

**Individual Differences in Responses to War and
Displacement: A Study of Syrian Refugee Children**

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Submitted in partial fulfilment of the requirements of the Degree of Doctor of
Philosophy



Statement of Originality

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Details of collaboration and publications

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Abstract

Since 2011, millions of children have been displaced by the Syrian war. The psychological effects of this experience can be severe, but children tend to differ in their response, with some appearing resilient. A range of possible explanatory factors have been identified, but the existing literature often focuses on individual outcomes and disproportionately relies on cross-sectional data from children settled in high income countries. My objective was to apply multi-dimensional and longitudinal perspectives to investigate resilience and mental health in a vulnerable sample of Syrian refugee children. Within this were five main aims: (1) estimate the proportion of children who could be described as resilient; (2) identify predictors of risk and resilience; (3) investigate how mental health and resilience change over time; (4) investigate reciprocal relationships between children and their environment; (5) investigate the mediating pathways through which environmental factors impact the child. To address these aims, I used data from 1,591 Syrian refugee child-caregiver dyads living in refugee camps in Lebanon, 1,000 of whom were followed up one year later. Overall, mental health improved from baseline to follow-up, but fewer children than expected showed resistance to or recovery from mental health problems (i.e., resilience). A range of individual and socio-ecological factors were associated with risk and resilience, the most consistent of which were self-esteem, bullying, caregiver mental health, and parenting factors. The wider environment had indirect effects on children, via caregiver mental health and harsh parenting. In turn, child mental health was predictive of multiple factors. I conclude that considering multiple dimensions of mental health is crucial, and demonstrates that Syrian refugee children living in camps need psychological support. The pathways I identify within the family and from the wider environment indicate a need for systemic interventions that consider the complexity of the family and refugee context.

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Chapter 1: General Introduction

1. Overview

According to the 1951 Refugee Convention (UN General Assembly, 1951) and 1967 Protocol (UN General Assembly, 1967), refugees are people who have fled their home country due to well-founded fears of persecution on the basis of race, religion, nationality, or membership of a particular social or political group. In 2022, as a result of new and ongoing conflict, violence, and human rights violations, the number of forcibly displaced people across the world reached 100 million for the first time on record (United Nations High Commissioner for Refugees/UNHCR, 2022c). Of those, approximately 32.6 million meet the above criteria and are registered as refugees (UNHCR, 2022b). The war in Ukraine alone has prompted at least 7.4 million refugees to flee to nearby countries since February of this year (UNHCR, 2022b). Prior to this, the Syrian conflict was the highest contributor to refugee numbers, with an estimated 5.6 million Syrians registered as refugees, primarily in neighbouring countries (UNHCR, 2022b). Children make up a substantial portion of these figures. By the end of 2021, UNHCR estimated that 42% of refugees (over 10 million) were children, despite children accounting for only 30% of the world's population (UNHCR, 2022a). This thesis will focus on Syrian refugee children specifically, of whom there are thought to be approximately 2.7 million (UNHCR, 2022b).

Of these children, large proportions have witnessed some of the most violent acts of war, including bombing, torture, and executions (Gormez et al., 2018). Post-migration, children continue to be exposed to adversities such as living in camps, poor access to basic resources, disrupted education, and child labour (UNHCR et al., 2021). Lebanon hosts the highest proportion of Syrian refugees relative to its population, and as a consequence many refugees have been forced to settle in informal tented settlements (ITSs; UNHCR et al., 2021). Despite these conditions, some children appear to adapt relatively well, showing no

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signs of trauma or other mental health problems (Scherer et al., 2020). In other words, they seem to be resilient.

Psychological resilience has been defined and operationalised in many different and ever more complex ways (Cosco et al., 2017; Karadzhov, 2015; Masten, 2016; Miller-Graff, 2020; Ungar, 2018; Windle et al., 2011). Here, we define it in simple terms as observable evidence that an individual is doing better than expected, given the context of adversity (Miller-Graff, 2020). In recent years, there has been a proliferation of research on what predicts psychological outcomes in refugees. A variety of predictors at the individual (e.g., coping strategies), social (e.g., family), and wider socio-ecological (e.g., poverty) levels have been identified (Scharpf et al., 2021). However, a disproportionate amount of this research is cross-sectional and has been conducted with adult refugees resettled in high income countries (HICs). There also remains a relative lack of research with refugee children regarding predictors of resilience, the process of adaptation, and the interplay between children and aspects of their environment.

In this chapter, I will provide a brief summary of the Syrian civil war and the challenges faced by Syrian refugees, and outline the effect these experiences have on children via prevalence estimates of mental health problems. I will then introduce the concept of psychological resilience and some of the surrounding debates, before reviewing the existing evidence on what predicts refugee children's mental health outcomes, and finally summarising critical gaps in the literature and how this thesis aims to address them. The contents of this chapter are based in part on the book chapter *Psychological resilience in response to adverse experiences: an integrative developmental perspective in the context of war and displacement* (Popham, McEwen, & Pluess) published in *Multisystemic Resilience* (Ungar, 2021).

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1.1. Context: Syria, the civil war, and mass displacement

1.1.1. The Syrian civil war

The Syrian civil war, starting in 2011 and still ongoing, has been one of the most complex and protracted conflicts this century. In what follows, I provide a brief summary of the primary points. The Arab Spring started in 2010, and protests against authoritarian regimes spread throughout the Middle East and North Africa. Syria had been facing economic and social crisis in addition to extreme drought for several years, which affected all citizens, particularly those living in rural areas (Zisser, 2017). Following the uprisings in other parts of the region, Syrian antiregime protests asking for political and economic reforms broke out in 2011. However, as protests spread across the country, they were met by increasingly violent crackdowns by the government (Britannica, 2020). By 2012, these clashes had grown into civil war (Britannica, 2020). The conflict quickly grew in complexity, developing ethnic and religious components, and gaining national and international support on both sides (Zisser, 2017). Different powers supported the regime or the rebels through political stance, funding, and military aggression. Rebel groups splintered and Islamist militants became more central in the conflict, leading to various coalitions and infighting between the different anti-government groups (Britannica, 2020). Despite early gains by rebels and multiple attempts at ceasefires, the regime maintained an aggressive stance, using broad attacks including bombing and the use of chemical weapons which not only targeted rebel groups but also civilian infrastructure (e.g., healthcare settings; Muzzall et al., 2021).

