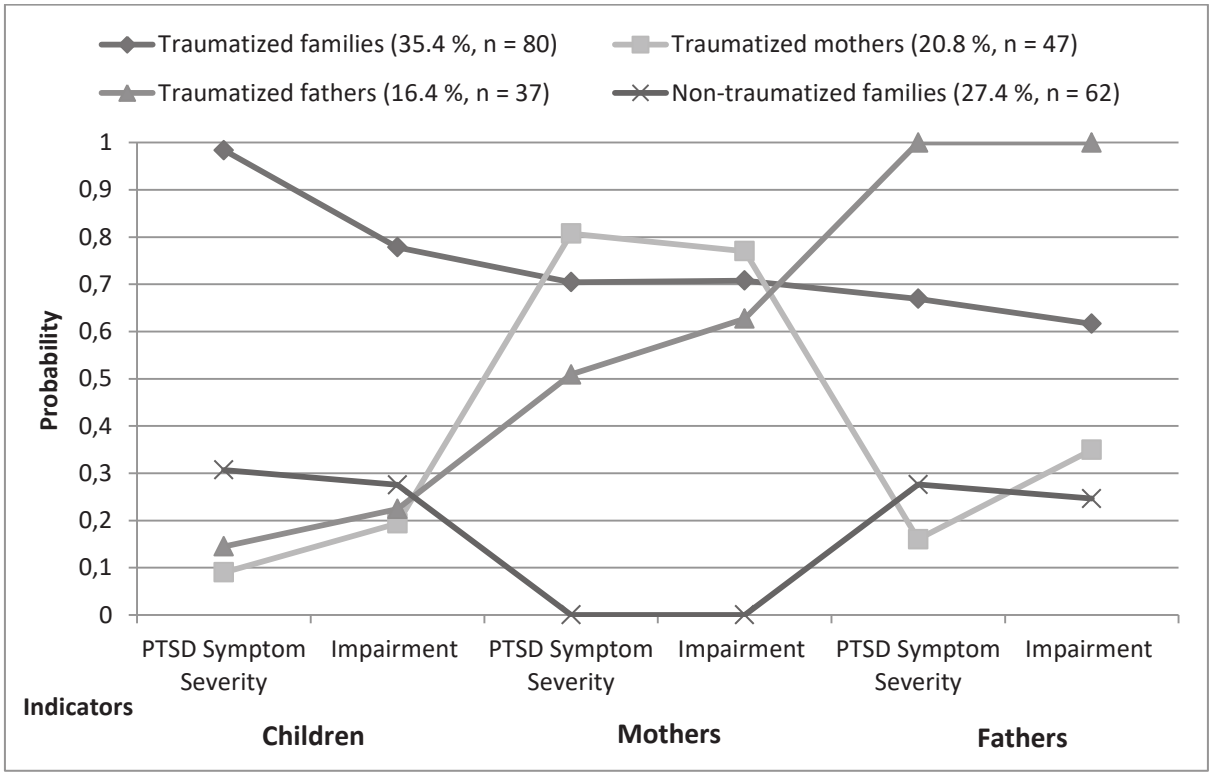


*Figure 1.* Latent classes of families based on family members` PTSD symptom severity and impairment. Y-axis indicates the average probability of having a PTSD symptom score above the median and meeting the impairment criterion for PTSD diagnosis.

Supplementary Table A. Prevalence rates of children`s traumatic experiences by gender and age.

| Traumatic event types | Girls (n = 109) | | Boys (n = 121) | | Gender Difference | 7 – 11 yrs. (n = 75) | | 12 – 15 yrs. (n = 155) | | Age Difference |
|---|---|---|---|---|---|---|---|---|---|---|
| | *n* | *%* | *n* | *%* | $X^2$ | *n* | *%* | *n* | *%* | $X^2$ |
| Death of a close person | 96 | 88.1 | 98 | 81.0 | 2.18 | 57 | 76.0 | 137 | 88.4 | 5.87* |
| Saw someone who was beaten up, shot at or killed | 62 | 56.9 | 66 | 54.5 | 0.13 | 42 | 56.0 | 86 | 55.5 | 0.01 |
| Dangerous flight | 52 | 47.7 | 53 | 43.8 | 0.35 | 26 | 34.7 | 79 | 51.0 | 5.41* |
| Deprivation of food | 38 | 34.9 | 54 | 44.6 | 2.28 | 20 | 26.7 | 72 | 46.5 | 8.24** |
| Natural disaster | 37 | 33.9 | 46 | 38.0 | 0.41 | 29 | 38.7 | 54 | 34.8 | 0.32 |
| Violent death or serious injury of a loved one or friend | 46 | 42.2 | 36 | 29.8 | 3.87* | 27 | 36 | 55 | 35.5 | 0.01 |
| Being very close to burning houses | 40 | 36.7 | 42 | 34.7 | 0.10 | 36 | 48.0 | 46 | 29.7 | 7.40** |
| Beaten up, shot at or threatened to be hurt badly in school, neighborhood or town | 30 | 27.5 | 49 | 40.5 | 4.28* | 22 | 29.3 | 57 | 36.8 | 1.24 |
| Close to crossfire or shootings | 32 | 29.4 | 42 | 34.7 | 0.75 | 21 | 28.0 | 53 | 34.2 | 0.89 |
| Saw people with mutilations or dead bodies | 30 | 27.5 | 44 | 36.4 | 2.05 | 25 | 33.3 | 49 | 31.6 | 0.07 |
| Saw a family member being hit very hard at home | 34 | 37.7 | 35 | 28.9 | 0.14 | 22 | 29.3 | 47 | 30.3 | 0.02 |
| Severe accident | 32 | 29.4 | 32 | 26.4 | 0.24 | 19 | 25.3 | 45 | 29.0 | 0.34 |
| Harassment by armed personnel (witnessed) | 26 | 23.9 | 38 | 31.4 | 1.63 | 24 | 32.0 | 40 | 25.8 | 0.97 |
| Close to a war zone | 27 | 24.8 | 36 | 29.8 | 0.72 | 16 | 21.3 | 47 | 30.3 | 2.05 |

| Traumatic event types | Girls (n = 109) | | Boys (n = 121) | | Gender Difference | 7 – 11 yrs. (n = 75) | | 12 – 15 yrs. (n = 155) | | Age Difference |
|---|---|---|---|---|---|---|---|---|---|---|
| | *n* | *%* | *n* | *%* | $X^2$ | *n* | *%* | *n* | *%* | $X^2$ |
| Hit very hard at school by a teacher | 30 | 27.5 | 33 | 27.3 | 0.00 | 16 | 21.3 | 47 | 30.3 | 2.05 |
| Close to a combat situation | 20 | 18.3 | 28 | 23.1 | 0.80 | 13 | 17.3 | 35 | 22.6 | 0.84 |
| Robbery or looting by armed personnel (witnessed) | 19 | 17.4 | 28 | 23.1 | 1.15 | 11 | 14.7 | 36 | 23.2 | 2.28 |
| Beatings or torture by armed personnel (witnessed) | 14 | 12.8 | 32 | 26.4 | 6.63** | 16 | 21.3 | 30 | 19.4 | 0.12 |
| Close to a bomb/grenade attack | 21 | 19.3 | 24 | 19.8 | 0.01 | 16 | 21.3 | 29 | 18.7 | 0.22 |
| Severe injury by weapon by armed personnel (witnessed) | 15 | 13.8 | 27 | 22.3 | 2.81 | 11 | 14.7 | 31 | 20.0 | 0.96 |
| Forced payment of taxes to armed personnel | 13 | 11.9 | 15 | 12.4 | 0.01 | 8 | 10.7 | 20 | 12.9 | 0.24 |
| Painful or scary medical treatment for severe sickness/injury | 13 | 11.9 | 14 | 12.8 | 0.01 | 6 | 8.0 | 21 | 13.5 | 1.50 |
| Forceful abduction or recruitment of a close person | 8 | 7.3 | 12 | 9.9 | 0.48 | 5 | 6.7 | 15 | 9.7 | 0.58 |
| Robbery or looting by armed personnel | 8 | 7.3 | 11 | 9.1 | 0.23 | 2 | 2.7 | 17 | 11.0 | 4.60* |
| Other scary or upsetting event | 9 | 8.3 | 8 | 6.6 | 0.23 | 3 | 4.0 | 14 | 9.0 | 1.87 |
| Rape of a woman, man or child (witnessed) | 7 | 6.4 | 9 | 7.4 | 0.09 | 3 | 4.0 | 13 | 8.4 | 1.50 |
| Unwanted touching of private parts | 11 | 10.1 | 2 | 1.7 | 7.66** | 3 | 4.0 | 10 | 6.5 | 0.57 |
| Beatings or torture by armed personnel | 4 | 3.7 | 7 | 5.8 | 0.56 | 2 | 2.7 | 9 | 5.8 | 1.09 |
| Harassment by armed personnel | 6 | 5.5 | 4 | 3.3 | 0.67 | 0 | 0.0 | 10 | 6.5 | 5.06* |
| Forced prostitution or sexual slavery (witnessed) | 7 | 6.4 | 2 | 1.7 | 3.47 | 2 | 2.7 | 7 | 4.5 | 0.46 |
| Forced to have sex with someone | 5 | 4.6 | 2 | 1.7 | 1.67 | 1 | 1.3 | 6 | 3.9 | 1.10 |
| Imprisonment | 2 | 1.8 | 4 | 3.3 | 0.49 | 2 | 2.7 | 4 | 2.6 | 0.00 |
| Injury by weapon by armed personnel | 3 | 2.8 | 0 | 0.0 | 3.37 | 1 | 1.3 | 2 | 1.3 | 0.00 |
| Forceful abduction or recruitment | 0 | 0.0 | 2 | 1.7 | 1.82 | 0 | 0.0 | 2 | 1.3 | 0.98 |

*Note*: Traumatic event types are sorted by total frequency in descending order. No alpha-level correction was applied for comparisons by gender and age.

*$p \leq 0.05$, **$p \leq 0.01$

Supplementary Table B. Prevalence rates of traumatic experiences for children, mothers and fathers

| **Traumatic event types** | **Children (*n* = 230)** | | **Mothers (*n* = 230)** | | **Fathers (*n* = 230)** | |
|---|---|---|---|---|---|---|
| | ***n*** | ***%*** | ***n*** | ***%*** | ***n*** | ***%*** |
| Death of a close person | 194 | 84.3 | - | - | - | - |
| Saw someone who was beaten up, shot at or killed | 128 | 55.7 | - | - | - | - |
| Dangerous flight | 105 | 45.7 | 184 | 80.0 | 206 | 89.6 |
| Deprivation of food | 92 | 40.0 | 184 | 80.0 | 181 | 78.7 |
| Natural disaster | 83 | 36.1 | 115 | 50.0 | 126 | 54.8 |
| Violent death or serious injury of a loved one or friend | 82 | 35.7 | - | - | - | - |
| Being very close to burning houses | 82 | 35.7 | 209 | 90.9 | 203 | 88.3 |
| Beaten up, shot at or threatened to be hurt badly in school, neighborhood or town | 79 | 34.3 | - | - | - | - |
| Close to crossfire or shootings | 74 | 32.2 | 199 | 86.5 | 211 | 91.7 |
| Saw people with mutilations or dead bodies | 73 | 32.2 | 181 | 78.7 | 204 | 88.7 |
| Saw a family member being hit very hard at home | 69 | 30.0 | - | - | - | - |
| Severe accident | 64 | 27.8 | 90 | 39.1 | 139 | 60.4 |
| Harassment by armed personnel (witnessed) | 64 | 27.8 | 164 | 71.3 | 198 | 86.1 |
| Close to a war zone | 63 | 27.4 | - | - | - | - |
| Hit very hard at school by a teacher | 63 | 27.4 | - | - | - | - |
| Close to a combat situation | 48 | 20.9 | 189 | 82.2 | 208 | 90.4 |
| Robbery or looting by armed personnel (witnessed) | 47 | 20.4 | 130 | 56.5 | 173 | 75.2 |
| Beatings or torture by armed personnel (witnessed) | 46 | 20.0 | 147 | 63.9 | 195 | 84.8 |
| Close to a bomb/grenade attack | 45 | 19.6 | 181 | 78.7 | 206 | 89.6 |
| Severe injury by weapon by armed personnel (witnessed) | 42 | 18.3 | 183 | 79.6 | 212 | 92.2 |
| Forced payment of taxes to armed personnel | 28 | 12.2 | 128 | 55.7 | 154 | 67.0 |
| Painful or scary medical treatment for severe sickness/injury | 27 | 11.7 | - | - | - | - |
| Forceful abduction or recruitment of a close person | 20 | 8.7 | 134 | 58.3 | 167 | 72.6 |
| Robbery or looting by armed personnel | 19 | 8.3 | 121 | 52.6 | 143 | 62.2 |
| Rape or sexual assault | 17 | 7.4 | 48 | 20.9 | 16 | 7.0 |

| Traumatic event types | Children (*n* = 230) | | Mothers (*n* = 230) | | Fathers (*n* = 230) | |
|---|---|---|---|---|---|---|
| | ***n*** | ***%*** | ***n*** | ***%*** | ***n*** | ***%*** |
| Other scary or upsetting event | 17 | 7.4 | - | - | - | - |
| Rape of a woman, man or child (witnessed) | 16 | 7.0 | 78 | 33.9 | 68 | 29.6 |
| Beatings or torture by armed personnel | 11 | 4.8 | 76 | 33.0 | 150 | 65.2 |
| Harassment by armed personnel | 10 | 4.3 | 115 | 50.0 | 175 | 76.1 |
| Forced prostitution or sexual slavery (witnessed) | 9 | 3.9 | 75 | 32.6 | 70 | 30.4 |
| Imprisonment | 6 | 2.6 | 27 | 11.7 | 98 | 42.6 |
| Injury by weapon by armed personnel | 3 | 1.3 | 17 | 7.4 | 72 | 31.3 |
| Forceful abduction or recruitment | 2 | .9 | 35 | 15.2 | 91 | 39.6 |
| Fought in a combat | - | - | 3 | 1.3 | 32 | 13.9 |
| Severe accident (witnessed) | - | - | 181 | 78.7 | 202 | 87.8 |
| Severe accident (caused) | - | - | 19 | 8.3 | 43 | 18.7 |
| Life threatening illness or injury | - | - | 132 | 57.4 | 152 | 66.1 |
| Life-threatening illness or injury of a close person | - | - | 181 | 78.7 | 198 | 86.1 |
| Suicide (witnessed) | - | - | 65 | 28.3 | 58 | 25.2 |
| Forced payment of taxes to armed personnel (witnessed) | - | - | 150 | 65.2 | 182 | 79.1 |
| Killing or murder of someone (witnessed) | - | - | 124 | 53.9 | 154 | 67.0 |
| Robbed or looted another person | - | - | 4 | 1.7 | 18 | 7.8 |
| Severely beat or tortured another person | - | - | 10 | 4.3 | 29 | 12.6 |
| Assaulted someone with a weapon | - | - | 2 | 0.9 | 17 | 7.4 |
| Abducted or recruited someone by force | - | - | 5 | 2.2 | 8 | 3.5 |
| Raped or sexually assaulted someone | - | - | 3 | 1.3 | 13 | 5.7 |
| Killed someone | - | - | 0 | 0 | 11 | 4.8 |

*Note*: For children, traumatic event types are sorted by frequency in descending order; for parents, traumatic event types are listed in random order.

Supplementary Table C. Prevalence of PTSD and other mental health problems among children and parents

| | Children (n = 230) | | | | Mothers (n = 230) | | | | Fathers (n = 230) | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | *%* | *n* | *M* | *SD* | *%* | *n* | *M* | *SD* | *%* | *n* | *M* | *SD* |
| PTSD Measures | | | | | | | | | | | | |
| DSM-5 diagnosis | 5.7[a] (2.2)[b] | 13 (5) | | | 32.6[c] | 75 | | | 29.1[c] | 67 | | |
| Symptom severity | | | 14.59[a] | 11.33 | | | 38.51[c] | 19.31 | | | 33.04[c] | 16.51 |
| Functional Impairment | 42.6 | 98 | | | 50.9 | 117 | | | 50.4 | 116 | | |
| SDQ | | | | | | | | | | | | |
| Total difficulties score | 10.9[d] | 25 | 10.65 | 5.06 | 15.9[e] | 36 | 10.84 | 6.04 | 11.5[e] | 26 | 9.30 | 5.56 |
| Internalizing problems | 16.5[f] | 38 | 6.33 | 3.26 | 27.8[g] | 63 | 6.26 | 3.74 | 11.0[g] | 25 | 4.67 | 3.29 |
| Externalizing problems | 1.3[h] | 3 | 4.32 | 2.92 | 3.1[h] | 7 | 4.59 | 3.25 | 5.3[h] | 12 | 4.63 | 3.57 |
| BSI-18 | | | | | | | | | | | | |
| Global Severity Index | | | | | 87.4[i] | 201 | 31.21 | 16.49 | 83.9[j] | 193 | 24.53 | 14.29 |
| Somatization | | | | | 75.2[k] | 173 | 10.12 | 5.97 | 62.6[l] | 144 | 6.92 | 5.11 |
| Depression | | | | | 85.2[m] | 196 | 11.08 | 5.94 | 77.8[n] | 179 | 9.50 | 5.39 |
| Anxiety | | | | | 72.6[k] | 167 | 10.01 | 6.29 | 66.5[o] | 153 | 8.11 | 5.78 |

*Note*: The SDQ values in the parent columns refer to the SDQ parent version. PTSD, posttraumatic stress disorder; SDQ, Strengths and Difficulties Questionnaire; BSI-18, Brief Symptom Inventory-18; SDQ cut-off scores are based on Goodman et al. (2000); BSI-18 cut-off scores are based on Derogatis (2000); Median scores of PTSD measures were 13.00 (children), 38.00 (mothers) and 33.00 (fathers).

[a] Assessed with the University of California at Los Angeles Child/Adolescent PTSD Reaction Index for DSM-5. [b] Prevalence of Dissociative Subtype. [c] Assessed with the PTSD Check List for DSM-5; [d] Cut-off ≥ 18; [e] Cut-off ≥ 17; [f] Cut-off ≥ 10; [g] Cut-off ≥ 9; [h] Cut-off ≥ 12; [i] Cut-off ≥ 13; [j] Cut-off ≥ 10; [k] Cut-off ≥ 6; [l] Cut-off ≥ 5; [m] Cut-off ≥ 5; [n] Cut-off ≥ 5; [o] Cut-off ≥ 5.