This conflict led to mass displacement; by 2014, 7.6 million Syrians were internally displaced (Internal Displacement Monitoring Centre/IDMC, 2022), and by mid-2017, over five million were externally displaced and registered as refugees, almost half of whom were children (UNHCR, 2022b).

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1.1.2. The Syrian refugee crisis

Globally, the majority of refugees are hosted in neighbouring (72%) and low and middle income countries (LMICs; 83%). While some are able to return to their country of origin, approximately 74% of the global refugee population have been in exile for at least five years (UNHCR, 2022a). The protracted conflict in Syria and the poor economic conditions in the country prior to the conflict means that many Syrians fall into these groups. The majority fled to the neighbouring countries of Turkey, Lebanon, Jordan, Iraq, and Egypt (UNHCR, 2022b), and have been forced to remain away from Syria long-term. This influx inevitably had a large impact on the host countries. Though the majority of refugees are hosted in LMICs, post-migration experiences vary widely. Some settle in camps or informal settlements from the short- to long-term, some continue in protracted transit, and others settle in formal housing.

Turkey hosts the highest number of refugees at 3.8 million, most of whom are Syrian (UNHCR, 2022a), but Lebanon hosts the highest proportional to its population, with over one million Syrians having fled to Lebanon, compared to a host population of approximately 4.7 million (Lebanon Info Center, 2022). Lebanon reached a peak of 1.2 million registered Syrian refugees in 2015, but authorities estimate that the number of displaced Syrians in the country is much higher, as registration of refugee status in Lebanon was suspended in May 2015. The country, which already had considerable socio-economic problems, struggled due to insufficient infrastructure, the effects of which were compounded because the majority of Syrians in Lebanon settled in Beqaa and North Lebanon, the poorer areas of the country. This led to competition for resources and a strained relationship between the local Lebanese and Syrian refugee populations (El Chammay et al., 2013). In 2021, 22% of Syrian refugees in Lebanon were living in non-permanent shelter such as ITSS, a proportion which continues to increase over time (UNHCR et al., 2021; UNHCR, 2018). Conditions in these settlements are

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poor, with inhabitants experiencing fires, floods, and raids by the Lebanese army (al Jazeera, 2017, 2019; Human Rights Watch, 2018). Over this time, Lebanon has also experienced disasters of its own, including revolution, COVID-19, the Beirut port blast, and ongoing economic crisis. These factors combine to put significant strain on citizens, services, aid organisations, and refugees, increasing the importance of studying this particularly vulnerable population.

1.1.3. Syrian refugee children's experiences of war and displacement

While refugee experiences are generally challenging, children and adolescents may be particularly vulnerable, due to the low control they have over their experiences, combined with greater susceptibility to the biological and psychological embedding of experiences. The first few years of life and adolescence in particular are sensitive stages characterised by substantial neural development (Gee & Casey, 2015). Early experiences of adversity and early levels of functioning can have cascading effects both on future functioning and future exposure to more environmental adversity (Obradović & Hipwell, 2010). These effects can last long into adulthood (Green et al., 2010).

In the case of refugees, children are often exposed to the myriad brutalities of war, despite their young age. Reports of Syrian refugee children find that a high proportion have experienced events such as explosions, interpersonal violence, and the death of close friends and relatives (Gormez et al., 2018). Some of these experiences are particularly brutal, including being forced to watch decapitations (Akesson & Sousa, 2019) or torture of and sexual violence towards family members (Rizkalla et al., 2020). Beyond war-related violence, living in a country undergoing civil war means continued internal displacement and experiences of hunger and deprivation (Akesson & Sousa, 2019; Rizkalla et al., 2020). Once families make the decision or are forced to flee across borders, the journey itself continues to

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bring danger. Syrian refugees in Lebanon and Jordan report being forced to flee on foot, and fearing aerial strikes on their journey (Akesson & Sousa, 2019; Rizkalla et al., 2020).

Families are also often separated; estimates suggest that approximately one third of Syrian adolescents have to leave family members behind (Uysal et al., 2022).

Post-migration experiences can vary widely in terms of many factors, including the process of seeking asylum, shelter, and income, accessing services, aid, healthcare, and education, and integrating into the host community. Syrian refugees in Lebanon report finding these processes particularly challenging. Compared to other host countries that created large, planned camps for the purpose of housing refugees, such as Zaatari camp in Jordan, no more formal camps were built in Lebanon for the influx of refugees from Syria. Therefore those unable to find shelter in urban, residential areas are forced to self-settle in informal settlements (Sanyal, 2017). Parents experience difficulties finding work, meaning that families are forced to live in poverty (Akesson & Sousa, 2019; Rizkalla et al., 2020); a large study of Syrians in the Beqaa area found that 74.3% of households experienced severe food insecurity (Habib et al., 2019). Such poverty has a cascading effect, with families often forced to decide between necessities such as food and medical care (Sim, Fazel, et al., 2018). Moreover, children are forced to work to help contribute to the household, exposing them to exploitation and making it more difficult for them to access education (Rizkalla et al., 2020). Habib and colleagues (2019) report that the average age of starting work is 10.9 years, with children primarily working in agriculture. Child marriage also becomes more common, as a coping strategy to deal with financial hardship by reducing the number of children that parents have to support (UNHCR et al., 2021). In addition to these practical or physical stressors, refugees also face social tensions. This may be a particular problem in host contexts such as Lebanon, where the host population was already under severe financial strain prior to the arrival of any refugees (El Chammay et al., 2013). Syrian parents report that they are

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targeted by locals, and that children often take the brunt of this experience, for example being attacked by other children in the neighbourhood (Rizkalla et al., 2020). Combined, these experiences cause children to grow up faster than they otherwise would, and feel responsibility to contribute to the family (Akesson & Sousa, 2019; Rizkalla et al., 2020).