Supplementary Table D. Sociodemographic characteristics of latent classes

| | **Traumatized families** | | | **Traumatized mothers** | | | **Traumatized fathers** | | | **Non-traumatized families** | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Characteristics** | **(35.4%, *n* = 80)** | | | **(20.8%, *n* = 47)** | | | **(16.4%, *n* = 37)** | | | **(27.4%, *n* = 62)** | | |
| | **Children** | **Mothers** | **Fathers** | **Children** | **Mothers** | **Fathers** | **Children** | **Mothers** | **Fathers** | **Children** | **Mothers** | **Fathers** |
| Camp, % (*n*) | | | | | | | | | | | | |
| Mtendeli | | 27.4 (22) | | | 36.2 (17) | | | 35.1 (13) | | | 22.6 (14) | |
| Nduta | | 36.3 (29) | | | 34.0 (16) | | | 32.4 (12) | | | 30.6 (19) | |
| Nyarugusu | | 36.3 (29) | | | 29.8 (14) | | | 32.4 (12) | | | 46.8 (29) | |
| Age, M (SD) | 12.46 | 35.04 | 43.10 | 11.94 | 33.79 | 39.60 | 11.51 | 33.24 | 38.59 | 12.13 | 35.39 | 42.87 |
| | (2.09) | (8.17) | (10.49) | (1.97) | (8.22) | (9.49) | (2.13) | (7.38) | (9.58) | (1.93) | (9.59) | (12.76) |
| Country of birth, *%* (*n*) | | | | | | | | | | | | |
| Burundi | 57.5 (46) | 93.8 (75) | 90.0 (72) | 72.3 (34) | 91.5 (43) | 91.5 (43) | 78.4 (29) | 94.6 (35) | 94.6 (35) | 61.3 (38) | 90.3 (56) | 88.7 (55) |
| Tanzania | 42.5 (34) | 1.2 (1) | 7.5 (6) | 27.7 (13) | 8.5 (4) | 8.5 (4) | 21.6 (8) | 2.7 (1) | 2.7 (1) | 38.7 (24) | 4.8 (3) | 9.7 (6) |
| Other | 0 | 4.0 (4) | 2.5 (2) | 0 | 0 | 0 | 0 | 2.7 (1) | 2.7 (1) | 0 | 4.9 (3) | 1.6 (1) |
| Relationship to child, *%* (*n*) | | | | | | | | | | | | |
| Biological Parent | | 83.8 (67) | 81.3 (65) | | 85.1 (40) | 83.0 (39) | | 89.2 (33) | 83.8 (3) | | 85.5 (83) | 90.3 (56) |
| Relative | | 7.6 (6) | 6.3 (5) | | 4.2 (2) | 8.5 (4) | | 0 | 0 | | 8.0 (5) | 6.4 (4) |
| Step parent | | 2.5 (2) | 3.8 (3) | | 2.1 (1) | 0 | | 2.7 (1) | 10.8 (4) | | 4.8 (3) | 1.6 (1) |
| Foster parent | | 6.3 (5) | 8.8 (7) | | 8.5 (4) | 8.5 (4) | | 8.1 (3) | 5.4 (2) | | 1.6 (1) | 1.6 (1) |

| Characteristics | Traumatized families (35.4%, *n* = 80) | | | Traumatized mothers (20.8%, *n* = 47) | | | Traumatized fathers (16.4%, *n* = 37) | | | Non-traumatized families (27.4%, *n* = 62) | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | **Children** | **Mothers** | **Fathers** | **Children** | **Mothers** | **Fathers** | **Children** | **Mothers** | **Fathers** | **Children** | **Mothers** | **Fathers** |
| Educational level, *% (n)*[a] | | | | | | | | | | | | |
| No schooling | 12.5 (10) | 28.7 (23) | 27.5 (22) | 10.6 (5) | 34.0 (16) | 27.7 (13) | 8.1 (3) | 45.9 (17) | 18.9 (7) | 10.3 (7) | 38.7 (24) | 17.7 (11) |
| Primary school, class 1 – 3 | 38.7 (31) | 20.1 (16) | 11.3 (9) | 59.5 (28) | 27.6 (13) | 21.3 (10) | 64.8 (24) | 18.9 (7) | 18.9 (7) | 48.4 (30) | 24.2 (15) | 17.7 (11) |
| class 4 - 6 | 48.8 (39) | 38.8 (31) | 31.3 (25) | 29.8 (14) | 25.5 (12) | 31.9 (15) | 27.0 (10) | 24.3 (9) | 51.3 (19) | 40.3 (25) | 27.4 (17) | 50.0 (31) |
| Some secondary school | | 12.5 (10) | 21.4 (17) | | 10.6 (5) | 12.8 (6) | | 8.1 (3) | 10.8 (4) | | 9.7 (6) | 12.9 (8) |
| Secondary school | | 0 | 8.9 (7) | | 2.1 (1) | 6.4 (3) | | 2.7 (1) | 0 | | 0 | 1.6 (1) |
| Number of people in household, *% (n)*[b] | | | | | | | | | | | | |
| 3 to 5 | | 12.5 (10) | | | 14.9 (7) | | | 18.9 (7) | | | 14.5 (9) | |
| 6 to 9 | | 62.5 (50) | | | 78.7 (37) | | | 67.5 (25) | | | 74.2 (46) | |
| 10 or more | | 25.0 (20) | | | 6.4 (3) | | | 13.5 (5) | | | 11.3 (7) | |
| Average household income p. month (USD)[b] | | | | | | | | | | | | |
| No income | | 12.5 (10) | | | 17.0 (8) | | | 16.2 (6) | | | 17.7 (11) | |
| Up to 20 | | 82.5 (66) | | | 78.8 (37) | | | 81.0 (30) | | | 75.9 (47) | |
| More than 20 | | 5.0 (4) | | | 4.3 (2) | | | 2.7 (1) | | | 6.5 (4) | |

[a] Children`s responses referred to their current level, parents` responses to the highest level they achieved. [b] Information on household variables is averaged across mothers` and fathers` report

## 9.3 Manuscript 3: Fuel to the fire: The escalating interplay of attachment and maltreatment in the transgenerational transmission of psychopathology in families living in refugee camps


### Abstract

Maltreatment by parents can be conceptualized as pathogenic escalations of a disturbed parent-child relationship which have devastating consequences for children`s development and mental health. Although parental psychopathology has been shown to be a risk factor both for maltreatment and insecure attachment representations, these factors` joint contribution to child psychopathology has not been investigated. In a sample of Burundian refugee families living in refugee camps in Western Tanzania, the associations between attachment representations, maltreatment, and psychopathology were examined by conducting structured interviews with 226 children aged 7 to 15 and both their parents. Structural equation modeling revealed that children`s insecure attachment representations and maltreatment by mothers fully mediated the relation between maternal and child psychopathology [*model fit:* comparative fit index (CFI) = 0.96; root mean square error of approximation (RMSEA) = 0.05]. A direct association between paternal and child psychopathology was observed (*model fit:* CFI = 0.96; RMSEA = 0.05). The findings suggest a vicious cycle, wherein an insecure attachment to a mother suffering from psychopathology may be linked to children`s risk to be maltreated, which may reinforce insecure representations and perpetuate the pathogenic relational experience. Interventions targeting the attachment relationship and parental mental health may prevent negative child outcomes.


*Keywords:* Parental psychopathology, attachment, maltreatment, child psychopathology, refugee families

# Introduction

## The burden of child maltreatment

Child maltreatment comprises parental acts of sexual, physical and emotional abuse, and neglect, which jeopardize children`s normal development (Cicchetti & Toth, 2005). Child maltreatment is an issue of global magnitude and concern, with high overall estimated prevalence rates of self-reported types of maltreatment (e.g., 22.6% for physical abuse, 36.3% for emotional abuse and 16.3% for physical neglect; Stoltenborgh et al., 2015). Child maltreatment not only incurs enormous direct (e.g., child welfare, physical or mental health care, law enforcement) and indirect costs (e.g. special education, loss of productivity) on societies (Toth et al., 2013), it also has devastating consequences for the individual victims that may persist throughout life (Cicchetti & Toth, 2016). These include an increased risk of chronic diseases (Danese & McEwen, 2012) and lower adult economic well-being (Currie & Widom, 2010).

From a developmental psychopathology perspective, maltreatment interferes with a child`s capacity to successfully resolve stage-salient developmental tasks, thereby hampering their adaptation and increasing the risk for developing psychopathology (Cicchetti & Toth, 2005). Accordingly, maltreatment has been consistently linked with a wide range of negative sequelae for children`s development and mental health (Bolger & Patterson, 2001; Catani et al., 2008; Cullerton-Sen et al., 2008; Hecker, Hermenau, et al., 2016; Kim & Cicchetti, 2010; Maughan & Cicchetti, 2002).

## Etiology of child maltreatment

Given these long-lasting deleterious consequences for the health and psychosocial functioning of survivors, it is of the utmost importance for prevention and intervention approaches to identify factors which contribute to increased maltreatment. Ecological models of the etiology of child maltreatment emphasize the role of multiple factors on different levels of children`s social ecology – ontogenic development (child factors), microsystem (family environment), exosystem (e.g., school, community) and macrosystem (society and culture), which interact with each other to influence the risk of the occurrence of maltreatment and, subsequently, children`s development (Belsky, 1980; Cicchetti & Lynch, 1993). Cicchetti and Lynch (1993) suggested that on each ecological level, potentiating risk factors (e. g. poor neighborhood, parents` childhood experiences of abuse) may increase and compensatory protective factors (e. g. stable marital relationship, improvement of financial conditions) may decrease the prevalence of maltreatment on a given level.

## Parental psychopathology and child maltreatment

A factor that has been consistently linked to increased child maltreatment is parental psychopathology (Cicchetti & Lynch, 1993). For instance, higher rates of anxiety, depression and somatic complaints were found in physically abusive mothers (Black et al., 2001). A history of depression in fathers and of other psychiatric illnesses in mothers were significant risk factors for maltreatment in the "*Children of the Nineties*" longitudinal study (Sidebotham & Golding, 2001). In two recent meta-analyses,

parents` current psychopathology was strongly related to neglect and physical abuse (Mulder et al., 2018; Stith et al., 2009).

With regard to posttraumatic stress disorder **(**PTSD), numerous studies demonstrated associations between traumatization and increased family violence, albeit mostly with fathers (Saile et al., 2014; Timshel et al., 2017). The increased propensity for violent behavior in traumatized parents has been explained by PTSD-related symptoms such as anger, irritability, and hyperarousal (American Psychiatric Association, 2013; Timshel et al., 2017). Consequently, negative parenting behaviors, of which maltreatment represents an extreme form, may be one of the mechanisms underlying the relation between parental and child psychopathology (e.g., Lambert et al., 2014).

**Attachment and maltreatment**

Another microsystem factor that has received less empirical attention in the etiology of child maltreatment is children`s attachment relationship to parents. This is surprising as maltreatment constitutes, in its essence, a pathogenic relational experience primarily in the parent-child relationship (Valentino, 2017). Infants develop a secure attachment relationship with their caregiver through consistently responsive and sensitive caregiving by the end of the first year of life (Bowlby, 1969). Insecure attachment results from a lack of sensitive parenting, while a disorganized attachment style has been described as a reaction to extremely inconsistent and harsh parenting (Valentino, 2017). Independent of the child`s age, the ultimate goal of the attachment relationship is the caregiver`s proximity and protection (George, 1996). However, whereas younger children will pursue this goal by overt dependent behaviors such as crying or running to the parent, older children`s attachment begins to take the character of a goal-corrected partnership, with children taking a more active part and balancing their own attachment needs and the parent`s feelings, goals, and plans (Bowlby, 1969). Based on their early and ongoing attachment experiences with a caregiver, children develop expectations about themselves and others in current and future relationships, so-called internal working models of attachment (Bowlby, 1969).

Given the unreliable, insensitive, and sometimes threatening parenting behaviors by parents who maltreat their children, children who experience maltreatment may be at an increased risk of developing insecure attachments and negative relational expectations, such as regarding themselves as unworthy and others as unavailable (Cicchetti & Toth, 2016). Accordingly, high rates of insecure and disorganized attachment have been found among children who have experienced maltreatment (Cicchetti & Barnett, 1991; Cyr et al., 2010). Moreover, there is evidence that maltreated children have more negative global representations of the parent-child relationship than non-maltreated children (Stronach et al., 2011). Although atypical attachment patterns appear to be more prevalent in younger years, insecure attachments among maltreated children may persist up through preadolescence (Lynch & Cicchetti, 1991), and have been associated with a range of negative developmental outcomes such as internalizing and externalizing symptoms, peer problems, and reduced cognitive abilities (Brumariu & Kerns, 2010). In contrast, the importance of secure parent-

child attachment for socioemotional, behavioral, academic and physiological development has been well established (Toth et al., 2013).

**Parental psychopathology and attachment**

Parenting qualities are crucial for the formation of a secure attachment, particularly parental emotional availability and sensitivity (De Wolff & van Ijzendoorn, 1997), but these are often impaired in various kinds of psychopathology. Following the potential for impairment, it has been proposed that attachment may mediate the effects of parents` mental health on child outcomes (van Ee et al., 2016). For instance, depression in parents has been linked to more critical, disengaged, and intrusive parenting behavior, as well as less warm, sensitive, and responsive parenting behavior in interactions with their children (Wilson & Durbin, 2010). Evidence on the association between parental depression and attachment security of the child is mixed, with small overall effect sizes in infancy (Atkinson et al., 2000) and no significant relation found in one study with school-aged children (Graham & Easterbrooks, 2000). Nevertheless, the evidence is still insufficient to draw conclusions.

Applying an attachment theoretical perspective to trauma research, it has been theorized that parental traumatization damages parents` internal attachment representations of their child, thereby undermining parents` ability to react sensitively to their children`s cues (Almqvist & Broberg, 2003). Accordingly, traumatized mothers have been found to be less sensitive, responsive, and available and more avoidant, hostile, and controlling in interaction with their young children (van Ee et al., 2016). Although more preliminary, trauma also appears to affect interactional qualities in fathers (van Ee et al., 2013). Adolescents who had parents with PTSD reported more problems in the parent-child relationship than adolescents of parents without PTSD (Field et al., 2013). However, to the best of our knowledge older children and adolescents` attachment representations have not yet been investigated as a potential mediator between parental PTSD and child psychopathology.

**Insecure attachment as a risk factor for child maltreatment**

While the detrimental effects of child maltreatment on children`s attachment representations of their caregivers and themselves have been well established (Cicchetti & Toth, 2016), these findings mostly come from children who had been referred to youth welfare offices and who received services to prevent further exposure to maltreatment. In contexts where maltreatment is ongoing, however, it is important to look at factors contributing to children`s recurrent risk of experiencing maltreatment. As maltreatment may arise from everyday parent-child interactions and children`s representations can be expected to guide their behaviors towards parents in these interactions (George, 1996) , we argue that children`s insecure attachment representations increase the risk of recurrent maltreatment. Parents suffering from psychopathology are likely to be impaired in their capacity to engage in the parent-child relationship, partly due to disrupted perceptions of themselves as caregivers and of their children (Almqvist & Broberg, 2003). Being constantly preoccupied with their own distress and trauma, these parents may feel overwhelmed by their role as caregivers and disengage from caregiving (De Haene et al., 2010). Thus, they are also less likely to experience the more rewarding aspects of interacting with

their child, which impairs parents` bonding with their child. If parental bonding as counterpart to child attachment is minimized and they feel less close to their children, parents can be expected to be more prone to maltreat their child when feeling overwhelmed by internal (e.g., distress) and/or external (e.g., child's behavior) stressors (Timshel et al., 2017).

Consistent with the notion of attachment as a goal-directed partnership between parents and older children (Bowlby, 1969; George, 1996), children will notice that their parents are unable to meet their attachment needs. They are likely to develop an insecure attachment, including internal representations of the parent as unavailable and of themselves as being unworthy of parental care and love (Cicchetti & Toth, 2016). As such, an insecure attachment may be an adaptive way to cope with this relational experience. For example, children may seek to avoid the aversive emotional arousal resulting from interactions with the insensitive and/or unavailable parent, or they may display increased negativity and dependency in order to elicit the attention of an otherwise preoccupied parent (Cummings & Davies, 1994). However, these characteristics of an insecure attachment may exacerbate difficult relational dynamics by challenging the already low stress sensitivity of distressed parents and further triggering neglectful and/or abusive behavior. This may be because children`s adaptations to the parent-child relationship may constantly remind parents of their own traumatic experiences and of their incapability to serve as a safe haven for their child and deactivate their attachment system (Almqvist & Broberg, 2003; De Haene et al., 2010). In this way, attachment could be expected to partially mediate the relation between parental psychopathology and child maltreatment. It would also imply a vicious cycle by which maltreatment continuously impairs parent-child attachment, which, in turn, increases the likelihood of recurrent maltreatment.

**Objectives of the present study**

Combining an attachment theoretical perspective with the study of causes and consequences of child maltreatment, the present study aims to investigate mechanisms underlying the association between parental and child psychopathology in late childhood and adolescence. For this purpose, we draw on a sample of refugee families from Burundi, currently living in refugee camps in Western Tanzania. This population is suitable for studying the interplay of psychopathology, attachment, and maltreatment for various reasons:

The prevalence of psychopathology in refugees in camp settings is likely to be high due to past traumatization and ongoing exposure to the chronic stressors of life in the camp**,** e. g. high levels of violence, lack of food and basic necessities and crowded housing (Reed et al., 2012). For instance, prevalence rates of 50% for serious mental health problems, e. g. anxiety, depression, somatic symptoms, (de Jong et al., 2000) and of up to 50.5% for PTSD (Neuner et al., 2004) have been found among adults living in refugee camps. Among youth living in refugee camps, rates for depressive symptoms ranged between 35% and 90% and for PTSD between 0% and 87% depending on the specific setting (Vossoughi et al., 2018). Previous studies conducted within East African refugee camps found associations between parental and child psychopathology (Betancourt et al., 2012; Meyer

et al., 2017), but no potentially underlying mechanisms were investigated. In addition, as the attachment system is activated in conditions of imminent threat, danger, and stress, attachment behaviors and subsequent negotiations between the child and parent regarding their respective needs and goals are likely to be particularly salient in refugee children living in camps close to ongoing conflict (Almqvist & Broberg, 2003). Finally, children in refugee camps may be at an increased risk of experiencing parental maltreatment, since more distal community risk factors such as poverty and violence, both highly prevalent in camp settings, have been shown to transmit to the proximal family level (Saile et al., 2016). In addition to camp-related stressors, long-standing norms widespread in Sub-Saharan African societies about the social acceptability and effectiveness of corporal punishment and other harsh discipline strategies can increase children`s risk of being maltreated (Hecker, Radtke, et al., 2016; Nkuba et al., 2018). Accordingly, in a recent study rates of emotional abuse and neglect were 2-3 times higher among Burundian adolescents than in comparable studies from high-income settings (Charak et al., 2017).

In the light of evidence suggesting differential associations of fathers` and mothers` psychopathology with child psychopathology (Weijers et al., 2018) and differences in the perceptions of children and adolescents` attachment relationship with mothers and fathers (Lieberman, Doyle, & Markiewicz, 1999), we used separate structural equation models (SEM) for mothers and fathers to test the following hypotheses: (a) higher levels of parental psychopathology are directly associated with more child maltreatment; (b) children`s attachment representations partially mediate the association between parental psychopathology and child maltreatment in that higher levels of parental psychopathology are related to children`s more insecure attachment representations, which are in turn associated with more child maltreatment; (c) children`s attachment representations partially mediate the relation between parental and child psychopathology in that higher levels of parental psychopathology are associated with children`s more insecure attachment representations, which are in turn associated with higher levels of child psychopathology; (d) child maltreatment partially mediates the association between parental and child psychopathology in that higher levels of parental psychopathology are related to more child maltreatment, which is in turn related to higher levels of child psychopathology; (e) child maltreatment partially mediates the relation between children`s attachment representations and child psychopathology in that children`s more insecure attachment representations are associated with more child maltreatment, which is in turn associated with higher levels of child psychopathology. Parental mental health, attachment relationships and maltreatment have been shown to affect children`s wellbeing and adjustment across various cultures and contexts (e. g. Hecker, Radtke, et al., 2016; Panter-Brick et al., 2014; Punamäki et al., 2017). Therefore, although it is important to consider cultural influences in developmental psychopathology (Causadias & Cicchetti, 2018), we expected a certain comparability of our findings with those of other studies from Western and non-Western cultures.

## Methods

### Sample and recruitment

The study was conducted between February and May 2018 in three refugee camps located in the Kigoma region in western Tanzania. Participants were recruited using a systematic sampling approach: each camp consists of zones, two of which were randomly chosen before data collection. A screening team randomly determined a sampling direction by spinning a pen in the centre of the selected zones. Every 6$^{th}$ house or tent in this direction was selected as the target household. In this way all families in the camp initially had the same chance of participating in the study. When the end of the assigned zone was reached, a new sampling direction was randomly selected, and the procedure was repeated. A family was defined as a triad consisting of the biological father or primary male caregiver (e. g. uncle, grandfather, step/foster parent), the biological mother or primary female caregiver (e. g. aunt, grandmother, step/foster mother) and the oldest child between 7 and 15 years (i.e., primary school age). If a family was absent, the next household in the given direction was approached.

The final study sample consisted of 226 family triads of child, mother/female caregiver and father/male caregiver ($N$ = 678). Four families were excluded because children and caregivers had only been united recently. In total, 46.9% (n = 106) of the children were girls. Eighty-one percent (n = 183) were living with both biological parents, 8.8% (n = 20) with one biological parent and a stepparent or other relative, 4.9 % (n = 11) with two relatives (e.g., grandparents, uncle, aunt), and 5.3% (n = 12) had been living with foster parents for at least one year. In the following, we refer to all caregivers as “mothers” and “fathers”. Table 1 shows the sociodemographic characteristics of the participating families.

### Procedure

Selected families were invited to the compound of a collaborating non-governmental organization (NGO) within the camp. All families that were approached and fulfilled the inclusion criteria stated above showed up. Upon arrival, they were welcomed by the project team and received a detailed oral and written explanation of the purpose of the study, the procedure, associated risks, their right to withdraw from participation at any time, and the confidentiality of their data. Each family member gave their informed consent by signing with their names or fingerprints. Caregivers gave their consent on behalf of children below the age of 11, older children provided their own consent. All but two selected families consented to participate in the study. The study was approved by the Ethics Commission of the University of Zurich (No. 2017.10.2) and the National Institute for Medical Research in Tanzania (No. NIMR/HQ/R.8a/Vol.IX/2632). Furthermore, all necessary permits to conduct research in Tanzania and in the refugee camps were obtained from the Commission for Science and Technology (COSTECH) and the Tanzanian Ministry of Home Affairs. Other aspects of the data gathered during the extensive investigations are presented elsewhere (Scharpf et al., 2019).

Structured clinical interviews were conducted individually in a discrete setting on the grounds of the NGO compound. Interviewers were three Tanzanian master’s degree-level psychologists and

three research assistants from the refugee community who were required to hold at least a secondary school degree, and be fluent in English and Swahili in addition to their native language Kirundi. The assistants had received one week of training in handling the interview guide and on general principles of conducting clinical interviews. The interviews were conducted in Swahili, which is the lingua franca in the refugee camps, or in Kirundi. The Tanzanian researchers were supported by three interpreters from the refugee community in the event that the participants` language skills in Swahili were not sufficient to be interviewed. Before data collection all research assistants and interpreters took part in an open group discussion, in which they analysed each item of the measures and discussed whether the underlying mental health concepts and symptoms were known in Burundian culture and what would be the equivalent terms and expressions in Kirundi. This way we could ensure that all research assistants had a common understanding of the relevant concepts and terms and improve the applicability of our measures for the specific cultural context of our sample. A pilot assessment with 8 families in the first camp further supported the applicability of the measures and allowed us to make adaptations. Neither the open group discussions nor the pilot assessment led to substantial changes in the survey instruments. Only minor language adjustments were made. After the interviews the families received a compensation of 8 USD.

**Measures**

The study instruments for children and parents consisted of individual questionnaires which were administered in form of a structured clinical interview. The measures were translated from English to Swahili (or existing Swahili versions were used) according to scientific guidelines, using blind-back translation.

*Sociodemographic information.* Children and parents answered questions about their age, country of birth, educational status, and family composition. Parents also reported on their relationship to the interviewed child, household characteristics (size, average income per month) and the reasons for their flight.