1.2. Psychological responses to war and displacement

1.2.1. Prevalence of post-traumatic stress disorder, depression, anxiety, and externalising problems

Given these examples of war and displacement-related experiences, it is unsurprising that refugee children also tend to show high rates of trauma and mental health problems. However, estimates of the prevalence of these problems vary widely throughout the literature. The most commonly reported outcomes are post-traumatic stress disorder (PTSD), depression, and anxiety. Estimates from refugees settled in HICs, where the majority of research is conducted, suggest anywhere between 19% and 52.7% of children may have PTSD, 10.3-32.8% depression, and 8.7-32% anxiety (Henkelmann et al., 2020; Kien et al., 2019). Estimates from Syrian refugees settled in LMICs are slightly higher, with different studies suggesting 18.3-61.2% of children may have PTSD (Gormez et al., 2018; Uysal et al., 2022), 30.4-60% may have depression (Ataç et al., 2018; Özer et al., 2016), and 53.2-72.8% may have an anxiety disorder (Kandemir et al., 2018; Uysal et al., 2022). However, given the relatively small number of LMIC child-focused studies, these estimates are often based on single samples and may therefore be overestimations in contrast to prevalence estimates based on systematic reviews and meta-analyses that have been adjusted for sensitivity and specificity, as is often the case for the HIC figures.

Although most estimates of refugee child mental health focus on internalising problems and symptoms of trauma, externalising behaviour problems can also be a common

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reaction to trauma in children. For example, the number of traumatic events experienced by a sample of Syrian refugee children in Turkey was directly associated with the level of conduct problems and hyperactivity they displayed (Çeri & Nasiroğlu, 2018). Of the few studies that have reported on externalising problems as a distinct outcome category, estimates seem to be lower than those for PTSD, depression, and anxiety, but are still higher than in non-refugee populations. For example, the systematic review by Blackmore and colleagues (2020) estimated that 8.6% of refugee and asylum-seeking children have attention deficit hyperactivity disorder (ADHD) and 1.7% oppositional defiant disorder (ODD), while a specific study of Syrian refugee children in Turkey estimated that 22% of children showed aggression (Özer et al., 2016).

In addition to the possible differences in mental health between children settled in higher and lower income countries, outcomes may vary according to other aspects of resettlement location. For example, a sample of children in Lebanon showed higher likelihood of PTSD compared to a similar sample in Jordan (Khamis, 2019a). Though both are LMICs, Khamis suggested that this difference in symptoms may be attributable to the worse conditions in Lebanon, in terms of the refugee settlements and the economic and legal status of refugees. However, the difference in mental health between children in different living situations (e.g., camps vs. living in the community) is not yet clear. In a study of adult refugees, those that had lived in camps prior to arrival in Australia showed worse initial distress compared to those that had been in community settings (Nickerson et al., 2022). In terms of children, a review of youth in refugee camps found that reported prevalence of PTSD ranged from 0-87% (Vossoughi et al., 2018). Rates of PTSD may therefore be very high in some camp contexts, but the extreme variance prevents any meaningful comparison to non-camp settings. Of course, camps can also vary widely in terms of environmental quality and resources. Some of the largest refugee camps in the world have become

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established as long-term residences for hundreds of thousands of individuals and contain hospitals, schools, and other resources (UNHCR, 2016). In contrast, informal settlements such as those in Lebanon may contain anywhere from very few to hundreds of shelters and have inconsistent and unreliable access to basic resources such as sanitation (Sanyal, 2017). While conditions in both types of settlements are poor, the instability inherent in informal shelter could pose more of a psychological burden.

The picture may also be clouded by comorbidity, which we expect to be particularly high in refugee populations, given the combined exposure to traumatic events and prolonged exposure to stressors relating to displacement and resettlement. However, estimates also vary here; in one sample of Syrian refugee children in Turkey, 28.7% scored above clinical cut-offs for both depression and anxiety (Kandemir et al., 2018), whilst in another only 7.4% scored above multiple cut-offs when measuring depression, anxiety, and PTSD (Scherer et al., 2020).

1.2.2. The problem of measurement validity

The extreme variety characteristic of prevalence estimates of refugee child outcomes could reflect a number of different challenges related to assessing mental health in refugee populations. Time and resource constraints mean that researchers often need to rely on self-report, which might lead to higher prevalence estimates than other methods (Henkelmann et al., 2020). This overestimation could be further pronounced by issues regarding the cultural and contextual validity of measures. Often, measures are not validated locally or in refugee populations, leading to items that might be interpreted differently by participants and researchers (Kyrillos et al., 2022). For example, the phrase *“I wish I were dead”* is a common way to express feeling tired or exasperated in some populations, but could be confused with suicidality. As another example, in groups that celebrate Ramadan or other

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forms of religious fasting, children may report changes in appetite or energy during those periods, which could overlap with symptoms of depression.

Additionally, some items might not be good indicators of clinical functioning in certain settings. For example, children may display seemingly antisocial behaviours, such as staying out late, being violent towards animals, or fighting with other children. However, these behaviours could reflect reasonable or adaptive responses given the refugee context, rather than symptoms of a psychological disorder. Children may stay out late because the tent they live in is too small and cramped for the family, show violence towards animals because they enter the settlements and pose a potential threat, or fight with others in order to defend siblings from peer violence (Kyrillos et al., 2022).

These issues of interpretation can be addressed using locally validated measures or clinical interviews. Indeed, Blackmore and colleagues' review (2020), which focused solely on studies that reported diagnoses based on clinical interviews using validated diagnostic assessments, produced prevalence estimates towards the lower end of the scale (22.7% PTSD, 13.8% depression, 15.8% anxiety). This may not always be the case however; Henkelmann and colleagues (2020) found that, while self-reported anxiety tended to show higher prevalence than clinical diagnosis, the difference was not statistically significant for PTSD or depression.

Despite these challenges in measurement, the most conservative estimates available for refugee children remain much higher than worldwide prevalence estimates for children (Table 1.1), according to which the rate of depressive disorders is 2.6%, of anxiety is 6.5%, and of disruptive disorders is about 5.7% (Polanczyk et al., 2015). Rates of PTSD in the general population vary more substantially based on life experiences, but estimates suggest between 0.5% and 7.8% of children and adolescents in HICs may have PTSD (Copeland et al., 2007; Lewis et al., 2019). Within trauma-exposed but non-displaced and non-conflict

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affected children, the rate of PTSD is estimated to be around 15.9%, which nevertheless remains lower than Blackmore and colleagues' estimate of 22.7% for refugees (Alisic et al., 2014; Blackmore et al., 2020). We can therefore conclude that refugee children are at increased risk of PTSD, depression, anxiety, and externalising problems, but further work needs to be done to improve the accuracy of estimates, and establish how different groups of refugees compare. Careful consideration of the contextual and clinical validity of measures is necessary for this purpose.

Table 1.1. Prevalence of child mental health outcomes according to population

	Non-refugee	Refugees in HIC	Refugees in LMIC
PTSD	0.5 ^a -7.8 ^b %	19-52.7% ^d	18.3 ^g -61.2% ^h
Depression	2.6% ^c	10.3-32.8% ^d	30.4 ⁱ -60% ^j
Anxiety	6.5% ^c	8.7 ^d -32% ^e	53.2 ^k -72.8% ^h
Externalising	2.1-5.7% ^c	1.7% ^f	22% ^j

^a Copeland et al. (2007), US-based children aged 9-16, weighted prevalence; ^b Lewis et al. (2019), England and Wales-based children aged 18, lifetime prevalence; ^c Polanczyk et al. (2015), children aged 4-18, worldwide prevalence of any depressive disorder, any anxiety disorder, any conduct/oppositional defiant/disruptive disorder; ^d Kien et al. (2018), Europe-based refugees and asylum seekers aged 2-23, point prevalence interquartile range; ^e Henkelmann et al. (2020), HIC-based refugees with mean ages 10-17, pooled prevalence; ^f Blackmore et al. (2020), refugees in Germany, Malaysia, Norway, Sweden, & Turkey, aged 0-19, pooled prevalence; ^g Gormez et al. (2018), children aged 9-15 in Turkey, unadjusted prevalence; ^h Uysal et al. (2022), children aged 12-18 in Turkey, unadjusted prevalence; ⁱ Ataç et al. (2018), children with a mean age of 15.1 ($SD = 2.1$) in Turkey, unadjusted prevalence; ^j Özer et al. (2016), children aged 9-18 in Turkey, unadjusted prevalence; ^k Kandemir et al. (2018), children with a mean age of 11 ($SD = 3.67$) in Turkey, unadjusted prevalence.

1.2.3. Psychological adaptation

Although most prevalence estimates focus on cross-sectional data, adaptation to war and displacement is a continuous process, meaning that refugee children's mental health likely changes over time. This could provide another explanation for the variety of estimates, as measures are completed at any time from immediately to several years after displacement.

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According to the relatively few studies with more than one wave of data, some children experience persistently high symptoms of PTSD, depression, anxiety, and externalising problems, and a not insignificant portion of children show increasing problems over time (Müller, Gossmann, et al., 2019; Panter-Brick et al., 2015). However, generally it seems that symptoms tend to improve over time since displacement (Hermosilla et al., 2021; Müller, Gossmann, et al., 2019; Purgato et al., 2020). This might reflect adaptation to war-related traumatic experiences as well as the post-migration context.

In fact, despite exposure to the extreme range of challenges and potentially traumatic experiences reviewed above, a substantial proportion of refugee children appear to adapt well to their circumstances. This ‘successful adaptation’ can manifest in multiple different ways. In addition to the children who are initially negatively affected and then recover, or ‘bounce back’, many appear to resist the negative effects of their trauma, and show consistently low symptoms across PTSD, depression, anxiety, and externalising behaviour measures (Müller, Gossmann, et al., 2019; Scherer et al., 2020). Finally, some children demonstrate post-traumatic growth (Sleijpen et al., 2016), defined as positive psychological change following a struggle with adverse life events (Tedeschi & Calhoun, 2009).

These three trajectories (recovery, resistance, growth) can all be described as forms of psychological resilience (Masten & Narayan, 2012; Figure 1.1). This resilience-oriented approach has become more popular in refugee research, as it moves focus away from psychopathology towards a more hopeful narrative, and emphasises children’s strengths and agency (Jafari et al., 2022; Masten, 2009; Rutter, 2007).

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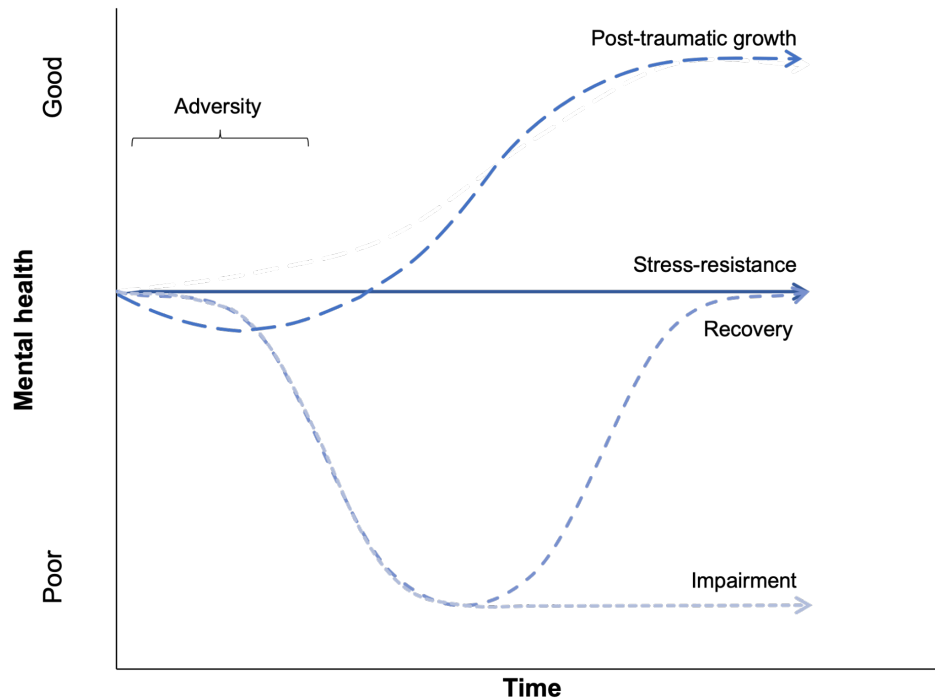


Figure 1.1. Possible resilience trajectories. Adapted from Masten and Narayan (2012).