***Child measures***

*Cumulative traumatic exposure.* Children`s exposure to traumatic events was assessed using a checklist of 35 war- and non-war-related events (e.g., natural catastrophes, physical injury, sexual assault). The checklist did not cover experiences of maltreatment by parents. The measure consisted of 13 items from the Trauma History Profile of the University of California at Los Angeles Child/Adolescent PTSD Reaction Index (UCLA RI-5) for the fifth edition of the *Diagnostic and Statistical Manual of Mental Disorders* (DSM-5; Steinberg et al., 2013) and 22 items adapted from a checklist created by Neuner and colleagues (2004). For the analysis, we calculated a sum score of lifetime exposure to traumatic and adverse experiences by summing up all items (range: 0-35).

*PTSD symptoms.* PTSD symptom severity was assessed using the UCLA RI-5 (Steinberg et al., 2013), which covers the full range of diagnostic criteria of PTSD according to DSM-5 over 31 items. The occurrence of each DSM-5 symptom within the last month is scored on a 5-point Likert scale ranging

from 0 (*none of the time*) to 4 (*most of the time*). The UCLA RI has shown good psychometric properties (Steinberg et al., 2013) and has been used in various cultural settings (Catani et al., 2008). Internal consistency in our sample was excellent, with Cronbach`s α = .90. For the analysis we calculated a sum score of PTSD symptom severity ranging from 0 to 124.

*Emotional and behavioral symptoms.* Emotional and behavioural problems were assessed using the self-report version of the Strengths and Difficulties Questionnaire (Goodman et al., 2000). The SDQ comes with good psychometric properties and has been utilized internationally (Goodman et al., 2000; Hecker, Hermenau, et al., 2016). The SDQ consists of 25 statements with the response categories of *not true (0)*, *somewhat true (1)* or *certainly true (2)*. The scores of all items, except the five prosocial behavior items, are summed up to obtain a total score of difficulties between 0 and 40. In the present study, the Cronbach`s Alpha for the total score of difficulties was .65, which is comparable to the internal consistencies reported in other studies (Hecker, Hermenau, et al., 2016; Panter-Brick et al., 2014). The rather low Cronbach Alpha coefficient can be explained by the heterogeneity of the score consisting of items assessing both internalizing and externalizing symptoms across two subscales each.

*Children`s attachment representations.* The People In My Life questionnaire (PIML; Ridenour et al., 2006) was used to assess children`s attachment representation of the relationship with each parent. The PIML was originally designed to measure internal representations of 10- to 12-year-old children of their relationship with parents, peers and teachers. Recently, the PIML has also been validated in a sample of Portuguese children aged between 8 and 12 years (n = 314) and adolescents aged between 13 and 18 years (n = 281; Moreira et al., 2017). Instead of using the original 20 items referring to both parents, we used the 15 items of a shortened version of the PIML (Gifford-Smith, 2000) and asked them separately for mothers and fathers. The items are rated on a 4-point scale from 0 (*almost never or never true*) to 3 (*almost always or always true*). Example items are "*My mother/father accepts me as I am*" (trust), "*I share my thoughts and feelings with my mother/father*" (communication) and "*I feel angry with my mother/father*" (alienation). The five items of the alienation subscale were reverse scored. In our sample, Cronbach`s Alpha of the total score ranging from 0 to 45 was high for mothers (α = .84) and for fathers (α = .89).

*Child maltreatment.* Parents` maltreatment of their child was assessed with the child-report version of the Parent-Child Conflict Tactic Scales (CTSPC; Straus et al., 1998). The 27 items of the CTSPC are coded on an 8-point Likert scale which allows children to indicate the frequency of specific acts of physical violence, emotional violence and neglect by mothers and fathers in the past year (*never happened*, *once per year*; *twice per year*; *3 to 5 times per year*; *6 to 10 times per year*; *11-20 times per year*; *more than 20 times per year*; *not in the past year but before*). The items were identical for mothers and fathers. A recent study found evidence for its construct and concurrent validity (Sierau et al., 2018). For the analysis, we excluded the four items of the nonviolent discipline subscale and we recoded ranges of frequency of a given act into its average value (Straus et al., 1998). For example,

*11-20 times per year* was coded as a value of 15, and *more than 20 times per year* was coded 25. As we were interested in children`s current experiences of maltreatment, we did not consider lifetime exposure to maltreatment by parents in this study. Internal consistency of the whole scale was good for maltreatment by mothers (α = .80) and by fathers (α = .82).

***Parent measures***

*PTSD symptoms.* PTSD symptoms were assessed using the PTSD Checklist for DSM-5 (PCL-5; Blevins et al., 2015), which covers the 20 DSM-5 symptoms of PTSD with one question each. Responses are coded on a 5-point scale ranging from *not at all* (0) to *extremely* (4) during the past month and summed up to obtain a total score of PTSD symptom severity (range 0 – 80). The PCL- 5 has shown satisfactory to good psychometric properties (Blevins et al., 2015). In our sample, internal consistency was excellent for both mothers (α = .94) and fathers (α = .91).

*Psychological Distress.* The Brief Symptom Inventory-18 (BSI-18; Derogatis, 2000) was used as a measure of general psychological distress. The BSI-18 has shown good psychometric properties and has been used in various cultural settings (Asner-Self et al., 2006). It consists of 18 items. Respondents are asked to indicate on a 5-point Likert scale from *not at all* (0) to *extremely* (4) how much they have been *distressed or bothered* by each symptom in the past seven days. The *Global Severity Index (GSI)* of distress represents the sum of all items ranging from 0 to 72 with higher scores indicating higher levels of psychological distress. Internal consistency was excellent, with Cronbach`s Alphas of .92 for mothers and of .90 for fathers.

**Statistical analysis**

All descriptive analyses were conducted with IBM SPSS Statistics Version 24. The rate of missing values per scale was very low (< 1%) and there were no participants with missing values >10% of a scale. Therefore, we replaced missing values of a participant in a given scale with the mean score of the participant in that scale. We conducted separate SEM analyses for mothers and fathers applying maximum likelihood estimation with the package *lavaan* (Rosseel, 2012) implemented in the statistical environment R (R Core Team, 2019). All variables were modeled as latent constructs except for children`s cumulative traumatic exposure represented by a sum score**,** for which we did not expect measurement error due to the dichotomous response format of the underlying event scale. Child and parental psychopathology were modeled as second-order factors with the first-order factors of posttraumatic stress symptoms (PTSS) and emotional and behavioral symptoms for children and PTSS and psychological distress for parents (see Figure 1 and Figure 2).

Indicators of latent variables in SEM can be either the individual items of a scale applied to measure a certain target construct or some form of aggregation of the individual items into item subsets, a technique referred to as parceling (Little, Cunningham, Shahar, & Widaman, 2002). We chose to apply parceling as it has both psychometric (e. g. higher reliability and communality, lower likelihood of distributional violations) and modeling benefits (e. g. fewer parameter estimates) over the use of individual items (Little et al., 2002; Little, Rhemtulla, Gibson, & Schoemann, 2013). Given

the multidimensionality of our instruments as indicated by exploratory factor analyses, we created parcels using the domain representative approach, which provides parcels that contain an equal number of items from each dimension, ensuring that each parcel is equally representative of all the dimensions of the given construct (Little et al., 2002). We created three parcels for each latent construct as this number appears to be both most beneficial for model fit and to prevent estimation bias (Matsunaga, 2008). All latent constructs were allowed to co-vary with one another and their variances were fixed to unity. Additionally, we constrained the loadings of the first-order factors on the second-order factors to one to obtain a reasonably high loading and model identification. Following Bentler and Chou (1987) who proposed a minimum ratio of 5 cases per free parameter for normally distributed variables in SEM, we achieved adequate power to estimate the 46 parameters in our model.

Preliminary analyses showed that all statistical assumptions were met. There were neither univariate nor multivariate outliers. We used the following indices to assess goodness of model fit: Comparative Fit Index (CFI) and Tucker-Lewis Index (TLI) ≥ 0.95, Root Mean Square Error of Approximation (RMSEA) ≤ 0.06, and Standardized Root Mean Squared Residual (SRMR) ≤ 0.08 (Hu & Bentler, 1999). The basic measurement model showed a good fit for both models (see Supplementary Figure A and Figure B). Statistical significance of the indirect effects was assessed through joint significance tests of the direct paths from the independent variable to the mediator and from the mediator to the outcome. This method has an accurate Type I error rate and good power (Mackinnon et al., 2002). We used $R^2$ as a measure of the variance of each endogenous variable in the model (attachment representations, maltreatment, child psychopathology) that was explained by its predicting latent variables. For associations within the SEM, our metric for a small effect size was $\beta$ ≥.10, for a medium effect $\beta \geq .30$, and for a large effect $\beta \geq .50$ (Shrout & Bolger, 2002). Owing to the directional a priori hypotheses, we used one-tailed p-values. Child age and sex were included as covariates in SEM.

## Results

Descriptive information is displayed in Table 1. Inter-correlations between first-order latent variables are presented in Table 2.

*Mother-to-child.* The model is graphically displayed in Figure 1 and all direct, indirect and total effects in Table 3.Our hypotheses were largely supported and the model fit was good ($\chi^2$ [174] = 279.837, p < 0.001; CFI = 0.96; TLI = 0.95; RMSEA = 0.052, 90% CI [0.040 – 0.063]; SRMR = 0.077). $R^2$ values were 0.03 for attachment representations, 0.14 for child maltreatment and 0.36 for child psychopathology, implying that 36% of the variance in the latent variable child psychopathology could be explained through the latent variables maternal psychopathology, attachment representations and child maltreatment as well as the observed variable cumulative trauma. More severe maternal psychopathology was related to more maltreatment, which in turn was related to more

psychopathology in children ($\beta$ = 0.04, $p$ = 0.043). There was no indirect effect from maternal on child psychopathology via children`s attachment representations ($\beta$ < 0.01, $p$ = 0.387). More psychopathology in mothers was significantly associated with more insecure attachment representations, which in turn were associated with more maltreatment ($\beta$ = 0.05, $p$ = 0.028). Finally, more insecure attachment representations were significantly related to higher levels of psychopathology in children through increased maltreatment ($\beta$ = -0.06, $p$ = 0.025).

*Father-to-child.* The model, which is graphically displayed in Figure 2, showed a good fit ($\chi^2$ [174] = 272.722, p < 0.001; CFI = 0.96; TLI = 0.96; RMSEA = 0.050, 90% CI [0.038 – 0.061]; SRMR = 0.065). $R^2$ values were 0.03 for attachment representations, 0.17 for child maltreatment and 0.39 for child psychopathology. However, our hypotheses regarding the mediational role of attachment representations and maltreatment were not supported. There were no statistically significant indirect effects. However, paternal psychopathology was directly associated with children`s psychopathology ($\beta$ = 0.17, $p$ = 0.012). The two total effects consisting of this association and the respective indirect associations via attachment representations and maltreatment as well as the total effect of attachment representations of the father on child psychopathology via maltreatment were significant (see Table 3).

## Discussion

Although parental psychopathology is highly relevant both to maltreatment and attachment research, our study is the first to offer a synthesis of these factors in a joint model and investigate their associations with child psychopathology. In doing so, our study extends existing research on risk factors and outcomes of maltreatment and insecure attachment representations and proposes a view that takes into account their dynamic and escalating interrelation in potentially increasing the risk of recurrent maltreatment and adverse child outcomes.

### Attachment representations as mediator between parental psychopathology and child maltreatment

Our first hypothesis that attachment representations would partially mediate the relationship between parental psychopathology and child maltreatment was supported by the interplay between mother and child. Children of mothers with higher levels of psychopathology reported more insecure attachment representations, which in turn were associated with higher child-reported maltreatment. This suggests that mothers` distress and traumatization may impair their capability to engage effectively in the parent-child relationship, which may result in children`s insecure attachment representations and trigger cognitive and behavioral adaptations within the dyad that favor maltreatment. This finding is in line with research indicating reduced sensitivity and responsiveness of depressed and traumatized mothers in parent-child interactions (van Ee et al., 2016) and with meta-analyses demonstrating negative associations between maternal depression and attachment security in infants and young children (Atkinson et al., 2000; Martins & Gaffan, 2000). Our finding is also consistent with studies showing a link between maternal symptoms of PTSD and impaired parent-child bonding (Field et al.,

2013). While it has been repeatedly shown that the attachment relationship is particularly vulnerable to disruptions caused by the insensitivity and unresponsiveness associated with maternal psychopathology in children`s early years of life (e. g. Bosquet Enlow et al., 2014; Martins & Gaffan, 2000), our results suggest that this may also hold for older children`s attachment representations according to their self-report.

In contrast to mothers, fathers` psychopathology was not associated with children`s attachment representations. Although more preliminary, this is inconsistent with research indicating reduced sensitivity and impaired bonding in depressed and traumatized fathers (van Ee et al., 2013; Wilson & Durbin, 2010). On the one hand, this finding may reflect a general lower involvement of fathers in parenting (Williams & Kelly, 2005). This would fit with the notion that in Burundian culture mothers are primarily in charge of children`s socialization (Song et al., 2014). On the other hand, it is possible that fathers have found a way to cope with their distress that does not affect the relationship with their children and hence their attachment. For instance, they may deliberately withdraw when highly distressed to mitigate negative effects on the parent-child relationship (van Ee et al., 2013).

More insecure attachment representations of the relationship with both mothers and fathers were strongly associated with higher child-reported maltreatment, which is in line with studies showing increased rates of insecure attachment (Cicchetti et al., 2006; Lynch & Cicchetti, 1991) and more negative representations of their caregivers (Stronach et al., 2011) in maltreated children. It also corroborates research that established the quality of the parent-child relationship as a potent risk factor for child maltreatment (Stith et al., 2009). Moreover, there was a direct positive relation between maternal psychopathology and maltreatment, which is consistent with explanatory approaches of maltreatment based on the symptom characteristics of parental mental disorders such as hyperarousal and irritability in PTSD (Timshel et al., 2017) or increased negativity and a reduced sense of control in depression (Cummings & Davies, 1994). The lack of such an association for fathers is surprising and inconsistent with evidence on increased abuse potential in fathers with higher PTSD symptom levels (Saile et al., 2014). It may be possible that factors that we did not include in our analyses, such as substance abuse and own experiences of childhood maltreatment are more relevant in explaining maltreatment by fathers (Timshel et al., 2017).

In sum, the results suggest an escalating interplay between attachment and maltreatment that may put in motion a vicious relational cycle. As maltreatment occurs within the context of a disturbed parent-child relationship, an insecure attachment to a mother suffering from psychopathology may put children at an increased risk for recurrent maltreatment, which in turn may reinforce negative representations of mother and self. However, potential underlying mechanisms need to be elucidated in future research. Paternal psychopathology seems to contribute to maltreatment neither directly nor through attachment security, which may suggest differential roles of mothers and fathers in children`s lives.

**Attachment representations as mediator between parental and child psychopathology**

Contrary to our hypothesis, neither attachment representations of mothers nor of fathers mediated the relationship between parental and child psychopathology. The absence of a significant direct association between security of attachment representations of parents and child psychopathology is inconsistent with a large body of research demonstrating strong links between older children`s and adolescents` insecure attachment and higher depressive symptoms, anxiety, internalizing and externalizing problems (Brumariu & Kerns, 2010; Fearon et al., 2010). For instance, it has been theorized that the internal working models of insecurely attached children increase children`s vulnerability to anxiety and depression (Brumariu & Kerns, 2010). In our study, however, attachment representations emerged as element of a two-staged mediation between maternal and child psychopathology through their association with child maltreatment, which in turn impacted on children`s mental health. This finding suggests that perceived maltreatment behaviors by mothers may function to continuously reinforce and confirm children`s negative internal working models. More secure attachment representations of fathers were associated with less psychopathology in children. Although not statistically significant, this association was equivalent to a small effect and in concordance with a growing body of research that emphasizes the importance of the father-child relationship for positive child outcomes (Barker et al., 2017).

**Maltreatment as a mediator between parent and child psychopathology**

Our hypothesis that child maltreatment would mediate the link between parental and child psychopathology was supported for mothers and children. This is consistent with the large body of research demonstrating links between maternal psychopathology and impaired parenting behavior (van Ee et al., 2016) and the subsequent detrimental impact of maladaptive parenting on child mental health (Hecker, Hermenau, et al., 2016; Saile et al., 2016). The negative association between maternal maltreatment and child mental health is in line with the wide array of studies demonstrating the negative mental health sequelae of maltreatment for children (Bolger & Patterson, 2001; Cullerton-Sen et al., 2008; Kim & Cicchetti, 2010). The association between maltreatment by fathers and child psychopathology pointed into a similar direction, but was not significant. It may be that in a patriarchal culture where the male figure is naturally viewed as household head and exerts control over women and children through the use of violence, children may consider abusive acts by fathers more acceptable (Gershoff, 2002). In a similar vein, cultural norms about the acceptability of violence in Sub-Saharan Africa may have also affected the association between maltreatment by mothers and child psychopathology. A study in six different countries found that mothers` use of physical discipline was generally linked to children`s aggression and anxiety but that this association was less strong in countries where physical discipline was more normative (Lansford et al., 2005).

There is a number of mechanisms potentially underlying the relationship between parents` and children`s mental health. For instance, besides specific behaviors other parent-related variables such as parenting stress have been shown to mediate this association (Weijers et al., 2018). Moreover,

biological processes and aspects of the family environment have been proposed to contribute to the transgenerational transmission of psychopathology. However, our finding of a full rather than a partial mediation suggests that attachment representations and maltreatment are important mechanisms in the association between maternal and child psychopathology.

In addition, there was a direct association between paternal and child psychopathology, which is consistent with a growing body of research documenting the impact of fathers` mental health on children`s well-being (Lambert et al., 2014). The finding is also in line with a previous study that found that the association between maternal and child psychopathology was fully mediated by parenting stress, whereas paternal psychopathology had a direct effect on child psychopathology after taking parenting stress into account (Weijers et al., 2018). We did not find mediation due to the insignificant associations between fathers` psychopathology and maltreatment and between maltreatment by fathers and child psychopathology. Consequently, other mechanisms than attachment and maltreatment appear to underlie this relationship. From a biological perspective, the direct effect may suggest a stronger genetic influence for fathers` psychopathology (Weijers et al., 2018). However, studies investigating this in humans are still lacking. It is also possible that fathers` distress increases marital conflict, which in turn impairs children`s mental health (Cummings & Davies, 1994). Another possibility is that distressed fathers are less able to shield children from ongoing stressful life events and/or to provide basic needs, which then exacerbates children`**s** psychopathology. In any case, the findings suggest that although both maternal and paternal psychopathology is related to child psychopathology, the mechanisms underlying this relationship may be different for mothers and fathers. Relational and parenting factors may be more relevant in the association between mother and child mental health.

The mothers and fathers in our sample have been exposed to many traumas (Scharpf et al., 2019) and these experiences are likely to be significant causes of their psychopathology (Neuner et al., 2004). However, when dealing with the intergenerational transmission of psychopathology in refugee families, it is essential to shift from a sole focus on pre-migration traumatic experiences, which unarguably jeopardize refugees` well-being, to a further consideration of daily post-migration stressors the families face. Over and above past trauma, factors such as unemployment, lack of resources, family separation, acculturative stress, discrimination or restrictive asylum policies have a negative impact on refugees` mental health and parenting (Bryant et al., 2018; Hecker et al., 2018; Sim et al., 2018).

**Practical implications**

Our findings suggest that the attachment relationship between parent and child may be an important target for prevention and intervention approaches in order to mitigate the negative mental health sequelae of maltreatment and decrease the risk of recurrent maltreatment (Valentino, 2017). As maternal psychopathology, attachment, and maltreatment interact to shape child adjustment, approaches addressing only one of these aspects will likely be insufficient. Parent-child interaction

therapy (PCIT) is a relational intervention that has been applied to improve parent-child interactions and teach parenting skills in dyadic sessions with parents and their children (Chaffin et al., 2004). PCIT has been shown to reduce re-reports of physical abuse of school-aged children (Chaffin et al., 2004), to increase parental sensitivity and to reduce behavior problems in children at risk for maltreatment (Thomas & Zimmer-Gembeck, 2011). However, as parental psychopathology constantly jeopardizes parental sensitivity and thus the attachment relationship, we argue that such an intervention should be coupled with a parallel treatment of mothers` distress and trauma. For instance, narrative exposure therapy (NET) has been shown to be effective in treating PTSD in adult refugees living in refugee camps (Neuner et al., 2008). NET can be delivered by trained lay counsellors and thus takes into account the scarcity of financial, personnel and logistical resources in camp settings. A relational intervention that considers the role of parents` traumatic experiences for the attachment relationship while actively fostering a positive parent-child relationship is child-parent psychotherapy (CPP; Liebermann, Van Horn, & Ippen, 2005). CPP has been found to promote attachment security in maltreated infants (Stronach et al., 2013) and to decrease behavior problems and PTSD symptoms in preschool children (Lieberman et al., 2005). While these approaches are promising for younger children, there is a high need to develop and evaluate relational interventions for older children and adolescents (Toth et al., 2013). Our findings of a strong association between more insecure attachment representations of fathers and higher levels of maltreatment as well as the trend between more secure attachment representations of fathers and lower levels of child psychopathology suggest that fathers should equally be included in preventive interventions targeting the parent-child relationship (Barker et al., 2017).

With regard to refugees living in refugee camps, the adaptation and implementation of existing relational interventions is a challenging, but necessary effort. Interventions need to be tailored to the specific cultural background of families by incorporating culturally sensitive concepts of parenting and relationships and consider the scarcity of resources in camps. Therefore, interventions that can be easily disseminated by engaging lay counsellors and that do not require time- and cost-intensive training may be most suitable (Jacob et al., 2014; Neuner et al., 2008). An example that meets these criteria and showed promising results in preventing child abuse and promoting positive parent-child relationships, but did not actually include children, is a parenting intervention conducted in post-conflict Liberia (Puffer et al., 2015). As children`s own traumatic experiences were still the most powerful predictor of their psychopathology, such an intervention should be accompanied by a trauma-focused individual intervention, such as narrative exposure therapy for children (KIDNET; Ruf et al., 2010) or trauma-focused cognitive behavioral therapy (TF-CBT; Cohen et al., 2016). The latter involves parallel individual sessions for the child and the parent as well as conjoint parent-child sessions. In the individual sessions, parents are supported in developing more adequate parenting behaviors and both children and parents are taught skills and strategies to better deal with their traumatic experiences, e.g. relaxation, affective modulation, cognitive processing of trauma and in-

vivo mastery of trauma reminders. The conjoint sessions focus on creating a joint trauma narrative for child and parent (Cohen et al., 2016). A recent evaluation of the TF-CBT treatment model with unaccompanied refugee minors in Germany provided evidence for the effectiveness of TF-CBT in reducing PTSD symptoms in vulnerable refugee youth (Unterhitzenberger et al., 2019). Moreover, a group-based and culturally modified version of TF-CBT delivered by non-clinical facilitators in a resource-poor setting in Congo achieved reductions in war-affected girls` PTSD symptoms, internalizing and conduct problems compared to a wait list control (O'Callaghan et al., 2013).

**Strengths and limitations**

Our findings have to be considered in the light of several limitations. First and foremost, our cross-sectional design precludes any causal interpretations of the investigated associations. Therefore, the direction of the mediation effects has to be interpreted with caution. However, we emphasize the bidirectional nature of the complex associations between attachment representations, maltreatment, and child psychopathology. For instance, longitudinal studies have shown that children`s externalizing behaviors elicit harsh parenting strategies (Gershoff, Lansford, Sexton, Davis-Kean, & Sameroff, 2012). While early maltreatment is likely to cause insecure attachment representations in later life, we suggest that attachment and maltreatment constantly influence each other over time, developing into a downward spiral fueled by parental psychopathology and with detrimental effects on children`s mental health and well-being. However, this potential transactional relation needs to be investigated in a longitudinal design, such as could be done in a cross-lagged panel, with regular diary assessments beginning in early developmental periods. Although our high-risk sample of refugee families living in resource-poor and stressful camp settings provided a unique opportunity to study the interplay of psychopathology, attachment representations, and maltreatment in a natural environment, our sample`s specific cultural background and living context limit the generalizability of our findings to other populations. For example, a recent study using network analysis suggests that the PTSD symptom profiles of refugee minors differ from those of trauma-exposed youth without a flight background (Pfeiffer et al., 2019). Moreover, as we modeled parental and child psychopathology as second-order latent factors we were not able to assess the specificity of associations between different types of parental and child psychopathology (Weijers et al., 2018). Similarly, our modeling of maltreatment did not allow for a separate examination of different types of maltreatment. Our study instruments have not been validated for the specific cultural and linguistic background of our sample. However, we qualitatively evaluated the cultural appropriateness of our measures before data collection. Although we generally noted a high readiness of both children and parents to report on intimate and sensitive topics, we cannot rule out reporting biases such as under-reporting of symptoms. We only used a questionnaire measure to assess children`s attachment representations. A multi-method approach including also narrative or observational measures of attachment might have strengthened our results. On the basis of the directed hypotheses, we have correctly opted for a one-sided testing. However, this may increase the risk of false positive results. Finally, due to our modest

sample size we were not able to calculate a joint model including both maternal and paternal variables, which would have allowed us to control for the interaction between mothers and fathers.

Notwithstanding these limitations, our study also has considerable strengths. The fact that we included family triads allowed us to investigate differential associations between mothers` and fathers` psychopathology and child outcomes. By assessing attachment representations, maltreatment, and mental health through children`s self-report, we were able to eliminate biases associated with distressed parents` reports of their behaviors and child well-being (Ringoot et al., 2015).

**Conclusions**

Child maltreatment can be considered an escalation of a disturbed parent-child relationship, which constitutes a major threat to children´s mental health and well-being. When mothers suffer from psychopathology, the attachment relationship is likely to be impaired. A vicious cycle may develop, wherein an insecure attachment may increase the risk of recurrent maltreatment, which may in turn reinforce insecure attachment representations in children and perpetuate the pathogenic relational experience. Interventions targeting the attachment relationship and maternal mental health may contribute to preventing negative child outcomes. As fathers` mental health and attachment representations of fathers appear to be related to children`s mental health, fathers should be equally engaged in prevention and intervention approaches.

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## Tables and Figures

**Table 1**. Descriptive statistics of sample characteristics and study variables

| | Families (*N*=226) | | |
|---|---|---|---|
| | **Children (*n*=226)** | **Mothers (n=226)** | **Fathers (n=226)** |
| Age, *M* (*SD*) | 12.11 (2.04) | 34.49 (8.48) | 41.52 (11.00) |
| Age range | 7-15 | 19-80 | |
| Orphan (half or full orphan), *%* (*n*) | 13.3 (30) | | |
| Number of siblings, *M (SD)* | 4.31 (4.00) | | |
| Educational level, *%* (*n*)[a] | | | |
| No schooling | 8.0 (18) | 34.8 (80) | 23.0 (53) |
| Primary, class 1-3 | 49.9 (113) | 22.6 (52) | 16.6 (38) |
| class 4-6 | 39.0 (88) | 30.0 (69) | 39.2 (90) |
| Some secondary | 3.1 (7) | 11.7 (27) | 16.9 (39) |
| Completed secondary | | 0.9 (2) | 4.3 (10) |
| Household variables, *M* (*SD*)[b] | | | |
| Number of people in household | | 7.00 (1.95) | |
| Household income per month | | $6.22 ($11.86) | |
| Study variables, *M* (*SD*, Min-Max) | | | |
| Cumulative trauma exposure | 7.57 (5.31, 0–27) | | |
| PTS Symptoms (UCLA/PCL-5) | 14.50 (11.37, 0–49) | 38.80 (19.14, 0–80) | 33.14 (16.61, 0-74) |
| Emotional and Behavioral Problems (SDQ) | 10.64 (4.98, 0-23) | | |
| Psychological Distress (BSI-18) | | 31.56 (16.35, 0–71) | 24.62 (14.37, 0-67) |
| Child Maltreatment | | 44.77 (44.98, 0–241) | 34.78 (42.19, 0-218) |
| Attachment to parents (PIML) | | 36.46 (7.69, 6-45) | 33.58 (9.57, 5-45) |

PTS, Posttraumatic Stress; UCLA RI: University of California at Los Angeles Child/Adolescent PTSD Reaction Index for DSM-5; SDQ: Strengths and Difficulties Questionnaire; CPCTS: Child-Parent Conflict Tactic Scales; PIML: People In My Life; PCL-5: PTSD Check List for DSM-5; BSI-18: Brief Symptom Inventory-18.[a] Children`s responses referred to their current level, caregivers` responses to the highest level they achieved. [b] Information on household variables is averaged across mothers` and fathers` reports.

**Table 2**. Latent variable correlations

| | 1 | 2 | 3 | 4 | 5 | 6 |
|---|---|---|---|---|---|---|
| 1. Parental PTS symptoms (PCL-5) | - | 0.63*** | -0.11 | 0.22** | 0.17* | -0.01 |
| 2. Parental psychological distress (BSI-18) | 0.65*** | - | -0.23** | 0.19** | 0.24** | -0.01 |
| 3. Attachment representations of parent (PIML) | 0.08 | 0.03 | - | -0.32*** | -0.05 | 0.08 |
| 4. Maltreatment by parent (CPCTS) | 0.08 | -0.05 | -0.35*** | - | 0.29*** | 0.20* |
| 5. Child PTS symptoms (UCLA RI) | 0.16* | 0.13 | -0.13 | 0.25*** | - | 0.41*** |
| 6. Child emotional and behavioral problems (SDQ) | 0.20* | 0.14 | -0.02 | 0.20* | 0.41*** | - |

*Note*: Bivariate correlations between the first-order latent variables used in the structural equation models. Correlations between child and mother variables are displayed above the diagonal, correlations between child and father variables below the diagonal.

PTS, Posttraumatic Stress; UCLA RI: University of California at Los Angeles Child/Adolescent PTSD Reaction Index for DSM-5; SDQ: Strengths and Difficulties Questionnaire; CPCTS: Child-Parent Conflict Tactic Scales; PIML: People In My Life; PCL-5: PTSD Check List for DSM-5; BSI-18: Brief Symptom Inventory-18.

***$p < 0.001$, **$p < 0.01$, *$p < 0.05$ (two-sided p values)

**Table 3**. Direct, indirect and total effects for mother and father model

| | Mother model | | | Father model | | |
|---|---|---|---|---|---|---|
| | b | SE | β | b | SE | β |
| Direct effect of cumulative traumatic experiences on child psychopathology | 0.13 | 0.02 | 0.55*** | 0.13 | 0.02 | 0.56*** |
| Direct effect of parental on child psychopathology | 0.03 | 0.10 | 0.02 | **0.22** | **0.10** | **0.17*** |
| Direct effect of parental psychopathology on attachment | -0.18 | 0.08 | -0.18* | 0.07 | 0.08 | 0.07 |
| Direct effect of parental psychopathology on maltreatment | 0.22 | 0.09 | 0.20** | 0.10 | 0.08 | 0.09 |
| Direct effect of attachment on child psychopathology | 0.03 | 0.10 | 0.02 | -0.14 | 0.10 | -0.11 |
| Direct effect of attachment on maltreatment | -0.30 | 0.08 | -0.29*** | -0.41 | 0.09 | -0.38*** |
| Direct effect of maltreatment on child psychopathology | 0.22 | 0.10 | 0.19* | 0.11 | 0.10 | 0.10 |
| Indirect effect of parental psychopathology on child psychopathology via maltreatment | **0.05** | **0.03** | **0.04*** | 0.01 | 0.01 | 0.01 |
| Indirect effect of parental on child psychopathology via attachment | 0.00 | 0.02 | 0.00 | -0.01 | 0.01 | -0.01 |
| Indirect effect of parental psychopathology on maltreatment via attachment | **0.05** | **0.03** | **0.05*** | -0.03 | 0.03 | -0.03 |
| Indirect effect of attachment on child psychopathology via maltreatment | **-0.07** | **0.03** | **-0.06*** | -0.05 | 0.04 | -0.04 |
| Sum of direct effect of parental on child psychopathology and indirect effect via maltreatment | 0.08 | 0.10 | 0.06 | **0.23** | **0.10** | **0.18**** |
| Sum of direct effect of parental on child psychopathology and indirect effect via attachment | 0.02 | 0.10 | 0.02 | **0.21** | **0.10** | **0.16*** |
| Sum of direct effect of parental psychopathology on maltreatment and indirect effect via attachment | **0.27** | **0.09** | **0.25**** | 0.07 | 0.09 | 0.06 |
| Sum of direct effect of attachment on psychopathology and indirect effect via maltreatment | -0.04 | 0.09 | -0.03 | **-0.19** | **0.09** | **-0.15*** |

Key findings are highlighted in bold. b, unstandardized regression weight; SE, standard error; β, standardized regression weight.

*** p < .001 ** p < .01, * p < .05.

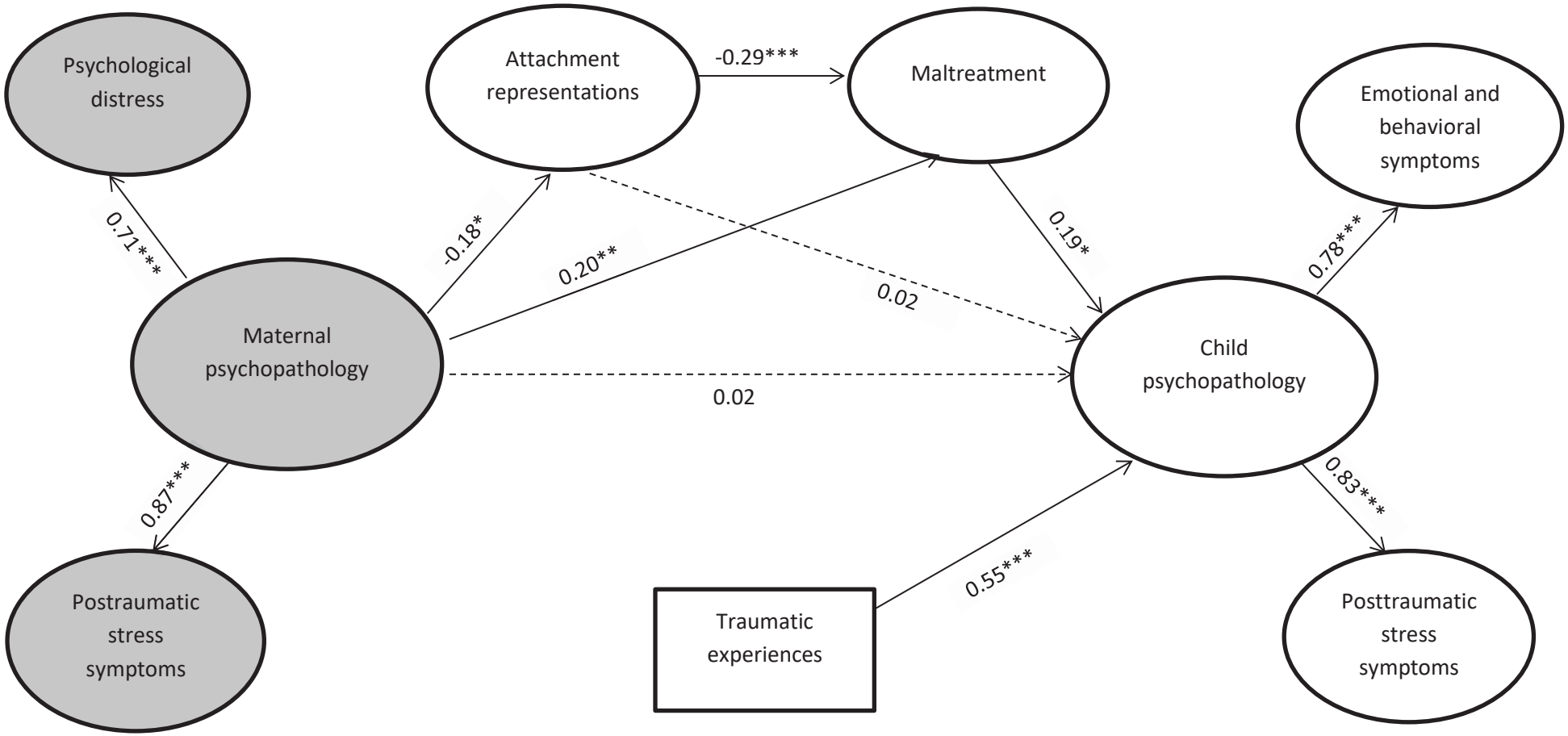



*Figure 1.* Structural model of the hypothesized relationship between maternal psychopathology (assessed with the Posttraumatic Stress Disorder (PTSD) Checklist for the fifth edition of the *Diagnostic and Statistical Manual of Mental Disorders* (DSM-5) and the Brief Symptom Inventory-18), attachment (assessed with the People in My Life Questionnaire), maltreatment (assessed with the Parent-Child Conflict Tactic Scales) and child psychopathology (assessed with the UCLA Child/Adolescent PTSD Reaction Index for DSM-5 and the Strengths and Difficulties Questionnaire). Higher maternal psychopathology is associated with more insecure child attachment, which in turn impacts child psychopathology through increased maltreatment. Moreover, there is an indirect effect of maternal psychopathology on child psychopathology through increased maltreatment. Model fit was good: $\chi^2$ [174] = 279.837, $p < 0.001$; CFI = 0.96; TLI = 0.95; RMSEA = 0.052, 90% CI [0.040 – 0.063]; SRMR = 0.077. Standardized estimates are shown. The covariates child sex and age are not shown. Dashed lines indicate nonsignificant effects. Variables marked grey are based on mother report. Latent variables were represented by item parcels as indicators (see Supplementary Figure A for details).***$p < 0.001$, **$p < 0.01$, *$p < 0.05$.