1.3. Resilience

1.3.1. The history of resilience research

The concept of psychological resilience was developed in early work on childhood adversity, following from the observation that children show considerable heterogeneity in outcomes despite equivalent risk (Werner, 1992). A large proportion of children thought to be at risk due to socio-economic disadvantage or parents with mental health problems developed better than expected (Garmezy, 1974), leading researchers to label them as “*invulnerable*” (Anthony et al., 1978). However, the term invulnerability implies an absolute resistance to adversity in all circumstances, as the function of a stable characteristic intrinsic to the individual (Luthar et al., 2000). This conflicts with evidence that certain types of adversity can impact a specific individual more than others, and that the effects of adversity tend to be cumulative (Rutter, 1993). Additionally, research showed that some individuals, who had been exposed to adversity in childhood and initially displayed maladaptive behaviours,

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recovered over time and seemed to function well in adulthood (Werner, 1992). In other words, they appeared to bounce back, most likely due to specific individual or environmental characteristics that exerted a protective function on their development. The term resilience came into use to describe these observations and the research focus shifted to potential protective factors and mechanisms (Masten & Garmezy, 1985; Rutter, 1987).

1.3.2. Defining and operationalising resilience: continued debates

Since its inception, how best to define and operationalise resilience has been a continued source of debate, and there is as yet no standard approach (Bonanno, 2012; Cosco et al., 2017; Karadzhov, 2015; Miller-Graff, 2020; Schwarz, 2018; Ungar, 2018; Windle et al., 2011). One key question is whether it can be considered a trait, process, or outcome (Luthar et al., 2000; Miller-Graff, 2020). The trait approach is based on the idea that resilience is an innate capacity for adaptation that affects how well an individual is able to cope when faced with adversity and that can be quantified using scale measures (Connor & Davidson, 2003). Trait resilience overlaps with capacities such as hardiness and ego-resiliency (Hu et al., 2015), which are likely to be important personal resources that influence how an individual adapts. However, this definition suffers from similar problems as the initial concept of invulnerability. It does not, for example, account for how children could take different trajectories (e.g., resistance, recovery) but ultimately adapt well (Masten & Narayan, 2012). Rather, it implies that an individual will either be resilient or not. For this reason, the idea of resilience as a process gained in popularity (Masten, 2012; Rutter, 1987).

Conceptualising resilience as a process to be studied longitudinally allows us to understand the complexity of dynamic responses to adversity, which can itself be dynamic, as is the case for refugee children exposed to prolonged experiences of war and displacement. However, focus on the individual's capacity for adaptation risks placing the culpability for a

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person's mental health solely on the individual (Masten, 2012). Further movements have therefore been made towards the idea of resilience as the resources that are available to the individual that might be protective (i.e., protect against negative effects) or promotive (i.e., promote positive development) in the context of adversity (Ungar, 2015). In other words, the focus has broadened from the resilience of the child to the resilience of the system in which the child is embedded. Miller-Graff (2020) describes this as generative resilience, which includes assets and actions on the individual level, such as coping, as well as socio-ecological assets such as family support. However, which resources are most useful for specific groups may vary. Pre- and post-migration experiences affect the impact that resources such as coping or family support can have (Elklit et al., 2012; Kliewer et al., 2021), and yet a portion of children appear to adapt regardless of the context. It can therefore be useful to operationalise resilience as an outcome (i.e., observable success in adaptation), in order to further investigate what helps children reach that outcome and adapt successfully. This can be called 'manifested resilience' (Masten, 2016; Miller-Graff, 2020).

This leaves the question of what can be considered successful adaptation. Initially, resilience was based on an absence of psychopathology, but in order to contribute information beyond the traditional study of mental ill health, a resilience operationalisation arguably requires more detail beyond an absence of problems (Bonanno, 2012). Several researchers have therefore suggested an additional dimension of mental wellness (Miller-Graff, 2020), healthy adjustment (Bonanno, 2012), or subjective wellbeing (Grych et al., 2015). There are also multiple possible dimensions of functioning that could additionally be considered important to successful adaptation, such as physical health, academic achievement, or other developmentally relevant (e.g., social) skills (Miller-Graff, 2020). What is successful can also be extremely subjective, and depend on culture or context (Schwarz, 2018). However, there remains an argument that if adversity is extreme and highly

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likely to lead to psychopathology, avoidance of that outcome can be a success in and of itself (Yule et al., 2019).

The key to this approach is the fundamental, but often overlooked, component of adversity in the definition of resilience. In order to infer resilience, there must be some form of adversity *to be resilient to*, that is sufficiently contextually severe to threaten usual functioning. Ungar (2015) has argued that a resilience “*diagnosis*” needs to take into account the characteristics of the adversity in addition to the outcomes. We can therefore use the adversity to determine what a successful outcome might look like in that context. Some have done this statistically using a residuals-based approach, plotting a regression line of psychological symptoms against adversity exposure in the sample of interest (Cahill et al., 2022; Sim et al., 2019). Children below the line are said to be doing better than expected compared to the total sample data, and labelled resilient. This is a neat way of integrating adversity and outcomes, but is limited by the characteristics of the sample. For example, if all children were struggling and showing very high symptoms of PTSD, depression, and externalising problems, a child could be doing better than expected compared to the others but still have a high number of symptoms. The optimal method would therefore be a combination of contextual considerations and absolute outcome scores.

1.3.3. Our approach to measuring resilience: manifested resilience

Given the considerations reviewed above, the working definition of resilience for this thesis is *the process of adapting to function better than expected in the context of adversity* (Masten, 2016; Miller-Graff, 2020). Crucially, we have chosen not to use the word ‘successful’ so as to avoid the implication that some children are unsuccessful. For the purpose of the thesis, we focus on manifested resilience (Masten, 2016; Miller-Graff, 2020), using an outcome-oriented approach in order to investigate which potential risk and

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protective factors determine how well Syrian refugee children living in camps in Lebanon are able to adapt. Given the extreme nature of the adversity that this group have faced, we consider avoiding psychopathology across multiple dimensions (PTSD, depression, externalising behaviour problems) as evidence of functioning better than expected (Yule et al., 2019), but additionally test whether these children score higher on the positive outcome dimension of general wellbeing (Grych et al., 2015). Crucially, these outcome measures should be validated to ensure they are sufficiently contextually sensitive, as well as clinically relevant. We also emphasise that multiple possible trajectories of response to adversity (i.e., resistance, growth, recovery) can fit within our definition of resilience (Masten & Narayan, 2012). Finally, we acknowledge the importance of a systems-based perspective (i.e., generative resilience) and its premise of not placing responsibility for mental health on the individual (Ungar, 2018), as well as the other possible manifestations and dimensions of resilience that we do not have the scope to measure or include (e.g., physical health, academic competence; Miller-Graff, 2020). We have constrained our operationalisation of resilience in order to test what we believe to be the most important questions: Which refugee children are doing better than expected across a set of common responses to war and displacement (Kien et al., 2019), and why?