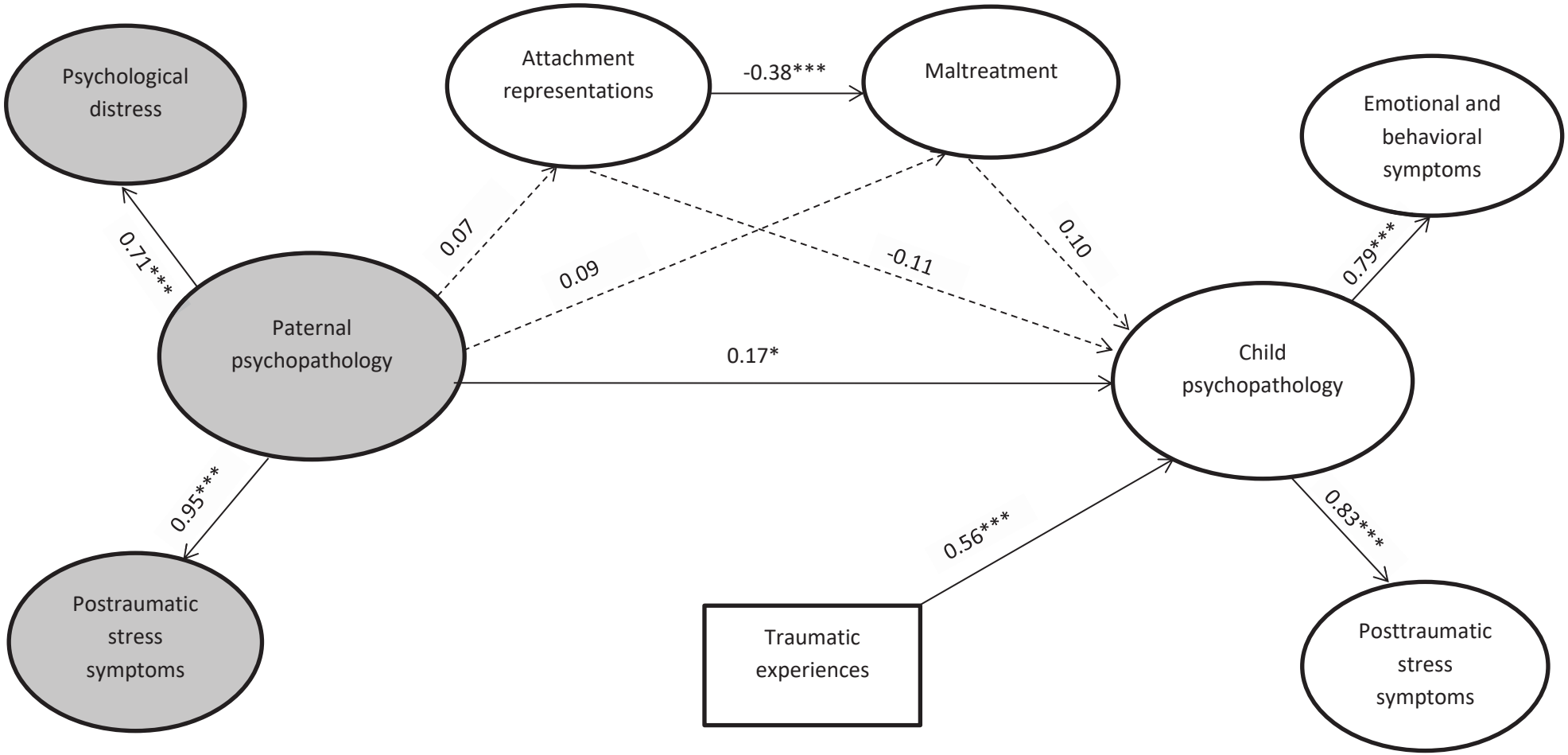
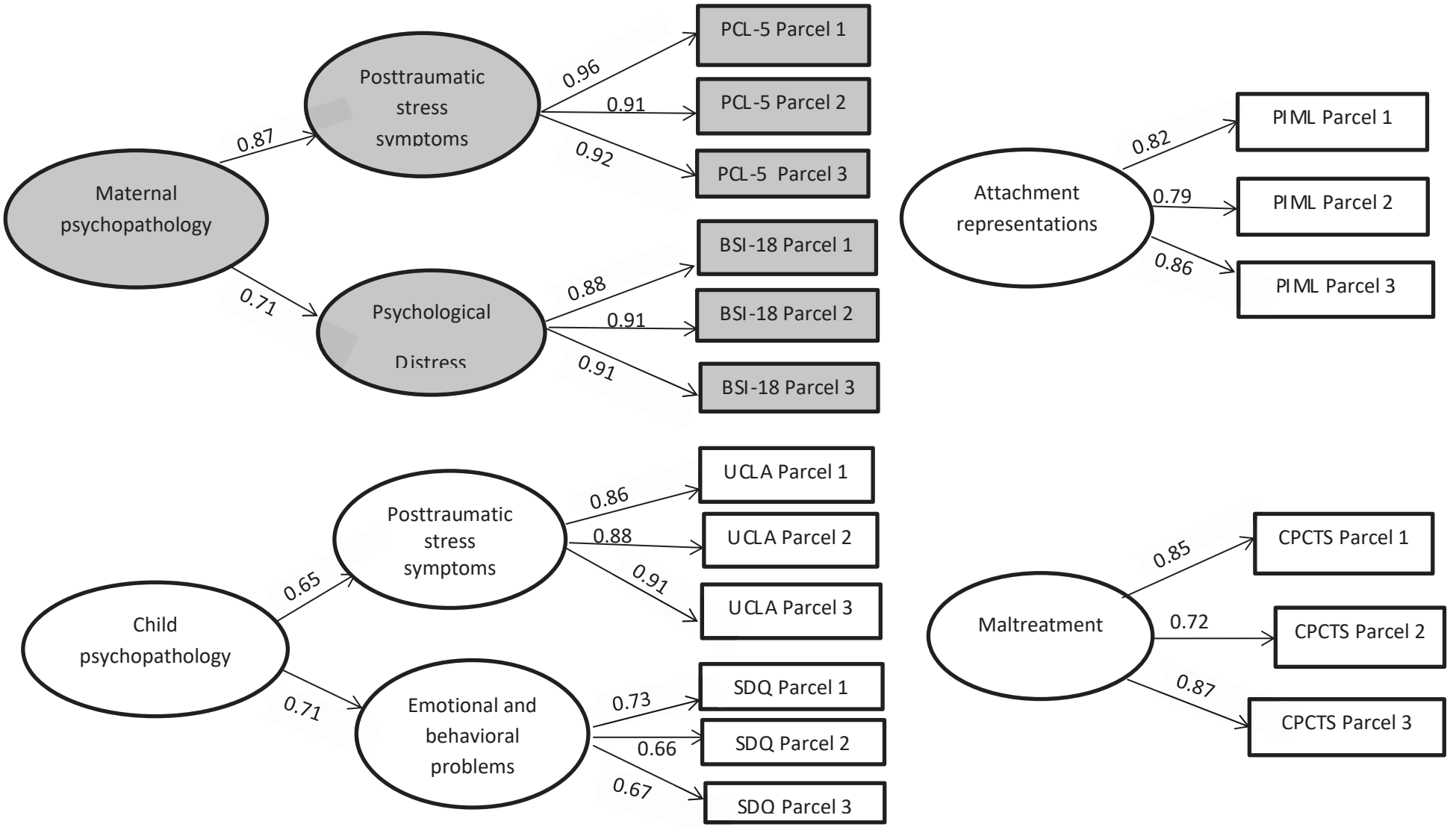
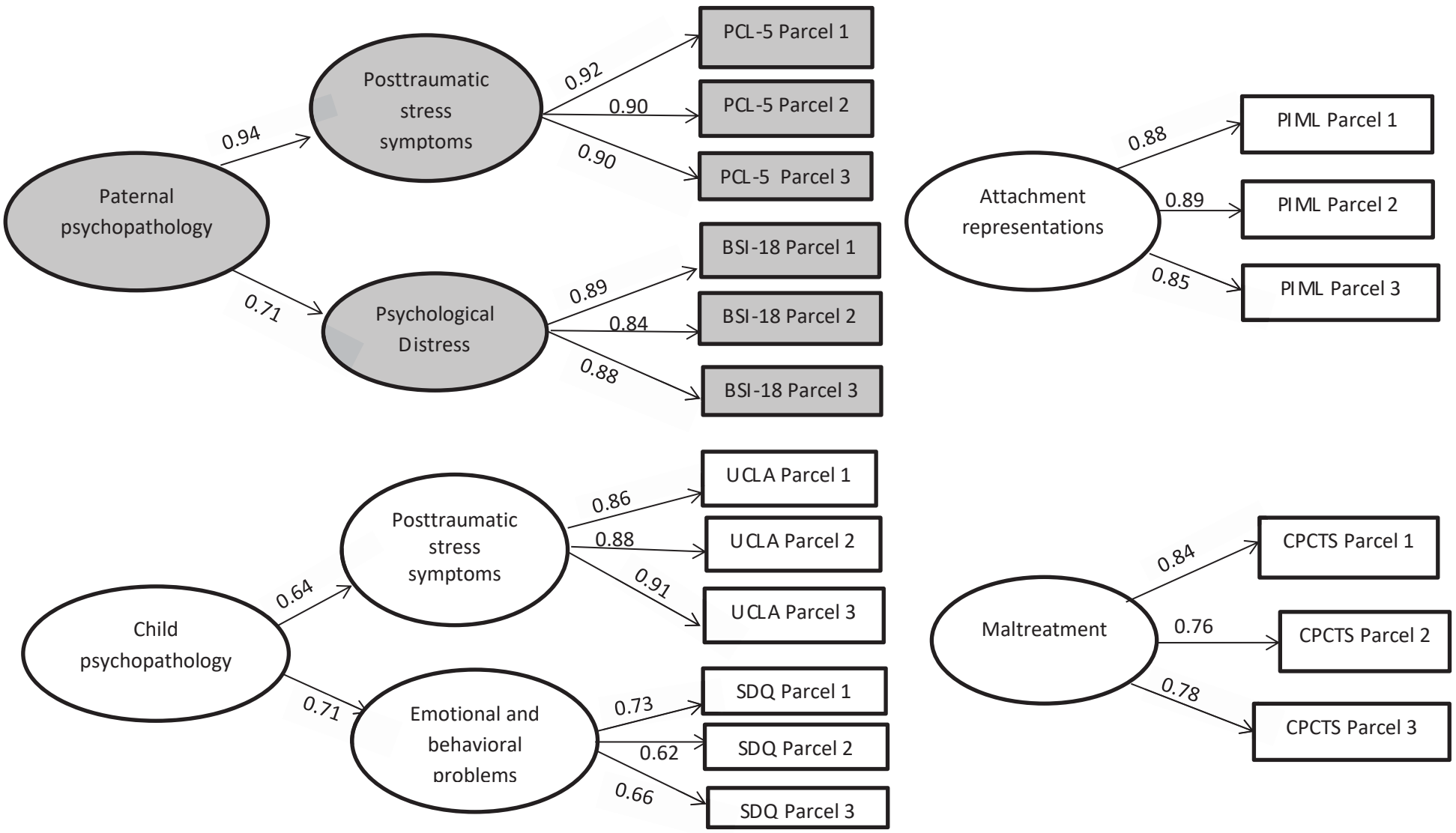



*Figure 2*. Structural model of the hypothesized relationship between paternal psychopathology (assessed with the Posttraumatic Stress Disorder (PTSD) Checklist for the fifth edition of the *Diagnostic and Statistical Manual of Mental Disorders* (DSM-5) and the Brief Symptom Inventory-18), attachment (assessed with the People in My Life Questionnaire), maltreatment (assessed with the Parent-Child Conflict Tactic Scales) and child psychopathology (assessed with the UCLA Child/Adolescent PTSD Reaction Index for DSM-5 and the Strengths and Difficulties Questionnaire). There is a direct effect of paternal psychopathology on child psychopathology, yet there are no indirect effects through attachment or maltreatment. Model fit was good: $\chi^2$ [174] = 272.722, $p < 0.001$; CFI = 0.96; TLI = 0.96; RMSEA = 0.050, 90% CI [0.038 – 0.061]; SRMR = 0.065. Standardized estimates are shown. The covariates child sex and age are not shown. Dashed lines indicate nonsignificant effects. Variables marked grey are based on father report. Latent variables are represented by item parcels as indicators (see Supplementary Figure A for details) ***$p < 0.001$, **$p < 0.01$, *$p < 0.05$.


Maternal psychopathology
0.87
0.71
Posttraumatic stress symptoms
Psychological Distress
0.96
0.91
0.92
0.88
0.91
0.91
PCL-5 Parcel 1
PCL-5 Parcel 2
PCL-5 Parcel 3
BSI-18 Parcel 1
BSI-18 Parcel 2
BSI-18 Parcel 3
Attachment representations
0.82
0.79
0.86
PIML Parcel 1
PIML Parcel 2
PIML Parcel 3
Child psychopathology
0.65
0.71
Posttraumatic stress symptoms
Emotional and behavioral problems
0.86
0.88
0.91
0.73
0.66
0.67
UCLA Parcel 1
UCLA Parcel 2
UCLA Parcel 3
SDQ Parcel 1
SDQ Parcel 2
SDQ Parcel 3
Maltreatment
0.85
0.72
0.87
CPCTS Parcel 1
CPCTS Parcel 2
CPCTS Parcel 3


Paternal psychopathology
0.94
0.71
Posttraumatic stress symptoms
Psychological Distress
0.92
0.90
0.90
0.89
0.84
0.88
PCL-5 Parcel 1
PCL-5 Parcel 2
PCL-5 Parcel 3
BSI-18 Parcel 1
BSI-18 Parcel 2
BSI-18 Parcel 3
Attachment representations
0.88
0.89
0.85
PIML Parcel 1
PIML Parcel 2
PIML Parcel 3
Child psychopathology
0.64
0.71
Posttraumatic stress symptoms
Emotional and behavioral problems
0.86
0.88
0.91
0.73
0.62
0.66
UCLA Parcel 1
UCLA Parcel 2
UCLA Parcel 3
SDQ Parcel 1
SDQ Parcel 2
SDQ Parcel 3
Maltreatment
0.84
0.76
0.78
CPCTS Parcel 1
CPCTS Parcel 2
CPCTS Parcel 3

Description of figures

Supplementary Figure A. Baseline measurement model for mother and child with standardized factor loadings. All factor loadings were significant at $p < 0.01$. $\chi^2$ [127] = 177.266, p < 0.01; CFI = 0.98; TLI = 0.98; RMSEA = 0.042, 90% confidence interval (CI) [0.026 – 0.056]; SRMR = 0.055. Variables marked grey are based on mother report. PCL-5: PTSD Check List for DSM-5; BSI-18: Brief Symptom Inventory-18.; UCLA RI: University of California at Los Angeles Child/Adolescent PTSD Reaction Index for DSM-5; SDQ: Strengths and Difficulties Questionnaire; CPCTS: Child-Parent Conflict Tactic Scales; PIML: People In My Life.

Supplementary Figure B. Baseline measurement model for father and child with standardized factor loadings. All factor loadings were significant at $p < 0.01$. $\chi^2$ [127] = 167.401, p < 0.01; CFI = 0.98; TLI = 0.98; RMSEA = 0.038, 90% CI [0.019 – 0.052]; SRMR = 0.051. Variables marked grey are based on father report. PCL-5: PTSD Check List for DSM-5; BSI-18: Brief Symptom Inventory-18.; UCLA RI: University of California at Los Angeles Child/Adolescent PTSD Reaction Index for DSM-5; SDQ: Strengths and Difficulties Questionnaire; CPCTS: Child-Parent Conflict Tactic Scales; PIML: People In My Life.

BSI-18 Parcel 1 consists of BSI-18 items 1, 2, 3, 10, 11 and 12; BSI-18 Parcel 2 consists of BSI-18 items 4, 5, 6, 13, 14, 15 and 16; BSI-18 Parcel 3 consists of BSI-18 items 7, 8, 9, 16, 17, 18; PCL-5 Parcel 1 consists of PCL-5 items 1, 4, 7, 10, 13, 16 and 19; PCL-5 Parcel 2 consists of PCL-5 items 2, 5, 8, 11, 14 , 17 and 20; PCL-5 Parcel 3 consists of PCL-5 items 3, 6, 9, 12, 15 and 18; UCLA Parcel 1 consists of UCLA items 3, 9, 11, 17, 18, 19, 20, 25 and 28; UCLA Parcel 2 consists of UCLA items 6, 8, 10, 12, 14, 16, 23, 26, 27 and 29; UCLA Parcel 1 consists of UCLA items 1, 2, 4, 5, 7, 13, 15, 21, 22, 30 and 31; SDQ Parcel 1 consists of SDQ items 2, 6, 8, 12, 19, 21 and 24; SDQ Parcel 2 consists of SDQ items 5, 10, 11, 13, 18, 23 and 25; SDQ Parcel 1 consists of SDQ items 3, 7, 14, 15, 16 and 22; PIML Parcel 1 consists of PIML items 2, 5, 8, 9 and 12; PIML Parcel 2 consists of PIML items 3, 6, 10, 13 and 15; PIML Parcel 3 consists of PIML items 1, 4, 7, 11 and 14; CPCTS Parcel 1 consists of CPCTS items F, G, I, O, U, P, NA and ND; CPCTS Parcel 2 consists of CPCTS items C, I, N, M, R, T, NB and NE; CPCTS Parcel 3 consists of CPCTS items D, H, J, K, S, V and NC.

## 9.4 Manuscript 4: Psychopathology mediates between maltreatment and memory functioning in Burundian refugee youth


### Abstract

**Background:** The detrimental impact of child maltreatment on children and adolescents` academic achievement and later socioeconomic wellbeing is well known. However, it is still unclear (1) whether maltreatment is actually linked to youth`s long- and short-term memory deficits and (2) whether potential impairments are due to maltreatment per se or related psychopathology.

**Objective:** Based on the Attentional Control Theory, we investigated a mediational model in which maltreatment would be related to psychopathology (internalizing symptoms, posttraumatic stress symptoms, posttraumatic cognitions), which would in turn be related to impaired memory functioning.

**Participants and Setting:** We drew on a sample of 155 Burundian refugee youth (aged 11 to 15) currently living in refugee camps in Tanzania and at high risk of experiencing ongoing maltreatment by parents.

**Methods:** Youth reported on their experiences of maltreatment and psychopathology in structured clinical interviews and completed visuospatial memory tasks involving a short-term and a working memory component (Corsi Block Tapping Test) and delayed recall from long-term memory (Rey-Osterrieth Complex Figure).

**Results:** Structural equation modeling showed that psychopathology mediated the association between increased maltreatment and reduced working memory capacity ($\beta$ = -.07, $p$ = 0.02), and with a trend towards mediation for short-term memory ($\beta$ = -.05, $p$ = .06). Higher levels of maltreatment, but not psychopathology, were directly linked to long-term memory deficits ($\beta$ = -.20, $p$ = .02).

**Conclusions:** Preventive efforts targeting maltreatment and interventions focusing on related psychopathology are needed to counter memory deficits and their potential negative implications for academic and socioeconomic outcomes.


*Keywords:* Child maltreatment, psychopathology, working memory, attention, refugee youth

## Introduction

Maltreatment can be defined as any threatened or actual act of physical, sexual, and emotional abuse and neglect by a parent or caregiver that harms or has the potential to harm the child`s physical, cognitive, or emotional development (Leeb et al., 2008). Children and adolescents who experienced maltreatment are at an increased risk of developing a range of psychopathology, including posttraumatic stress disorder (PTSD), internalizing problems, e.g., anxiety and depression, and externalizing problems, e.g., aggression and conduct problems (De Bellis et al., 2013; Hecker et al., 2016; Lansford et al., 2014; Palosaari et al., 2013). Moreover, maltreatment has been associated with lower levels of academic achievement that may persist into adulthood (Boden et al., 2007; Mills et al., 2019), impairing the socioeconomic well-being and livelihoods of individuals, families, communities, and societies (Currie & Widom, 2010). Low socioeconomic status (SES) and poverty, in turn, increase the risk of child maltreatment (van IJzendoorn et al., 2020) implying a vicious cycle. It is therefore of utmost importance to identify risk factors for academic achievement in the context of maltreatment.

One factor that appears to be crucial for youth`s academic outcomes is working memory. Working memory refers to the temporary maintenance and manipulation of information and is associated with neural activity in fronto-parietal brain areas particularly the dorsolateral prefrontal cortex and the parietal cortex (Chai et al., 2018). Longitudinal studies showed that working memory capacity significantly predicted higher reading ability and mathematical skills in youth (Alloway & Alloway, 2010; Christopher et al., 2012). However, memory is a wide domain and besides working memory, the concepts of short-term memory and long-term memory exist (Chai et al., 2018). Although the distinction between short-term memory and working memory is a matter of ongoing debate (Aben et al., 2012), the multi-component working memory model (Baddeley, 2000) offers a useful framework to conceptualize these memory functions: The central executive controls and coordinates the allocation of resources to two slave-systems associated with short-term storage of verbal (the phonological loop) and visuospatial information (the visuospatial sketchpad). The distinguishing feature between short-term and working memory is the amount of cognitive resources, e.g., attention that is required to solve as specific task. Findings indicate that short-term and working memory independently contribute to academic achievement (e. g. Bull et al., 2008). Long-term memory conceptually differs from the other two systems in terms of the period of time that information is stored (Aben et al., 2012). It can be further broken down into declarative memory for facts and events, which engages limbic brain structures, particularly the hippocampus, and non-declarative memory for habits and skills, which relies mainly on the cerebellum and motor cortex (Squire & Zola, 1996). Short-term and long-term memory appear to reflect related, but distinct processes that both contribute to intellectual functioning (Unsworth, 2010).

The neural substrates underlying memory functioning appear to be adversely affected by altered biological stress responses resulting from child maltreatment (Wilson et al., 2011; Young-Southward et al., 2020). Neuroimaging studies with adult victims of child maltreatment demonstrated

abnormalities in memory-related fronto-limbic brain structures, such as decreased hippocampal volumes (Hart & Rubia, 2012; Teicher et al., 2012). Neuropsychological studies revealed corresponding deficits in tasks of verbal and visual memory domains in maltreated children and adults (Irigaray et al., 2013; Kavanaugh et al., 2017; Young-Southward et al., 2020). Memory may be directly affected by maltreatment through stress-induced brain changes or indirectly through maltreatment-related psychopathology (Augusti & Melinder, 2013). Some studies suggest that memory deficits in maltreated children are not related to current PTSD symptoms (Augusti & Melinder, 2013; Biedermann et al., 2018; De Bellis et al., 2013), whereas others indicate that PTSD symptoms exacerbate memory functions above and beyond maltreatment (De Bellis et al., 2009, 2010). Similarly, studies with children exposed to war-related (Chen et al., 2019; Elbert et al., 2009) and other traumatic events (Samuelson et al., 2010; Yasik et al., 2007) have produced inconsistent evidence regarding the role of PTSD symptoms. However, a unilateral focus on clinical samples with PTSD may obscure associations between maltreatment and memory functioning by masking memory deficits owing to maltreatment per se and neglecting other common mental health sequelae of maltreatment such as internalizing, e.g. anxiety and depression, and externalizing problems, e.g. aggressive behavior (Hart & Rubia, 2012; Stover & Keeshin, 2018).

Attentional Control Theory (Eysenck et al., 2007) provides a useful theoretical framework of how psychopathology may impair performance on cognitive and specifically memory tasks by diverting attention to task-irrelevant internal (e.g., symptoms) and external (e.g., distractors) stimuli. Internalizing symptoms, such as anxious worry and depressive ruminations, are thought to interfere with the central executive`s capacity to inhibit task-irrelevant stimuli, shift attention between tasks, and update memory representations (Eysenck et al., 2007). With regard to PTSD, core symptoms such as intrusions and hypervigilance to threat can disrupt attentional control, particularly in the context of emotional cues (Fani et al., 2019; Leskin & White, 2007; Vasterling et al., 1998). Furthermore, maltreatment as a chronic interpersonal trauma may be associated with children`s negative beliefs about themselves, e.g., "*I am helpless*", and about the world, e.g., "*the world is a dangerous place*" (Meiser-Stedman et al., 2009). Such appraisals were associated with higher levels of PTSD, internalizing and externalizing symptoms in maltreated youth (Leeson & Nixon, 2011; Münzer et al., 2017). Although it is conceivable that these posttraumatic cognitions may impair memory task performance by draining the central executive`s attentional resources, their role for maltreated youth`s memory functioning has not been investigated so far. While internalizing problems, PTSD symptoms and posttraumatic cognitions appear to represent different clinical concepts (de Haan et al., 2020), they may impair memory functioning through the same underlying mechanism, i.e., by interfering with attentional resources needed to solve relevant tasks. Moreover, all these symptoms are mediated by prefrontal brain regions (Macdonald et al., 2016; Maier et al., 2012) and thus share neural substrates with short-term/working memory and attentional control (Chai et al., 2018). Therefore, it may be useful to conceptualize them as *attention-interfering symptoms* and examine their joint role in memory

functioning.

**The current study**

We aimed to investigate the mediational role of potentially attention-interfering psychopathology (internalizing problems, PTSD symptoms, posttraumatic cognitions) in the association between child maltreatment (physical and emotional abuse, neglect) and different visuospatial memory functions (short-term, working and long-term memory). We drew on a representative community sample of Burundian refugee youth living in refugee camps in Tanzania. Given the accumulation of established risk factors for child maltreatment in their social ecology, e.g., parental psychopathology, low SES and cultural acceptance of violence against children (Timshel et al., 2017), these youth could be considered at a high risk of experiencing ongoing maltreatment by parents.

In line with the prediction of Attentional Control Theory that psychopathology would impair performance especially on tasks relying on the central executive, we expected that a) psychopathology would mediate the association between maltreatment and visuospatial working memory. Considering the conceptual overlap of short-term and working memory, we also expected that b) psychopathology would mediate the association between maltreatment and visuospatial short-term memory. However, we also hypothesized that c) psychopathology would have a stronger effect on working memory compared to short-term memory. Studies using delayed recall of verbal and visual information have produced mixed findings as to whether children with internalizing symptoms are impaired in long-term memory (Günther et al., 2004; Toren et al., 2000). Moreover, studies with children and adults suggest that PTSD is not related to memory retrieval when controlling for initial learning (Samuelson et al., 2010; Vasterling et al., 1998). Given this inconsistent evidence, we did not have directed a priori hypotheses regarding the link between maltreatment, psychopathology and visuospatial long-term memory.