1.4. Risk and protective factors

Despite the popularity of resilience as a concept, the majority of research into predictors of refugee children's outcomes has focused on individual psychological disorders. Nevertheless, the risk and protective factors that have been identified in relation to individual dimensions of mental health may go some way to answering why some children demonstrate resilience across multiple dimensions and others do not. Unsurprisingly, war exposure is an important predictor of outcomes in refugee children. In general, war has a cumulative effect,

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whereby experiencing a greater quantity of traumatic war events is associated with worse mental health (Çeri & Nasiroğlu, 2018; Müller, Büter, et al., 2019), but the quality of exposure also seems to be important (Amone-P'Olak & Ovuga, 2017; Gormez et al., 2018; Panter-Brick et al., 2015; Regev & Slonim-Nevo, 2019). Witnessing violent events such as torture, the death of or threats to loved ones, and directly experiencing danger to the self, including imprisonment or sexual abuse, have all been associated with greater mental health problems in children compared to other forms of war exposure, such as witnessing bombing (Amone-P'Olak & Ovuga, 2017; Gormez et al., 2018; Regev & Slonim-Nevo, 2019).

Traumatic war events also have the potential to affect children in the long term. For example, a follow-up study in Denmark found that the number of different traumatic events young refugees experienced pre-migration were still predictive of mental health problems 8-9 years after displacement (Montgomery, 2008). That being said, the length of time since war exposure and displacement is often negatively correlated with symptoms; children tend to show improvements as time passes (Uysal et al., 2022). However, in some settings the opposite is true (Braun-Lewensohn & Al-Sayed, 2018; Nasiroğlu et al., 2018), though this is likely to be a function of post-migration experiences. For example, in the long-term follow-up reported by Montgomery (2008), the number of post-migration traumatic events experienced by the young refugees differentiated those who showed improvements at follow-up from those that remained traumatised.

Indeed, a variety of factors are likely crucial in determining whether children are able to adapt to the traumas they experience. Certain demographics such as age and gender have been associated with how refugee children respond to war and displacement. For example, girls generally report more PTSD (Beni Yonis et al., 2020) and internalising problems (Çeri & Nasiroğlu, 2018), while boys report more externalising problems (Çeri & Nasiroğlu, 2018), although this is not always the case (Braun-Lewensohn & Al-Sayed, 2018; Erucar et

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al., 2018; Gormez et al., 2018). Some studies find that older age is associated with more PTSD (Uysal et al., 2022) and internalising (Braun-Lewensohn & Al-Sayed, 2018) symptoms, whereas younger children are more likely to show externalising behaviour problems (Eruiyar et al., 2018). However, again findings are not consistent; some find evidence that older age is protective against internalising problems (Ahmad et al., 2015; Park et al., 2017), while others report no association between age and internalising or externalising problems (Betancourt, Yudron, et al., 2012). These inconsistencies could be explained by the relationship between age and other factors such as peer problems or war exposure (Eruiyar et al., 2018; Zevulun et al., 2017).

Although it is important to be aware of any systematic demographic differences that affect how well children are able to adapt, arguably the more important question is which of these more modifiable factors predict individual differences, in order to inform interventions. Previous research has identified a comprehensive selection of potential predictors of outcomes, ranging from individual resources such as trait optimism to wider socio-ecological risk factors such as post-displacement poverty. In order to synthesise and structure these findings, we can use an Ecological Systems Theory (EST) framework (Bronfenbrenner, 1979), according to which children are embedded in multiple systems from the more proximal to the more distal. The systems identified by Bronfenbrenner (1979) are the individual (e.g., psychological and biological factors), microsystem (close social systems e.g., the family), mesosystem (interactions between the microsystems), exosystem (proximal environment e.g., neighbourhood), macrosystem (wider social context), and chronosystem (time). Individual features within these systems can serve risk or protective functions, either exacerbating the effects of war on children, or protecting them and promoting more positive adaptation. There are also interactions between and within systems, whereby the distal

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systems impact a child via effects on the more proximal, and individual features within systems interact with one another.

In what follows, I will review the current evidence on predictors of refugee child mental health outcomes, starting with predictors at the individual level and moving outwards. I have separated the systems into (1) the individual, which includes the health, traits, and coping strategies of the child, (2) the immediate social environment, which is split into (a) the parent-child relationship and (b) other aspects of the social environment such as peer relationships and caregiver mental health, and finally (3) the wider refugee environment, which includes the social and physical aspects of the post-migration environment (Figure 1.2). I will start by discussing predictors separately, before reviewing the more limited evidence regarding how these might interact with one another in line with EST.

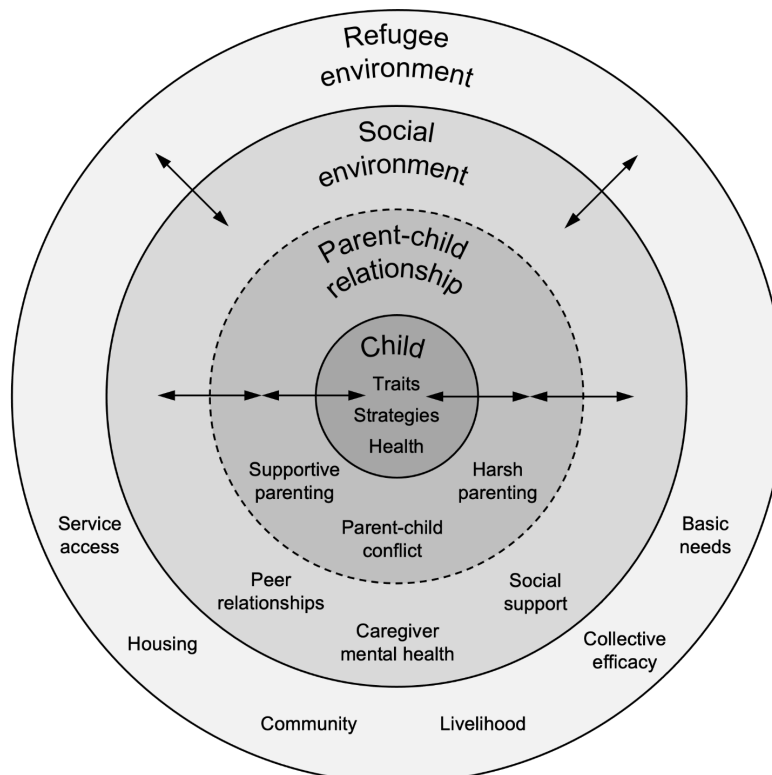


Figure 1.2. Ecological systems-based framework for refugee child mental health. Outer layers represent systems more distal to the child represented in the centre. Items within each system can interact with one another in addition to interactions between systems. Based on Bronfenbrenner (1979).

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1.4.1. Individual traits, strategies, and health

At the individual level, children can have a number of psychological assets and resources that may help them adapt to the experience of war. Certain traits, such as self-esteem, self-efficacy, and optimism might serve protective functions (Aitcheson et al., 2017; Chung et al., 2017; Marley & Mauki, 2019; Speidel et al., 2021), and even go further in actively promoting positive function via post-traumatic growth (Sleijpen et al., 2016). The way in which children think about the future may affect how they cope with past and current circumstances. Youths with a history of war exposure stress the importance of hope for the future (Nyarko & Punamaki, 2020) and future orientation has buffered the effects of trauma on mental health in children orphaned or made vulnerable by HIV/AIDS (Zhang et al., 2009). However, its function is not consistent in children affected by war; positive expectations for the future seem to be related to fewer behavioural problems, but may not affect internalising problems or PTSD symptoms (Braun-Lewensohn & Al-Sayed, 2018; Klasen et al., 2010).

Continuing on the theme of hope, religion may provide a sense of purpose, and be used by children as a coping strategy (Nagi et al., 2021). In fact, belief in god was associated with decreased likelihood that children showed PTSD, internalising, or externalising symptoms in a sample of former child soldiers (Klasen et al., 2010). However, a sample of adolescents who had experienced the Bosnian War showed positive associations between religiosity and PTSD (Duraković-Belko et al., 2003). This could be linked to the religious components of the conflict, or there may be an extent to which traumatic experiences prompt more need for coping strategies such as focus on religion. That being said, positive coping strategies such as cognitive restructuring and support seeking have been associated with fewer PTSD and depression symptoms in some refugee children (Khamis, 2019a; Lee et al., 2020). General use of coping skills was also associated with resilience group membership according to the criteria of showing minimal to no symptoms of depression or anxiety in a

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sample of Palestinian adolescents in refugee camps (Aitcheson et al., 2017). Problem-focused coping, on the other hand, seems to predict PTSD (Elklit et al., 2012) despite generally being regarded as a positive coping strategy. This could be a result of the type of adversity that refugee children face, which may be so great that problem-solving is insufficient to make a difference in the same way as in less challenging contexts, instead exacerbating a sense of stress or hopelessness (Woltin et al., 2018).

On the other side of the coin, there are certain coping strategies that are explicitly considered maladaptive. Avoidance in particular has been associated with more emotional and behavioural problems in refugee children (Elklit et al., 2012; Khamis, 2019b; Lee et al., 2020). Its relationship with PTSD is more uncertain; avoidance seems to predict symptoms, but McGregor and colleagues (2015) report that the association is reduced when any confounding between avoidance and PTSD symptom scales is controlled for.

Beyond coping strategies, certain individual traits might increase children's risk when faced with war and displacement. According to the concept of Environmental Sensitivity (Pluess, 2015), some children may be more responsive to and affected by both adverse and supportive experiences. Studies with non-refugee children suggest that physiological reactivity to social, cognitive, and emotional challenges is associated with different outcomes according to levels of adversity in young children (Obradović et al., 2010). Those with higher reactivity showed more adaptive outcomes if they lived in conditions of low adversity, but more maladaptive outcomes if they had high family adversity. Trait sensitivity could therefore play a risk function in refugee children, who have experienced high levels of adversity. In fact, there is evidence that sensitivity can exacerbate the effects of war exposure on PTSD symptoms (Karam et al., 2019).

Finally, while the majority of individual factors discussed thus far reflect aspects of psychological and behavioural functioning, a potential risk factor worth noting is physical

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health. Worse physical health could make children more vulnerable to the physical and psychological effects of war and displacement. Indeed, worse child health, as reported by a caregiver, was associated with worse scores across internalising and externalising domains in a sample of refugee adolescents in Australia (Lau et al., 2018).

1.4.2. Social relationships

Moving outwards through the systems, social relationships can provide some of the most powerful resources to children faced with adversity, as highlighted by proponents of generative resilience (Masten, 2016; Miller-Graff, 2020; Ungar, 2018). More specifically, aspects of the family environment are some of the most consistently reported predictors of refugee child outcomes. Mothers in particular are highlighted as a source of strength (Nagi et al., 2021), and warm parenting is associated with reduced PTSD, depression, anxiety, and behavioural problems in refugee children (Eltanamy et al., 2021; Eruyar et al., 2020). Additionally, parents spending time with their children and overall family cohesion are associated with fewer symptoms of PTSD as well as emotional and behavioural problems in adolescents who have been exposed to war (Aitchison et al., 2017; Fayyad et al., 2017).

However, it is not only the warmth of the parent-child relationship that matters for children, other aspects of parenting may be equally important. In fact, authoritative parenting may have a protective function across internalising and externalising dimensions of child functioning (Smetana & Ahmad, 2018). More specifically, parental monitoring, or the extent to which parents are aware of their child's activities, seems to be associated with fewer problems as well as more positive outcomes, according to a meta-analysis of refugee children (Eltanamy et al., 2021). However, the function parental monitoring plays might depend on other factors. For example, Ahmad and colleagues report that it was associated with less norm breaking in boys only for those that perceived their mother as high in control (Ahmad

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et al., 2015). This emphasises the complexities of family relationships, and the importance of considering interplay between factors within the family system.