## Methods

**Sampling and procedures**

The present study utilized a sub-sample of a larger cohort of refugee children and adolescents who took part in a research project on refugee families` mental health carried out in three large refugee camps in Western Tanzania. The families had fled political violence in neighboring Burundi starting in 2015. Children and both of their parents or primary caregivers had been recruited using a combined systematic and random sampling approach (for more details see Author Citation, 2019). The study purpose, associated risks, and participants` rights were thoroughly explained to families in oral and written form. Each family member provided their informed consent through signature or fingerprints. All but two families agreed to participate. Structured clinical interviews were conducted individually with children and parents in a discrete setting by Tanzanian masters-level psychologists as well as research assistants from the refugee community who had been trained as interviewers or interpreters prior to data collection (Author Citation, 2019). After the interviews, the families received 8 USD in

cash. The study was approved by the Ethics Commission of the University of xxx (No. xxx) and the National Institute for Medical Research in Tanzania (No. xxx).

**Participants**

The sub-sample (n = 155, 72 girls) utilized for the present investigation comprised all adolescents between 11 and 15 years currently attending school and without a medical condition potentially impairing their memory test performance (e.g., sight problems, epilepsy; cf. Table 1).

**Instruments**

The test instructions and measures were translated from English to Swahili (or existing Swahili versions of measures were used) using blind-back translation (Brislin et al., 1973).

*Short-term and working memory.* The Corsi Block Tapping Task (CBTT) has been extensively used to assess visuospatial memory both in clinical and experimental studies (Berch et al., 1998). In the first stage (CBTT forward), the child was required to copy sequences of black blocks fixed on a wooden board (see Supplementary File 1 for details on the apparatus and instructions) in the same order as shown by the interviewer, providing an indicator for visuospatial short-term memory capacity. In the second stage (approximately 15 minutes later), the child was asked to reproduce block sequences in reversed order (CBTT backward), which is considered an indicator of visuospatial working memory due to the parallel demands of storing and manipulating the sequences (Bull et al., 2008). In both versions, the number of correctly reproduced sequences was used as an index of memory capacity. Being independent of educational level and technical equipment, the CBTT has shown to be a feasible and economic assessment of memory (Hecker et al., 2016).

*Long-term memory.* The Rey-Osterrieth Complex Figure (ROCF; Waber & Holmes, 1985) is a widely-used assessment of visuospatial memory within declarative memory. The task involves copying a complex geometrical figure and then reproducing it from memory either immediately, after a delay, or both (Shin et al., 2006). We administered the ROCF according to the procedure described by Waber and Holmes (1985; cf. Supplementary File 1). Approximately 25 minutes after the copy trial, children were asked to draw the figure from memory. The copied and recalled figures were each scored according to the criteria by Meyers and Meyers (1995), which break down the ROCF into 18 units and rate each unit`s accuracy and placement by 0, 0.5, 1 or 2 points, resulting in possible scores between 0 and 36. Ratings were done by two independent raters and intraclass correlations (ICC) were excellent (ICC = .97) for the copy score and good (ICC = .70) for the recall score (Cicchetti, 1994). We calculated a memory quotient consisting of the sum of the copy and recall score, divided by the copy score and multiplied by 100.

*Exposure to war-related trauma.* Youth reported on their exposure to different war-related traumatic events (e.g., physical injury, sexual assault, dangerous flight) on a checklist of 22 items with a dichotomous *yes* (1)/*no* (0) response scale (Neuner et al., 2004). The sum score of all items was used for analyses.

*Child maltreatment.* Maltreatment by parents was assessed using the Parent-Child Conflict Tactic Scales (CTSPC; Straus et al., 1998). Children reported on the frequency of specific acts of physical abuse, emotional abuse, and neglect by each parent within the past year over 23 items with a 7-point Likert scale (0 = *never happened* to 6 = *more than 20 times per year*). Mothers` and fathers` scores were summed up to receive a total score of parental maltreatment. The CTSPC have previously been used successfully in Sub-Saharan Africa (Nkuba et al., 2018). Internal consistency of the maltreatment scale was α = .89.

*Internalizing problems.* The Strengths and Difficulties Questionnaire (SDQ; Goodman et al., 2000) is a widely-used instrument to screen for children`s and adolescents` emotional and behavioral problems within the past 6 months. The items are rated on a 3-point Likert scale with the response categories *not true (0)*, *somewhat true (1),* or *certainly true (2)*. The SDQ has been previously utilized in Sub-Saharan Africa (Hoosen et al., 2018). For the analysis, the five items of the *emotional problems* subscale were used, which has shown good concurrent validity with other established self-report measures of internalizing problems (Muris et al., 2003). The sum score had a low internal consistency (α = .56), which is however comparable to other studies (Hoosen et al., 2018) and can be partly explained by the low number of items.

*PTSD symptoms.* The University of California at Los Angeles Child/Adolescent PTSD Reaction Index for DSM 5 (UCLA-RI-5; Pynoos & Steinberg, 2015) covers the PTSD symptom clusters according to DSM 5 (American Psychiatric Association, 2013). The 31 items are rated according to the occurrence of each symptom within the last month on a 5-point Likert scale ranging from *none of the time* (0) to *most of the time* (4).The UCLA-RI-5 has shown good psychometric properties and has been used in various cultural settings (Doric et al., 2019; Takada et al., 2018). Internal consistency of the sum score was high in our sample (α = .91).

*Posttraumatic cognitions.* The 10-item short form (McKinnon et al., 2016) of the Child Posttraumatic Cognition Inventory (CPTCI; Meiser-Stedman et al., 2009) is a self-report measure to assess negative cognitions about the self and the world following a traumatic event. The 10 items are rated on a 4-point Likert scale from *Don`t agree at all* (0) to *Agree a lot* (3). Both the short and original versions of the CPTCI have demonstrated good psychometric properties (McKinnon et al., 2016; Meiser-Stedman et al., 2009). Internal consistency of the sum score was good in our sample (α = .85). Although past studies (Hitchcock et al., 2015; Münzer et al., 2017) often referred the CPTCI items to a single trauma or the worst maltreatment experience, we referred the CPTCI items more generally to children`s frightening experiences due to our sample`s high rate of exposure to trauma and maltreatment.

**Data analysis**

All descriptive analyses were conducted with IBM SPSS Statistics Version 25. A total of 154 children (one excluded due to incorrect administration) provided CBTT data, and 153 children (two excluded due to refusal and early termination of the task) provided ROCF data for further analysis. There were no missing values in relevant study variables. We tested three structural equation models (SEM) with

child maltreatment as predictor, children`s attention-interfering psychopathology as mediator and the respective memory function as criterion using the package *lavaan* (Rosseel, 2012) implemented in the statistical environment R (R Core Team, 2019). Statistical fit of the models was indicated by a Comparative Fit Index (CFI) ≥ 0.95, a non-significant Root Mean Square Error of Approximation (RMSEA) ≤ 0.06 and a Standardized Root Mean Squared Residual (SRMR) ≤ 0.08 (Hu & Bentler, 1999). Psychopathology was modeled as a second-order latent construct with the first-order latent factors internalizing problems (represented by the individual items of the SDQ emotional problems subscale), PTSD symptoms (represented by the individual sum scores of the five symptom clusters in the UCLA-RI-5) and posttraumatic cognitions (represented by three parcels containing the CPTCI items). Item parcels were created randomly given the unidimensionality of the CPTCI in our sample (Little et al., 2013). The latent variables were allowed to co-vary with one another and their variances were fixed to unity. The loadings of the first-order factors internalizing problems and posttraumatic cognitions on the second-order factor psychopathology were constrained. The resulting measurement model showed a good fit (CFI = 0.98, RMSEA = 0.038, p = .76, 90%-CI [0.00–0.063], SRMR = 0.067) and all factor loadings were significant at the level p < .01. Child maltreatment and memory functions were modeled as observed variables in the SEM represented by the respective sum scores.

To test the first two hypotheses, we examined the significance of the respective indirect effects, i.e., the product of the associations between maltreatment and psychopathology and between psychopathology and short-term/working memory capacity (Mackinnon et al., 2002). To compare the relative impact of attention-interfering psychopathology on short-term and working memory, we checked whether the 95% confidence intervals around the respective standardized regression coefficients overlapped (Cumming, 2009). Preliminary analyses indicated that only the ROCF memory score deviated from normality according to West, Finch and Curran (1995). Thus, maximum likelihood estimation (MLE) was applied to the short-term and working memory models and MLE with robust standard errors and Satorra-Bentler scaled test statistic was used to estimate the long-term memory model. All other statistical assumptions were met and there were no outliers. Age, gender, educational level, and children`s exposure to war-related trauma were included as covariates. All analyses used a two-tailed α = .05.

## Results

Descriptive statistics are displayed in Table 1. Partial correlations between study variables under control of war exposure, age, gender and class are shown in Table 2. The models for short-term, working and long-term memory demonstrated reasonable fit (see Figure 1). Across models, higher levels of parental abuse and neglect within the past year were significantly associated with higher levels of attention-interfering psychopathology including internalizing problems, PTSD symptoms and negative cognitions about the self and the world ($\beta$ = .25/.26, $p$ = .001). More psychopathology, in turn, was significantly linked to reduced working memory capacity (β = -.26, 95% CI [-0.271, -0.245],

p = .002) resulting in a significant indirect effect, $\beta$ = -.07, $p$ = 0.02. Although the indirect effect marginally failed statistical significance ($\beta$ = -.05, $p$ = .06), more attention-interfering psychopathology was also significantly related to lower short-term memory capacity (β = -.20, 95% CI [-0.216, -0.188], p = .02). The confidence intervals around the standardized regression coefficients of the associations between psychopathology and short-term respectively working memory did not overlap, indicating a significant difference.

Contrary to the models for short-term and working memory, attention-interfering psychopathology was not associated with delayed recall from long-term memory ($\beta$ = .05, $p$ = .56). However, more severe maltreatment by parents was significantly related to poorer long-term memory performance ($\beta$ = -.20, $p$ = .02), resulting in a significant total effect ($\beta$ = -.19, $p$ = .02). As we were also interested in the possibility that psychopathology was associated with encoding of information rather than its retrieval, we analyzed the mediational model with the ROCF copy performance as dependent variable (see Supplementary Figure A). Neither maltreatment ($\beta$ = -.04, $p$ = .60) nor attention-interfering psychopathology ($\beta$ = -.04, $p$ = .64) were associated with encoding for delayed recall in the ROCF copy trial.

## Discussion

This study investigated the mediational role of attention-interfering psychopathology in the association between maltreatment and different memory functions (short-term, working and long-term memory) in a sample of Burundian refugee youth with an increased risk of exposure to ongoing maltreatment. Higher levels of maltreatment by parents were indirectly related to lower short-term and working memory capacity through increased levels of internalizing problems, PTSD symptoms and maladaptive cognitions about themselves and the world. However, a direct link between more severe maltreatment and poorer long-term memory was observed.

The findings suggest that psychopathological symptoms interfered with the attentional resources the adolescents needed to perform well on the short-term and working memory component of the CBTT, which is in line with the prediction of Attentional Control Theory (Eysenck et al., 2007). Our finding is also consistent with a previous study showing that internalizing symptoms mediated the association between harsh discipline and working memory capacity as measured by the CBTT in a sample of Tanzanian school children (Hecker et al., 2016). As hypothesized based on the Attentional Control Theory, psychopathology had a relative stronger effect on working compared to short-term memory. This suggests that interference by psychopathology was greater in the executively more demanding working memory task, which is consistent with previous studies using tasks with a short-term and working memory component (Eysenck et al., 2005; Franklin et al., 2010; Opris et al., 2019). The finding also supports the idea of short-term and working memory as conceptually overlapping functions that differ in the amount of required attentional resources (Aben et al., 2012; Baddeley, 2000). Overall, our findings are in line with a robust body of research documenting visuospatial short-

term and working memory deficits in clinical and community samples of children and adolescents with internalizing problems (Blanken et al., 2017; Moran, 2016; Owens et al., 2012; Vasa et al., 2007).

To our knowledge, our study is the first to examine independent associations between maltreatment, psychopathology and different memory functions in a community sample of adolescents. On the one hand, this makes it difficult to compare our findings with existing studies, which have mostly used group designs, included clinical samples with PTSD or focused on only one memory domain (e. g. Augusti & Melinder, 2013; Beers & De Bellis, 2002; De Bellis et al., 2013). On the other hand, our study may help to reconcile the inconsistent evidence produced by these studies by suggesting that both the level of psychopathology and the specific memory function need to be taken into account when examining links between maltreatment and memory.

From a neurobiological perspective, the pattern of associations between attention-interfering psychopathology and short-term/working memory capacity is consistent with the overlap of the respective underlying neural substrates in the pre-frontal cortex (Chai et al., 2018; Macdonald et al., 2016). Retrieval from long-term memory, however, is processed mainly by the hippocampus in the medial temporal lobe. Although a strict functional and neural dissociation between short-term/working and long-term memory can be questioned (Jeneson & Squire, 2012), the smaller overlap in the underlying neural circuits may explain the lack of an association between psychopathology and long-term memory.

**Practical and clinical implications**

Given the important role of memory functioning for intellectual and academic outcomes (Bull et al., 2008; Unsworth, 2010), our findings suggest that maltreatment not only incurs suffering in terms of psychopathology, but may also impede youth`s academic progress with potentially adverse consequences for their socioeconomic well-being in later life. Thus maltreatment may impair the livelihoods of whole families and communities and contribute to further destabilization of already fragile and poor regions, underscoring the need for collective measures on individual and structural levels. In order to break a vicious cycle of poverty and violence, practical efforts should therefore focus on preventing maltreatment by targeting established risk factors such as SES and the parent-child relationship (van IJzendoorn et al., 2020). In our East-African refugee sample, parents` own trauma-related psychopathology (Timshel et al., 2017) and normative beliefs about violence against children (Hecker et al., 2016) may also be relevant factors. A recent pilot randomized controlled trial of a parenting intervention for Syrian refugee families in Lebanon reported preliminary positive effects on parents` and children`s well-being and parenting skills (Miller et al., 2020). On the other hand, interventions should aim at treating mental health sequelae of maltreatment and trauma that can impair memory functioning by interfering with children`s attentional resources. Cognitive-behavioral approaches may be especially suitable to tackle symptoms such as anxious worry and posttraumatic cognitions, and have shown promising first results for trauma-exposed youth in low-income settings (O'Callaghan et al., 2013).

**Limitations**

Some limitations, however, require discussion. First, although the neuropsychological tests provided a feasible and economical assessment of different visuospatial memory functions of children living in refugee camps, the results are not generalizable to other populations and should be replicated using these and similar established instruments in other samples. While we realize that our Burundian refugee sample is highly specific, it also gave us the unique opportunity to investigate the links between maltreatment, psychopathology and memory functioning in a context in which violence against youth is still highly normative and could be considered as ongoing risk to youth`s mental health and cognitive functioning. Second, given our cross-sectional design, the direction of mediation effects must be interpreted with caution. Longitudinal studies are needed to investigate the interplay of maltreatment, mental health, and memory functioning over time. Third, we were not able to provide completely standardized conditions for our neuropsychological assessment, which may be considered a trade-off for an increased ecological validity of our field setting. Fourth, the specific role of sub-types of psychopathology and maltreatment for memory functioning may have been masked by our conceptualization of these constructs. Fifth, we did not consider other factors that potentially impact the cognitive development of refugee children living in resource-poor camps, such as extreme poverty. Finally, and sixth, we retrospectively assessed the frequency of children`s self-reported maltreatment experiences within the past year, which may be prone to biases associated with recall and social desirability.

In sum, our findings suggest that the consequences of child maltreatment on individuals` educational progress and socioeconomic wellbeing may be in part due to deficits in short-term, working and long-term memory. In order to support refugee youth`s adaptation to host societies and to improve their socioeconomic prospects, maltreatment and its mental health sequelae should be reduced and prevented.

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**Table 1.** Description of sample characteristics and study variables

| | Adolescents (n = 155) |
|---|---|
| Age, M (SD) | 13.01 (1.18) |
| Educational level, % (n) | |
| Class 1 and 2 (Primary) | 23.9 (37) |
| Class 3 and 4 | 39.3 (61) |
| Class 5 and 6 | 32.2 (50) |
| Class 7 and 8 (Secondary) | 4.5 (7) |
| Lives with, % (n) | |
| Both biological parents | 83.8 (130) |
| One biological parents | 8.4 (13) |
| Relatives (e. g. uncle, sister) | 3.9 (6) |
| Other people (e. g. foster parents) | 3.9 (6) |
| Orphan (half or full orphan), % (n) | 11.6 (18) |
| Study variables, M (SD, range) | |
| Short-term memory (CBT forward) | 6.61 (2.72, 0 – 13) |
| Working memory (CBT backward) | 4.43 (2.78, 0 – 14) |
| Long-term memory (ROCF) | 192.53 (51.89, 115.15 – 500.00) |
| Exposure to war-related trauma | 4.01 (3.77, 0 -16) |
| Child maltreatment (CTSPC) | 82.91 (83.80, 0 – 446.00) |
| Emotional problems (SDQ) | 4.22 (2.31, 0 -10) |
| PTSD symptoms (UCLA-RI-5) | 15.07 (11.41, 0 - 49) |
| Posttraumatic cognitions (CPTCI) | 6.97 (6.72, 0 – 24) |

CBT, Corsi Block Tapping Test; ROCF, Rey-Osterrieth Complex Figure; CTSPC, Child-Parent Conflict Tactic Scales; SDQ, Strengths and Difficulties Questionnaire; UCLA-RI-5, The University of California at Los Angeles Child/Adolescent PTSD Reaction Index for DSM 5CPCTI, Child Posttraumatic Cognitions Inventory.

**Table 2.** Partial correlations between study variables

| | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
|---|---|---|---|---|---|---|---|
| 1. Maltreatment (CTSPC) | - | | | | | | |
| 2. Emotional problems (SDQ) | .15* | - | | | | | |
| 3. PTSD symptoms (UCLA-RI) | .27** | .23** | - | | | | |
| 4. Posttraumatic cognitions (CPTCI) | .14* | .36*** | .53*** | - | | | |
| 5. Short-term memory (CBTT forward) | -.02 | -.10 | .05 | -.05 | - | | |
| 6. Working memory (CBTT forward) | -.05 | -.15* | .01 | -.17* | .51*** | - | |
| 7. Long-term memory (ROCF) | -.20** | -.03 | -.04 | -.08 | -.14 | -.10 | - |

Note: Partial correlations controlling for war exposure, age, gender and educational level.

$^{***}p < 0.001$, $^{**}p < 0.01$, $^{*}p < 0.05$

CTSPC, Parent Child Conflict Tactic Scales; SDQ, Strengths and Difficulties Questionnaire; UCLA-RI, The University of California at Los Angeles Child/Adolescent PTSD Reaction Index for DSM 5; CPTCI, Child Posttraumatic Cognitions Inventory; CBTT, Corsi Block Tapping Test; ROCF, Rey-Osterrieth Complex Figure.

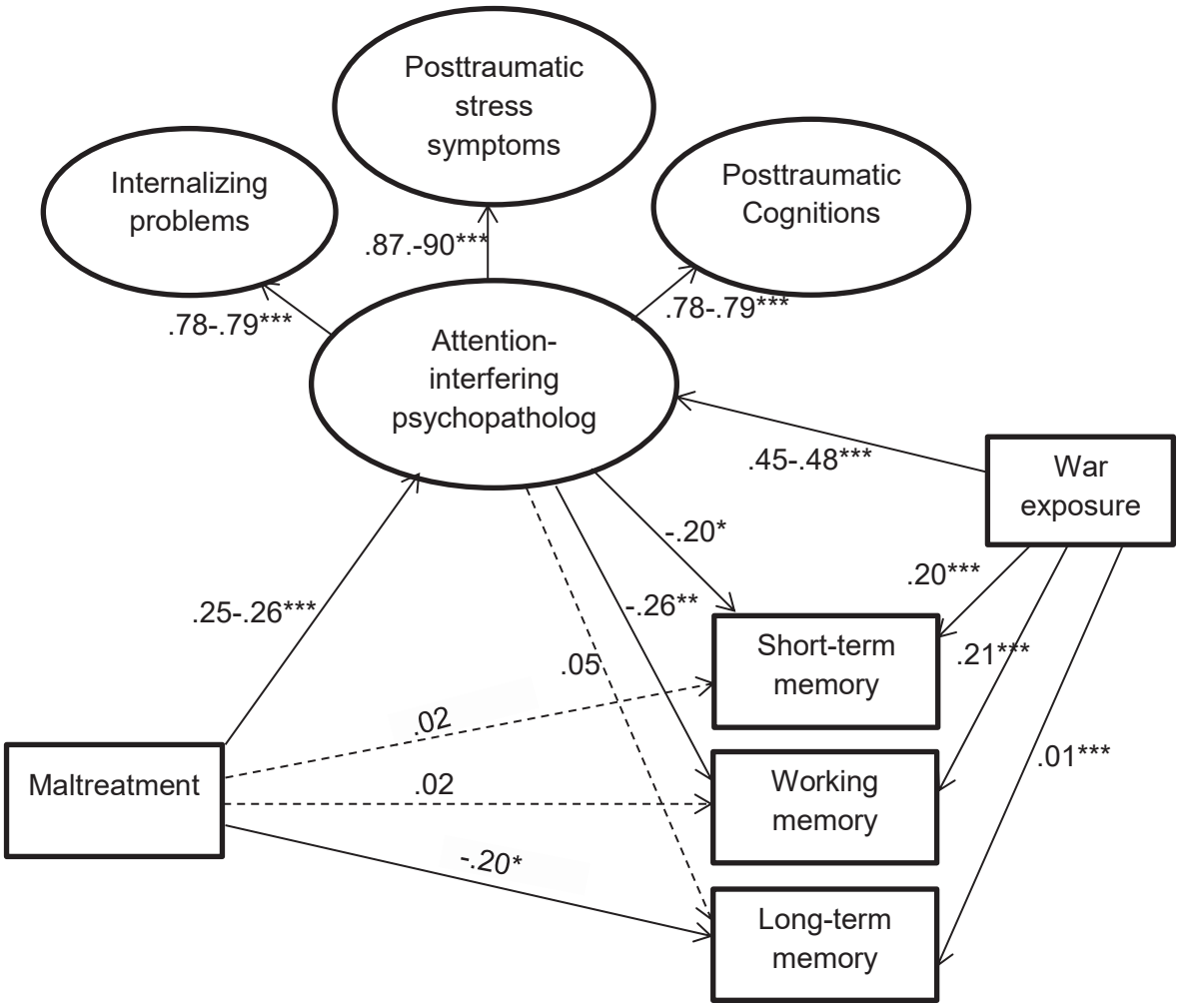


**Figure 1:** Structural equation modeling results for the associations between maltreatment, psychopathology and memory functioning. The three structural equation models for each memory function are displayed in one figure for improved clarity. There was a significant indirect effect of maltreatment on working memory via psychopathology ($\beta$ = -0.066, $p$ = 0.023) and a trend towards a significant indirect effect of maltreatment on short-term memory via psychopathology ($\beta$ = -0.052, $p$ = 0.057). There was a significant direct and total effect of maltreatment on long-term memory ($\beta$ = -0.187, $p$ = 0.016). The covariates age, gender and class are not shown. Dashed lines indicate nonsignificant effects. *** $p \leq 0.001$, ** $p \leq 0.01$, * $p \leq 0.05$.

Model fit (short-term memory): Comparative Fit Index (CFI) = 0.95, Root Mean Square Error of Transformation (RMSEA) = 0.048 (p = .58), Standardized Root Mean Square Residual (SRMR) = 0.067 (n = 154).

Model fit (working memory): CFI = 0.95, RMSEA = 0.045 (p = .65), SRMR = 0.067 (n = 154).

Model fit (long-term memory): CFI = 0.96, RMSEA = 0.039 (p = .82), SRMR = 0.064 (n = 153).

**Supplementary File 1: Materials and instructions for memory testing**

**Corsi Block Tapping Task (CBTT)**

As described by Milner (1971), the apparatus consisted of nine 2.25 $cm^3$ black blocks that were randomly arranged on and fixed to a 23 x 28 cm wooden board. The blocks were numbered on one side and were only visible to the interviewer. In the first application of the task (CBTT forward), the child was asked to reproduce block tapping sequences in the same order as shown by the interviewer. We used the following child-friendly introduction (see: Hecker et al., 2016): *"Now we are going to play a game. Imagine that my finger* (showing the forefinger) *is a little monkey. He is called Eddy. The board between us* (pointing at the board) *is the forest where the monkey lives and these blocks* (pointing at the blocks) *are the trees. You and the monkey are together in the forest. He jumps from one tree to the other. For example he jumps this way:"* (The interviewer was pointing at the sequence 3 – 1 – 2). *"When he has arrived, you have to follow him. You jump on the same trees as he did, in the same order as he did. Now try to follow the monkey the way he just went* (child points at the blocks 3 – 1 – 2).*""Right. Now the monkey begins with a way of three trees. If you can follow him, he will jump on more trees. Did you understand that? ... Now we start."*

In the second part of the task, the child was asked to reproduce the block sequences shown by the interviewer in the reversed order (CBTT backward). Here the following introduction was used: *Do you remember this game as well? Now we will play the game differently. Our monkey Eddy jumps from tree to tree, but when he has arrived, he doesn't remember the way back. You have to show him the way back."* (The interviewer is pointing at the sequence 3 – 1 – 2) *"Now show him the way back."* (Child points at the blocks 2 – 1 – 3) *"Right. Again the monkey begins with a path of three trees. If you can show him the way back, he will jump on more trees. Did you understand that? ... Now we start."* In both task applications, the interviewer made sure that she or he touched the blocks with the index finger at a rate of 1 block per second with no pause between the individual blocks. Starting with a sequence of 3 blocks, the sequences increased by one block after every three trials until the child failed to reproduce three consecutive trials.

***References:***

Hecker, T., Hermenau, K., Salmen, C., Teicher, M., & Elbert, T. (2016). Harsh discipline relates to internalizing problems and cognitive functioning: findings from a cross-sectional study with school children in Tanzania. *BMC Psychiatry*, *16*, 118. https://doi.org/10.1186/s12888-016-0828-3

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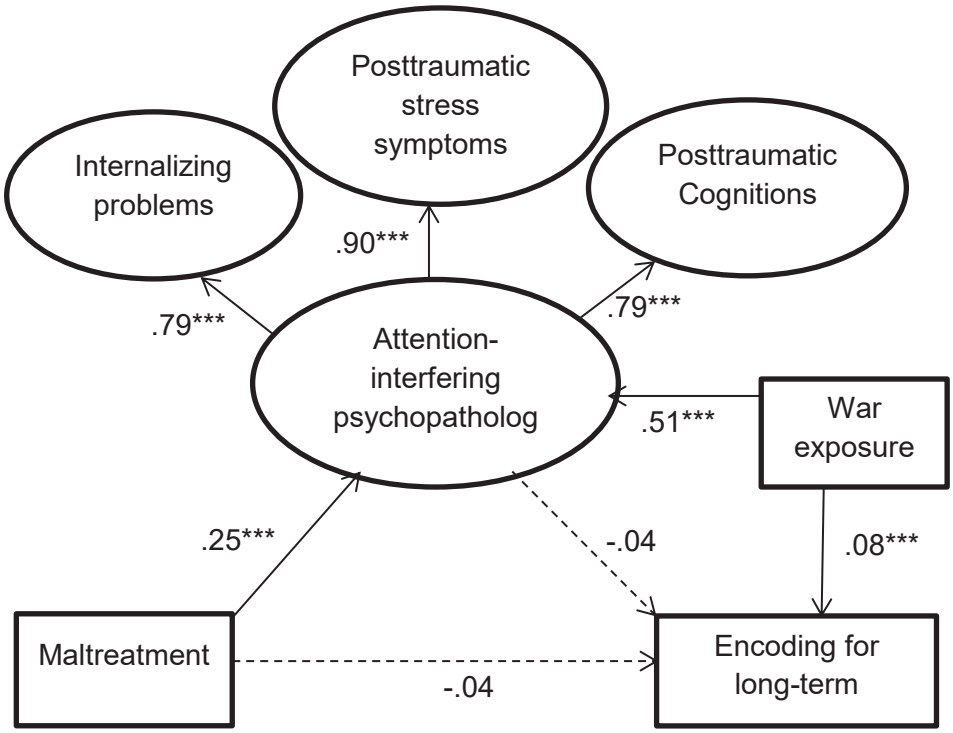
**Rey-Osterrieth Complex Figure (ROCF)**

The following instructions were used to introduce the ROCF task to the child: *"Now you can draw something. Do you like drawing?"* The ROCF with a base rectangle of 8 x 5.5 cm was displayed on a 20 x 15 cm white card and presented to the child horizontally, with the diamond to the extreme right. The child was provided a piece of white paper measuring 21 x 29.7 cm and five colored pencils (blue, green, orange, purple, red). The paper was also placed in a horizontal position. The child was instructed to copy the figure as accurately as possible starting with a designated color and to change the color after every 30 seconds: *"Please copy this figure as best as you can on your empty sheet of paper. Be careful that the lines in your copy are like the ones in the figure. You can start with a color I tell you. I will tell you when to take another color.*" This color coding was used in order to be able to retrieve the sequence in which the parts of the figure were copied. After all colors were used in the 150 seconds provided for the task, the child was asked to stop copying the figure and to look at the figure carefully one more time because they would be asked to draw it again later ("*Please be sure to remember this figure because I will ask you to draw it again later from memory")*. After an interval of 25 minutes that consisted of two other tasks and a break, the child was asked to draw the ROCF from memory on a piece of white paper using one color: "*I hope you remember the figure that you copied some time ago. Now I would like you to draw the figure again out of memory. You have 5 minutes and I will tell you when half of the time is over."* For the recall trial, the same order of colors as in the copy trial was used, but colors were changed after 1 minute. If necessary, the child was told to stop after 5 minutes.




Supplementary Figure A: Structural equation model for the associations between maltreatment, psychopathology and encoding for long-term memory in the Rey-Osterrieth Complex Figure copy trial. Model fit: Comparative Fit Index = 0.96, Root Mean Square Error of Estimation = 0.041 (p = .78), Standardized Root Mean Residual = 0.066 (n = 153). The covariates age, gender and class are not shown. Dashed lines indicate nonsignificant effects. *** $p \leq 0.001$, ** $p \leq 0.01$, * $p \leq 0.05$.

## 9.5 Manuscript 5: A socio-ecological analysis of risk, protective and promotive factors for the mental health of Burundian refugee children living in refugee camps

**Abstract**

Children`s and adolescents` mental health risk and resilience arise from a complex interplay of factors on several socio-ecological levels. However, little is known about the factors that shape the mental health of refugee youth living in refugee camps close to ongoing conflict. We conducted a cross-sectional study with a representative sample of 217 Burundian refugee children aged 7 to 15 and their mothers residing in refugee camps in Tanzania to investigate associations between risk, protective and promotive factors from various ecological levels (individual, microsystem, exosystem), and children`s posttraumatic stress disorder (PTSD) symptoms, internalizing and externalizing problems, and prosocial behavior. Data were collected using structured clinical interviews and analyzed using multiple regression models. Exposure to violence across all contexts and engagement coping were risk factors for PTSD symptoms and internalizing problems, while only violence by mothers seemed to increase children`s vulnerability for externalizing problems. A differential impact of violence exposures on prosocial behavior was observed. Higher quality friendships appeared to protect youth from PTSD symptoms and externalizing problems, while they also promoted children`s prosocial behavior, just as mothers` social support networks. Prevention and intervention approaches should integrate risk, protective and promotive factors for refugee youth`s mental health across multiple ecological contexts and take into account context-specific and adaptive responses to war and displacement.

*Keywords*: refugee children, ecological, risk factors, mental health, resilience, posttraumatic stress

## Introduction

Refugee children and adolescents are at an increased risk of developing mental health problems due to their exposure to violence before their flight, potentially traumatizing experiences during their journey and daily stressors after their arrival in the host country (Hebebrand et al., 2016; Reed et al., 2012). Accordingly, high prevalence rates of trauma-related psychopathology, such as posttraumatic stress disorder (PTSD), internalizing problems (e.g. depression and anxiety), and externalizing problems (e.g. aggressive and antisocial behavior) have been found among refugee youth (Kien et al., 2019; Vossoughi et al., 2018). A better understanding of the factors which increase and alleviate refugee children`s vulnerability for mental health problems is urgently needed to develop targeted prevention and intervention strategies (Reed et al., 2012).

Healthy child development has been widely depicted using ecological systems theory (Bronfenbrenner, 1979), which describes development as interactions between children and their social environment across five nested contexts: ontogenetic level (individual attributes), microsystem (family and peers), mesosystem (interactions between microsystems), exosystem (wider community context) and macrosystem (society and culture). Such a socio-ecological framework has been recently applied to conceptualize the factors that contribute to the mental health and well-being of refugee and other conflict-affected children (Betancourt & Khan, 2008; Eruyar, Huemer, et al., 2018; Reed et al., 2012). On the one hand, the model`s broad view takes into account the shattering direct and indirect impact of war and displacement on all aspects of children`s worlds. On the other hand, the model enriches this focus on *risk* factors with a resilience perspective, which considers those ecological factors that may be related to reduced mental health problems, i.e. *protective* factors, and to increased adjustment, i.e. *promotive* factors (Tol et al., 2013). From a socio-ecological perspective, these factors are expected to have both direct and indirect effects on children`s mental health through their interrelations with factors from the same and other ecological levels (Betancourt & Khan, 2008).

On the ontogenetic level, a higher exposure to war-related traumatic events is a powerful risk factor for refugee children`s mental health across settings (Fazel et al., 2012; Reed et al., 2012). Cumulative pre-migration trauma predicted higher levels of PTSD symptoms, depression, and anxiety in longitudinal studies with refugee minors in Norway (Jensen et al., 2019) and Belgium (Vervliet et al., 2014). Although the way refugee children cope with their adverse experiences is likely crucial for their mental health, there has been little research on the role of coping strategies (Eruyar, Huemer, et al., 2018). In the coping literature, engagement coping strategies, including problem-focused coping, support seeking, emotion regulation and cognitive restructuring, have been generally associated with positive mental health outcomes (Carver & Connor-Smith, 2010). In a study with war-affected Bosnian adolescents (Howell et al., 2015), a greater use of engagement strategies was associated with lower levels of PTSD symptoms. Syrian children who coped by acquiring social support and trying to reframe events also reported fewer PTSD symptoms (Khamis, 2019). However, greater use of problem-focused coping strategies was related to PTSD in Bosnian adolescents who were not entitled

to asylum (Elklit et al., 2012). Consequently, evidence on the nature of engagement coping in terms of risk or resilience for refugee youth`s mental health is still inconclusive and limited to PTSD as an outcome.

Within the microsystem, refugee parents` well-being and their parenting behaviors are likely to be important determinants of their children` adjustment (Eruyar, Maltby, et al., 2018; Fazel et al., 2012). Research in post-conflict settings has established a link between war trauma, family violence against children, and children`s mental health problems (Catani, 2018). Recent studies found that refugee parents` mental health problems stemming from exposure to war trauma and post-migration stressors were associated with greater levels of harsh parenting, which were in turn related to children`s emotional and behavioral problems (Bryant et al., 2018; Sim et al., 2018). Adolescents living in refugee camps in Uganda and Rwanda who reported higher exposure to physical, verbal, and sexual abuse also reported higher levels of anxiety and depression symptoms (Meyer et al., 2017). High-quality friendships, in contrast, have been shown to be an important protective factor for the mental health of children and adolescents facing adversity (Waldrip et al., 2008; Yearwood et al., 2019). Moreover, higher quality relationships with peers have been linked to higher levels of adolescents` empathy (Boele et al., 2019) and prosocial behavior (Laible, 2007; Padilla-Walker et al., 2015). For refugee children, higher self-reported support from friends was related to lower levels of mental health problems and better adjustment in a systematic review (Fazel et al., 2012). Higher levels of support by peers also decreased the association between stressful life events and anxiety symptoms in a more recent study with unaccompanied minors in Germany (Sierau, Schneider, et al., 2018). However, associations of refugee children`s friendship quality with their mental health have not been investigated.

Focusing on the exosystem, research with non-refugee populations suggests a strong link between increased levels of violence within the wider community and youth`s mental health problems, particularly PTSD symptoms and externalizing problems (Fowler et al., 2009). Higher exposure to community violence in the United States predicted higher levels of PTSD symptoms and risk behaviors as well as worse academic outcomes in Khmer refugee adolescents (Berthold, 2000). However, no study has investigated the association between refugee children`s current exposure to community violence and their mental health. Given the dynamic interaction between the different socio-ecological contexts, refugee parents may draw on social resources within the community that also indirectly benefit the individual child. For instance, wider and higher quality parental social support networks have been linked to better mental health outcomes in children and adolescents (McPherson et al., 2014). Refugee adolescents exhibited lower levels of psychopathology when they reported having families with wide kin contacts and mothers who often received visitors at home (Tousignant et al., 1999). The association between parents` social networks and child mental health is likely to be mediated by the positive impact of emotional and instrumental support on parental well-being and family functioning (Alvarez et al., 2017). There is also evidence suggesting that mothers`

social network quality predicts adolescents` own prosocial behavior through mechanisms of social learning (Markiewicz et al., 2001).

Although 80% of refugees flee to neighboring low- and middle-income countries where they usually settle in refugee camps (UNHCR, 2019), current evidence on risk and protective factors for refugee youth`s mental health is largely based on studies conducted in high-income countries, such as Europe, North America, and Australia (Fazel et al., 2012; Reed et al., 2012). This means that the lived realities of the majority of refugee children are not adequately represented by the current state of research. While refugee children in high-income countries may have to cope primarily with adjustment to a different host culture and complex asylum processes, those resettling in camps in low-income settings often suffer from material hardships and face ongoing threats to their security (Reed et al., 2012). Among the studies that investigated risk and protective factors associated with the mental health of refugee youth in camps, most focused on individual-level factors and few considered the family and community context (Vossoughi et al., 2018). Another shortcoming of available studies is the unilateral focus on negative mental health outcomes. In order to understand children`s resilience in the face of severe adversity, it is also important to look at positive aspects of mental health and to identify factors which promote these outcomes (Tol et al., 2013).

Applying a socio-ecological framework, this study aimed to investigate risk, protective, and promotive factors for the mental health of Burundian refugee children and adolescents currently living in refugee camps. In 2015, opposition against the Burundian president`s illegitimate third term led members of the ruling party to commit violence and atrocities towards perceived opponents, including abductions, extrajudicial killings, and torture, and caused more than three hundred thousand Burundians to flee to neighbouring countries (Human Rights Watch, 2017). Based on available evidence, we expected that exposure to violence on the different ecological levels (war exposure, violence by mothers, community violence) would be associated with higher levels of mental health problems and lower levels of prosocial behavior. Due to the inconclusive findings, we did not have a priori hypotheses regarding the association between engagement coping and mental health outcomes. Based on previous findings with refugee and non-refugee youth, we expected that higher quality relationships with friends as well as higher quality maternal social support networks would be associated with lower levels of mental health problems and higher levels of prosocial behavior.

## Methods

### Sampling and participants

The study was conducted between January and May 2018 in three large refugee camps (Nduta, Nyarugusu, and Mtendeli) in Western Tanzania. Recruitment was conducted using a combined systematic and random sampling approach to identify family triads consisting of the mother, the father, and the oldest child between 7 and 15 years, i.e. of primary school age (for details see Scharpf et al., 2019). For the current study, we focused on children and their mothers because women are

primarily in charge of children`s socialization in Burundian culture (Song et al., 2014). The final study sample consisted of 217 children (47% female) and their mothers. As 85.6 % (n = 186) of the primary female caregivers were children`s biological mothers, we refer to them as mothers. Other types of caregivers were relatives such as aunts or sisters (5.6%, n = 12), step-mothers (2.8 %, n = 6), and foster mothers (6 %, n = 13). The majority of the families (65.9%, n = 143) arrived at the camps in 2015 after the outbreak of political violence in Burundi. Most mothers (79.7%, n = 173) identified the political conflicts as the main reason for their flight. Table 1 shows other sociodemographic characteristics of the children and mothers.

**Procedure**

Data collection took place on the compounds of collaborating NGOs within the camps. Upon arrival, families were provided information regarding the purpose and the procedure of the study. Then each family member gave their informed consent by signing with their names or fingerprints. Parents gave their consent on behalf of children under the age of 11. All but two families were willing to participate in the study. The research team, consisting of Tanzanian master-level psychologists and trained research assistants from the refugee community residing in the camps, conducted structured clinical interviews individually with each parent and child in Swahili, the lingua franca in Tanzania and the refugee camps, or in Kirundi, the native language of Burundians. Trained interpreters were always present in case a participant was not proficient in Swahili (for details on the procedure see Scharpf et al., 2019). After the interviews, families received a material compensation of 8 US Dollars. The study was approved by the Ethics Commission of the University of Zurich and the Tanzanian National Institute for Medical Research. All necessary research permits were obtained from the Tanzanian Commission for Science and Technology (COSTECH) and the Tanzanian Ministry of Home Affairs.

**Measures**

The interview guides for mothers and children consisted of individual questionnaires that were either already available in Swahili or were translated from English to Swahili for this study using blind-back translation (Brislin et al., 1973). Prior to data collection, we conducted focus group discussions with the Burundian research assistants to qualitatively evaluate the appropriateness of the instruments and relevant mental health concepts in Burundian culture. We also conducted a pilot assessment with eight families, which allowed us to make necessary adaptations and supported the appropriateness of the instruments for the study context.

*Sociodemographic information.* Children and mothers were asked about their age and educational level. Mothers also answered questions about their ethnicity, date of arrival at the camp, household characteristics (size, average income per month) and the reasons for their flight.

*Posttraumatic stress symptoms.* The University of California at Los Angeles Child/Adolescent PTSD Reaction Index for DSM-5 (PTSD-RI-5; Pynoos & Steinberg, 2015) was used to assess children`s PTSD symptoms within the past month according to the criteria of the Diagnostic and Statistical Manual of Mental Disorders (DSM) 5$^{th}$ Edition (American Psychiatric Association, 2013). The 31

items are scored on a 5-point Likert scale ranging from 0 (*none of the time*) to 4 (*most of the time*) and are summed up to a total score of PTSD symptom severity ranging from 0 to 124. The PTSD-RI-5 has been used in various cultural settings and has shown good psychometric properties (Doric et al., 2019). It has also been applied successfully in studies with refugee youth (Karam et al., 2019). Internal consistency of the total score was high in our sample, with Cronbach`s α = .90.

*Internalizing and externalizing problems and prosocial behaviour.* The self-report version of the Strength and Difficulties Questionnaire (SDQ) is a widely used measure to screen for emotional and behavioural problems in children and adolescents with good psychometric properties (Goodman et al., 2003). The 25 items are rated as *not true* (0), *somewhat true* (1), or *certainly true* (2). All items are divided between five subscales of five items each: emotional problems, peer problems, hyperactivity/inattention, conduct problems, and prosocial behavior. The subscales emotional problems and peer problems can be combined to create an internalizing problem score (range 0 to 20), while the sum of the subscales hyperactivity/inattention and conduct problems yields an externalizing problems score (range 0 to 20). The four subscales together combined provide an index of total difficulties (range 0 to 40). The SDQ has been extensively used in Sub-Saharan Africa (Hoosen et al., 2018) and in refugee settings (Eruyar, Maltby, et al., 2018; Meyer et al., 2017). Cronbach`s Alpha of the total difficulties score was .65 in our sample, which is comparable to other studies (Eruyar, Maltby, et al., 2018; Panter-Brick et al., 2014). The rather low internal consistency can be attributed to the heterogeneity of the total score consisting of both internalizing and externalizing symptoms across four subscales.

*War-related traumatic events.* 22 items derived from a checklist by Neuner and colleagues (2004) were used to assess children`s exposure to war-related traumatic events (e. g. physical injury, sexual assault, dangerous flight).

*Engagement coping*. We used an adapted version of the Kidcope (Spirito et al., 1988) that had been developed based on qualitative research with war-affected Congolese adolescents (Cherewick et al., 2016) to assess the frequency of children`s use of engagement coping strategies. It covered five engagement strategies (cognitive restructuring, social support, problem solving, emotion regulation, praying) and six disengagement strategies (withdrawal, distraction, wishful thinking, self-criticism, resignation, blaming others) with 18 items. Similar to previous work (Cherewick et al., 2016), we asked children first to identify one stressful situation within the past week, for example in their family, with friends, or at school, and then to indicate whether they had used a specific strategy to cope with that situation on a binary *yes* (1)/*no* (0) scale. Here we were only interested in the five engagement strategies measured by seven items (range 0 to 7).

*Violence by mothers.* We used the Parent-Child Conflict Tactic Scales (CTSPC; Straus et al., 1998) to assess the mother`s use of physical and emotional violence towards the participating child. Children reported the frequency of specific abusive acts within the past year over 18 items on a 7-point Likert scale ranging from 0 (*never*) to 25 (*>20 times*). Summing up all items yielded a total score of maternal

violence within the past year with a potential range from 0 to 450. The CTSPC self-report version has shown good psychometric properties (Sierau, White, et al., 2018) and has been used successfully in East Africa (Nkuba et al., 2018). Internal consistency of the total violence score was good (α = .80).

*Quality of relationships with friends.* A shortened version (Gifford-Smith, 2000) of the People in My Life questionnaire (PIML; Cook et al., 1995) was used to assess the quality of children`s relationships with their friends. The PIML was originally designed to measure children`s internal representations of their relationship with parents, friends and teachers. The 15 items referring to friends are rated on a 4-point scale from 0 (*almost never or never true*) to 3 (*almost always or always true*) and cover the subscales trust, communication and alienation (Ridenour et al., 2006). The PIML has demonstrated good psychometric properties (Moreira et al., 2017; Ridenour et al., 2006). Cronbach`s Alpha of the total score ranging from 0 to 45 was good (α = .82).

*Community violence.* Mothers` report of experienced and witnessed violence committed by community members within the past month served as a proxy for children`s current exposure to community violence. The nine items answered on a binary *yes* (1)/*no* (0) scale covered different violence-related events, e. g., physical and sexual assault, and were derived from a checklist used in a study with Congolese refugees in a Ugandan refugee camp (Hecker et al., 2015).

*Maternal social support networks.* Five purpose-built items assessed how often mothers had met with others in a public place, received visitors at home, visited other people and talked about problems with friends, family members or other persons with similar traumas within the past month. The items were rated on a 5-point scale from *never* (0) to *very often* (4) and summed up to receive a total score ranging from 0 to 20. Internal consistency was acceptable (α = .71).

**Data analysis**

The data was analysed using the Statistical Package for the Social Sciences (SPSS) version 25.0. There were no missing values. To investigate the associations between presumed risk, protective and promotive socio-ecological factors and the outcomes PTSD, internalizing problems, externalizing problems, and prosocial behaviour, we conducted four multiple linear regression models, one for each outcome. The predictors on the different ecological levels – exposure to war-related trauma and engagement coping on the ontogenetic level, violence by mothers and friendship quality in the microsystem, community violence and mothers` social network in the exosystem – were entered at once in the regression models.

We retained univariate outliers in the analyses to also consider naturally occurring extreme values in children`s experiences and mental health. Multivariate outliers were removed from regression analyses. The regression models fulfilled all other necessary quality criteria for linear regression analysis. Residuals did not deviate significantly from normality, linearity, or homoscedasticity. The maximum variance inflation factor for the regression models did not exceed 1.26. Hence, we did not need to take multicollinearity into account. Children`s age and gender were added as covariates in the regression models due to their potential impact on both outcome variables

and predictor variables (Eruyar, Maltby, et al., 2018). Our metric for a small effect size was $f^2 \geq 0.02$, for a medium effect $f^2 \geq 0.15$, and for a large effect $f^2 \geq 0.35$(J. Cohen, 1992). All analyses used a two-tailed $\alpha = 0.05$.

## Results

Descriptive statistics and bivariate correlations are displayed in Tables 2 and 3. Table 4 shows the results of the multiple regression analyses. The model predicting PTSD symptoms explained 41% of the variability of PTSD symptoms (adj. $R^2 = 0.41$, $F(8, 198) = 18.83$, $p < 0.001$, $f^2 = 0.69$). Exposure to war-related traumatic events, violence by mothers and community violence as well as engagement coping strategies were significantly positively associated with PTSD symptoms, whereas friendship quality was significantly negatively related to PTSD symptoms. The model predicting internalizing problems explained 12% of the variability of internalizing problems (adj. $R^2 = 0.12$, $F(8, 194) = 4.46$, $p < 0.001$, $f^2 = 0.14$). Exposure to war-related traumatic events, violence by mothers and community violence as well as engagement coping strategies were significantly positively associated with internalizing problems. The model predicting externalizing problems explained 12% of the variability of externalizing problems (adj. $R^2 = 0.12$, $F(8, 191) = 4.29$, $p < 0.001$, $f^2 = 0.14$). Exposure to violence by mothers was significantly positively associated and friendship quality was significantly negatively associated with externalizing problems. Finally, the model predicting prosocial behavior accounted for 19% of the variability in prosocial behavior (adj. $R^2 = 0.19$, $F(8, 200) = 7.20$, $p < 0.001$, $f^2 = 0.23$). Exposure to war-related and community violence, friendship quality and the quality of mothers` social networks were significantly positively related to prosocial behavior, whereas violence by mothers was significantly negatively related to prosocial behavior.

## Discussion

This study investigated risk, protective, and promotive factors across multiple socio-ecological levels (individual level, microsystem, exosystem) for negative (PTSD symptoms, internalizing and externalizing problems) and positive (prosocial behavior) mental health outcomes in Burundian refugee youth living in camps close to ongoing conflict. As expected, higher exposure to violence related to war, within the family, and in the community was associated with higher levels of PTSD symptoms and internalizing problems. This is consistent with a large body of evidence documenting the detrimental mental health impact of traumatic experiences (Alisic et al., 2014; Reed et al., 2012), child maltreatment (Cicchetti & Toth, 2016; Karam et al., 2019; Meyer et al., 2017) and community violence (Berthold, 2000; Fowler et al., 2009) for refugee and non-refugee children and adolescents across various socioeconomic and cultural settings. Studies conducted within a socio-ecological framework have shown how violence on more distal ecological levels, e.g., structural and community violence, adversely affects children`s adjustment both directly and indirectly by increasing violence

within the more proximal family context (Cummings et al., 2012; Lynch & Cicchetti, 1998; Saile et al., 2016).

The unexpected findings that higher exposure to war-related and community violence was not associated with externalizing problems and with higher levels of prosocial behavior are noteworthy. This contradicts empirical findings and theoretical conceptualizations of how organized and community violence are associated with aggressive and antisocial tendencies and undermine prosocial behavior (Belsky, 2008; Dubow et al., 2009; Hecker et al., 2015; Keresteš, 2006; McMahon et al., 2013; Qouta et al., 2008). However, preliminary evidence suggests that victimization and war trauma may also favor prosocial behaviors and orientations through positive experiences in the midst of adversity, e.g., receiving and giving care and help or learning from prosocial role models, thereby reflecting resilience (Staub & Vollhardt, 2008). A more prosocial attitude may be adaptive in times of violent intergroup conflict as cooperative group members may be more likely to be rewarded and non-cooperative members to be punished (Gneezy & Fessler, 2012). The finding fits with the observed lack of an association between both war-related and community violence with externalizing problems, which also include antisocial behaviors and may thus be considered the converse of prosocial behavior. In contrast, increased violence by mothers was associated with increased externalizing problems and reduced prosocial behavior, suggesting the importance of social learning through parental role models for both antisocial and prosocial behavior (Dubow et al., 2009; Silke et al., 2018). The pattern of associations between violence on different ecological contexts, externalizing, and prosocial behaviors is in line with a recent study with unaccompanied refugee minors, which found family violence, but not organized violence, to be associated with self-reported aggression (Mueller-Bamouh et al., 2016).

A more frequent use of engagement coping strategies in everyday situations, such as problem-focused coping and cognitive restructuring, was associated with higher levels of PTSD symptoms and internalizing problems, which is inconsistent with studies that found engagement strategies to be related to lower levels of mental health problems in refugee children and adults (Howell et al., 2015; Huijts et al., 2012; Khamis, 2019; Seglem et al., 2014; Shisana & Celentano, 1987). However, other studies found that more problem-focused coping was associated with higher levels of internalizing problems in a sample of adult Syrian refugees living in Turkey close to the Syrian border (Woltin et al., 2018) and with the presence of PTSD in Bosnian refugee youth waiting for the resolution of their asylum claims (Elklit et al., 2012). Our finding adds to these and suggests that engaging intensively with situations and stressors that cannot be easily changed or controlled may also be detrimental to mental health. The children in our study lived in refugee camps close to ongoing conflict and under precarious circumstances. Many of the stressful situations they had to cope with referred to experiencing or witnessing violence at home, in the community, or at school, which may have been perceived as being beyond the children's ability to control.

In the face of severe adversity, children with closer and more supportive relationships with friends reported lower levels of PTSD symptoms and externalizing problems as well as higher levels of prosocial behavior. This is in keeping with studies with non-refugee youth showing that higher quality peer relationships moderated the impact of complex trauma (Yearwood et al., 2019), family adversity (Criss et al., 2002), and peer rejection (Waldrip et al., 2008) on youth`s adjustment. The finding is also consistent with previous evidence on the protective role of peer support for refugee children`s and adolescents` mental health (Fazel et al., 2012; Sierau, Schneider, et al., 2018). The positive association between friendship quality and prosocial behavior points to the importance of peer relationships for the development of prosocial behavior (Silke et al., 2018). Higher quality maternal social support networks appeared to have a similarly promotive impact on children`s prosocial behavior. This may be explained through social learning mechanisms, such as social behaviors modeled by mothers in their interactions that are observed and imitated by children (Markiewicz et al., 2001). However, we did not observe the expected associations between maternal social network and children`s mental health problems that has been found in previous studies (McPherson et al., 2014; Tousignant et al., 1999). It is possible that a wider and closer social network of mothers indirectly exposes youth to the traumas and problems of other community members, which may outweigh any positive indirect impact of maternal social networks for youth`s mental health. However, this hypothesis requires further testing.

The current study`s novel contributions to the evidence base on refugee children`s and adolescents` mental health are threefold. First, the present study contributes to efforts to better understand and support the mental health and well-being of refugee youth living in refugee camps close to ongoing conflict, a population that represents the majority of refugee minors globally. Second, the study shows that risk, protective, and promotive factors from different levels in children`s social environment are relevant for their adjustment and thus strengthens the importance of a socio-ecological perspective in research and practical work with refugee children. Third, the study not only includes a range of different negative mental health outcomes, but also investigates prosocial behavior reflecting positive adjustment. However, some limitations must be noted. First, due to the cross-sectional study design causal interpretations of the observed associations should be made with caution. Reciprocity may also be plausible when interpreting the present findings. For instance, children`s externalizing problems have been shown to elicit physical discipline by parents (Lansford et al., 2011), while more prosocial behavior also led to increased acceptance by peers (Layous et al., 2012). Second, the specific cultural background and living context of our sample may limit the generalizability of our findings to refugee youth with other backgrounds or living in other settings, e. g. in high-income countries or urban community settings. However, we argue that the factors we included in our study are also relevant and salient in the social ecologies of children living in refugee camps in other areas of the world and thus assume a certain generalizability to these contexts, which nevertheless has to be examined in future studies. Third, although we ensured the suitability of our measures through focus

group discussions and a pilot assessment, they have not been validated for our study sample. We recognize the importance of validating assessment tools for refugee youth in diverse settings (Gadeberg & Norredam, 2016), and hope that future research can address this shortcoming. Fourth, we assessed children`s prosocial behavior through their self-report, which may be affected by social desirability. Direct ratings by peers or parents may also be valuable to include for analysis. Relatedly, we used maternal reports as a proxy for children`s exposure to community violence which may underestimate the amount of children`s actual exposure. The assessment of community factors such as violence or social support from the child perspective or through more objective indicators may be useful in future studies.

Our findings may have important implications for the practical clinical work with refugee youth in camp settings. Interventions should target factors on different ecological levels, i. e. related to the individual child, family, peers and the community, and various mental health outcomes, i. e. negative and positive aspects of adjustment. Considering the strong detrimental impact of war-related trauma and ongoing violence, we advocate programs with a trauma focus. As violence by mothers broadly impairs children`s mental health, approaches should include parents and provide access to non-violent parenting strategies. The potentially protective and promotive nature of positive peer relationships may be harnessed by also considering interpersonal relationship skills as targets for intervention, incorporating psychosocial recreational elements (e.g., child-friendly spaces within the refugee camp), and by the choice of setting, for example conducting interventions in a group format or in a school setting. Utilizing existing community spaces and incorporating lay personnel into care provision would also require fewer additional resources in camp settings that face severe resource deficits. Examples for possible interventions include trauma-focused cognitive behavioral therapy (J. A. Cohen & Mannarino, 2008) and its adaption Teaching Recovery Techniques (Yule et al., 2013), which have been tested in studies with war-affected Congolese girls (O'Callaghan et al., 2013) and unaccompanied refugee minors in Sweden (Sarkadi et al., 2018), respectively. These programs also focus on coping with trauma and distress. Most notably, our findings suggest that it is important to take into account the context-dependent nature of certain coping styles and to carefully evaluate whether these may be adaptive or maladaptive for youth. Similarly, potential positive outcomes in the face of trauma and violence such as an increased prosocial orientation need to be considered by practitioners working in prevention and intervention.

In conclusion, exposure to violence across all contexts and engagement with everyday stressors appears to increase refugee youth`s risk for mental health problems, but there is also evidence for peer and community resources contributing to resilience in the midst of war and displacement. Prevention and intervention approaches aiming to improve and promote refugee children`s mental health should focus on reducing children`s exposure to violence in their social ecology and strengthen their relationships with peers.

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## Tables and Figures

**Table 1:** Sociodemographic characteristics of children and mothers

| | Children (n = 217) | Mothers (n = 217) |
|---|---|---|
| Age in years, M (SD, range) | 12.16 (2.03, 7 – 15) | 34.74 (8.52, 19 – 74) |
| Education, % (n) | | |
| No schooling | 8.3 (18) | 35.0 (76) |
| Class 1-3 (Primary) | 49.3 (97) | 22.6 (49) |
| Class 4-6 | 39.6 (86) | 30.8 (67) |
| Some secondary | 2.8 (6) | 10.7 (23) |
| Completed secondary[a] | | 0.9 (2) |
| Ethnicity | | |
| Hutu | 82.5 (179) | |
| Tutsi | 14.4 (31) | |
| Other | 3.1 (7) | |
| Household size, M (SD, range) | 7.3 (1.98, 3 – 14) | |
| Household income p. month (USD), % (n) | | |
| No income | 36.4 (79) | |
| Up to 20 | 54.9 (119) | |
| More than 20 | 8.7 (19) | |

[a] This was not applicable to children.

**Table 2**: Descriptive statistics of study variables

| Study variables, M (SD, Min-Max) | |
|---|---|
| Posttraumatic stress symptoms (UCLA-RI-5) | 14.98 (11.31, 0 – 49) |
| Internalizing problems (SDQ) | 6.36 (3.24, 0 – 16) |
| Externalizing problem (SDQ) | 4.40 (2.93, 0 – 15) |
| Prosocial behavior (SDQ) | 8.26 (1.57, 3 – 10) |
| War-related traumatic events | 3.77 (3.68, 0 – 16) |
| Engagement coping (Kidcope) | 3.87 (1.90, 0 – 7) |
| Violence by mothers (CTSPC) | 42.91 (42.28, 0 – 214) |
| Friendship quality (PIML) | 31.43 (8.02, 5 – 45) |
| Community violence | 2.67 (2.46, 0 – 9) |
| Maternal social support network | 9.47 (5.00, 0 -20) |

UCLA-RI-5, University of California at Los Angeles Child/Adolescent PTSD Reaction Index for DSM-5; SDQ, Strengths and Difficulties Questionnaire; CPCTS, Parent-Child Conflict Tactic Scales; PIML, People in My Life questionnaire.

**Table 3:** Bivariate correlations between study variables

| Variable | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Age | - | | | | | | | | | | |
| PTSD symptoms (UCLA-RI-5) | .129 | - | | | | | | | | | |
| Internalizing problems (SDQ) | .069 | .345*** | - | | | | | | | | |
| Externalizing problems (SDQ) | -.052 | .202** | .314*** | - | | | | | | | |
| Prosocial behavior (SDQ) | -.092 | .054 | .009 | -.202** | - | | | | | | |
| War-related trauma | .154* | .535*** | .255*** | .083 | .160* | - | | | | | |
| Engagement coping (Kidcope) | .142* | .189** | .161* | -.073 | .054 | .176** | - | | | | |
| Violence by mothers (CTSPC) | .036 | .233** | .079 | .176** | -.118 | .173* | -.060 | - | | | |
| Friendship quality (PIML) | -.169* | -.142* | .028 | -.180** | .256*** | -.084 | .305*** | -.186** | - | | |
| Community violence | -.120 | .183** | .131 | .045 | .073 | .139* | -.074 | .075 | -.113 | - | |
| Mothers` network | .006 | -.006 | -.040 | .067 | .225** | -.056 | -.029 | .042 | .076 | -.224** | - |

UCLA-RI-5, University of California at Los Angeles Child/Adolescent PTSD Reaction Index for DSM-5; SDQ, Strengths and Difficulties Questionnaire; CPCTS, Parent-Child Conflict Tactic Scales; PIML, People in My Life questionnaire. ***p < 0.001, **p < 0.01, *p < 0.05.

**Table 4:** Results of multiple regression analyses

| | PTSD Symptoms[a] (n = 207) | | | | Internalizing problems[b] (n = 203) | | | | Externalizing problems[c] (n = 200) | | | | Prosocial behavior[d] (n = 209) | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | ***B*** | ***β*** | ***t*** | ***p*** | ***B*** | ***β*** | ***t*** | ***p*** | ***B*** | ***β*** | ***t*** | ***p*** | ***B*** | ***β*** | ***t*** | ***p*** |
| Sociodemographic variables | | | | | | | | | | | | | | | | |
| Age | .02 | .003 | .06 | .95 | -.02 | -.01 | -.17 | .86 | -.12 | -.10 | -1.36 | .18 | -.05 | -.07 | -1.11 | .38 |
| Gender (female = 1, male = 0) | **-2.50** | **-.12** | **-2.16** | **.03** | -.59 | -.11 | -1.57 | .12 | .59 | .12 | 1.73 | .09 | **-.36** | **-.13** | **-1.98** | **.05** |
| Individual | | | | | | | | | | | | | | | | |
| War-related trauma | **1.50** | **.50** | **8.88** | **< .001** | **.13** | **.20** | **2.23** | **.03** | .06 | .09 | 1.23 | .22 | **.10** | **.26** | **3.84** | **< .001** |
| Engagement coping | **.81** | **.15** | **2.48** | **.01** | **.22** | **.15** | **2.05** | **.04** | -.08 | -.06 | -.85 | .40 | -.04 | -.05 | -.66 | .51 |
| Microsystem | | | | | | | | | | | | | | | | |
| Violence by mothers | **.05** | **.19** | **3.39** | **.001** | **.01** | **.17** | **2.54** | **.01** | **.02** | **.23** | **3.37** | **.001** | **-.01** | **-.16** | **-2.50** | **.01** |
| Friendship quality | **-.16** | **-.12** | **-2.01** | **.05** | .03 | .10 | 1.28 | .20 | **-.07** | **-.20** | **-2.81** | **.005** | **.04** | **.24** | **3.17** | **.002** |
| Exosystem | | | | | | | | | | | | | | | | |
| Community violence | **.55** | **.13** | **2.25** | **.03** | **.25** | **.22** | **3.09** | **.002** | .03 | .02 | .34 | .73 | **.08** | **.13** | **2.01** | **.05** |
| Maternal social network | .09 | .04 | .77 | .45 | .04 | .07 | 1.00 | .32 | .07 | .08 | .13 | .06 | **.09** | **.29** | **4.59** | **< .001** |

[a] adj. $R^2 = 0.41$, $F(8, 198) = 18.83$, $p < 0.001$, $f^2 = 0.69$; [b] adj. $R^2 = 0.12$, $F(8, 194) = 4.46$, $p < 0.001$, $f^2 = 0.14$; [c] adj. $R^2 = 0.12$, $F(8, 191) = 4.29$, $p < 0.001$, $f^2 = 0.14$; [d] adj. $R^2 = 0.19$, $F(8, 200) = 7.20$, $p < 0.001$, $f^2 = 0.23$.