In terms of social support from sources outside the family, findings are more mixed. Dehnel and colleagues (2021) report that the social support aspect of generative resilience as measured by the Child and Youth Resilience Measure (Panter-Brick et al., 2017) is the aspect most highly protective against depression in a sample of Syrian refugee children. However, support from peers might be less protective than that from family (Betancourt, Salhi, et al., 2012) and the efficacy of family support might depend on the type of trauma children have been exposed to (Kliewer et al., 2021). The form in which social support is available can also make a difference; psychological support played a protective role in a sample of North Korean refugee adolescents, while practical support did not seem to have an effect (Park et al., 2017).

Where positive relationships with family and friends can help protect children, negative relationships can represent a source of stress over and above experiences of war and displacement. Experiencing maltreatment in the home is associated with increased depression, PTSD, and ADHD (Karam et al., 2019; Lee et al., 2020; Meyer, Yu, et al., 2017), while a general family functioning measure including parent-child conflict has been shown to predict child depression and behavioural problems one year later in a sample of Cambodian and Vietnamese refugees in the US (Sangalang et al., 2017). Hostile and rejecting parenting is also associated with internalising and externalising problems, although may not be related to PTSD (Eruyar et al., 2020; Lau et al., 2018).

Beyond the parent-child relationship, a caregiver's own mental and general health seems to be tightly interlinked with child mental health. Caregiver, and particularly maternal, PTSD, depression, anxiety, and general distress have been associated with child emotional, behavioural, and anxiety symptoms (Eruyar et al., 2018; Javanbakht et al., 2018; Sim, Bowes,

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et al., 2018). Caregiver physical health, which is strongly linked to mental health in refugees (Berthold et al., 2014) may also be related to child outcomes, as seems to be the case in the general population (Hong et al., 2021). Again, the association between caregiver mental and physical health and child PTSD is less clear (Erucar et al., 2018). This may be because caregiver distress and harsh parenting tend not to be sufficiently severe to elicit trauma responses, whereas maltreatment and neglect more often are.

Outside of the family environment, refugee children can be particularly at risk of experiencing peer victimisation (Samara et al., 2020), which has been shown to be associated with worse emotional and behavioural problems, as well as post-traumatic stress (Çeri et al., 2021; Damra et al., 2022; Samara et al., 2020). These experiences can also lead to loneliness, which we know to be influential in how adults adapt to war exposure (Chen et al., 2017), but research on its effect in refugee children is still lacking.

1.4.3. The refugee environment

Compared to the family environment, less research has been conducted on how aspects of the refugee environment impact child mental health, but there is evidence that it may also be important. The wider social environment and belonging to a supportive community seem to play a protective role in some studies (Zwi et al., 2018), but others find no association between community connectedness and child symptoms (Betancourt, Salhi, et al., 2012). Other more practical points such as caregiver education might also be protective (Sapmaz et al., 2017) although not all have found such associations (Khan et al., 2019) and one study found the opposite effect regarding maternal literacy (Panter-Brick et al., 2015). In this study of war-affected Afghan youth, those that showed increased distress over time were more likely to have a literate mother. However, this pattern is likely related to the fact that

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literate mothers were more likely to have previously been employed, and for the family to have experienced a loss of income.

Indeed, in the same study, youths with rising distress were also more likely to come from a poorer household (Panter-Brick et al., 2015). Economic factors such as household income and caregiver employment might therefore be central, although rather than serving distinct risk or protective functions, it is more likely that they exist on a scale whereby relative deprivation and poverty is risky, while relative stability and wealth can be protective. Studies report that financial stability and parental employment are protective for children (Zwi et al., 2018) whereas paternal unemployment has been linked to child psychopathology (Sapmaz et al., 2017). Other factors related to economic status such as household assets have been shown to be associated with fewer internalising problems (Betancourt, Yudron, et al., 2012), but these findings are inconsistent between different groups of refugees (Meyer, Steinhaus, et al., 2017), and others find that factors such as housing or aid are not related to child mental health (Betancourt, Salhi, et al., 2012; Braun-Lewensohn & Al-Sayed, 2018). It may be that these factors affect children on a wider scale whereby location of resettlement and the broad services and living standards available do matter, but within samples living in similar camp settings there is not necessarily enough variation to see these effects (Beni Yonis et al., 2020; Khamis, 2019b).

Economic status is also linked with other established predictors of child outcomes, such as child labour, access to education, and household size. Child labour is often particularly dangerous in the refugee context (Habib et al., 2019), and has been associated with higher odds of depression (Meyer et al., 2020). Additionally, having no or an interrupted education, which can be a consequence of a child doing paid work, is a risk factor for refugee children (Scherer et al., 2020). Despite this, Meyer and colleagues (2020) identified that, in addition to increased odds of depression, child labour was in fact associated with decreased

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odds of anxiety. Being able to contribute to the household could be comforting for children despite the other risks associated with it (Rizkalla et al., 2020).

Finally, characteristics of the household may impact children. For example, having to share a living space with more people due to financial reasons has the potential to create crowding which could have a negative impact (Rizkalla et al., 2020). However, it may depend on the composition of the household, as having a larger family can have protective effects (Scherer et al., 2020; Wieggersma et al., 2011). In fact, family separation has been shown to act as a risk factor for refugee children. Separation from either the mother or father has been associated with more emotional problems (MacLean et al., 2019; Zwi et al., 2018), and the death of one or more parents is linked to higher rates of depression and PTSD (Beni Yonis et al., 2020; Meyer, Yu, et al., 2017). However, this did not apply in a sample of Rwandan children (Meyer, Yu, et al., 2017), and there is evidence that living with at least one biological parent may be protective (Meyer, Steinhaus, et al., 2017).

In conclusion, there are a variety of aspects of the refugee environment, as well as the family environment and individual child, that may serve risk or protective functions for refugee children. However, several findings are inconsistent. This may be due to interactions between predictors, or differences between specific populations or contexts.

1.4.4. Addressing environmental complexity: interplay between predictors

1.4.4.1. Interplay within systems

In order to understand what determines child outcomes, these potentially confounding effects must be addressed. As noted above, many aspects of the refugee environment, such as economic status and parental and child employment, are interlinked. It may therefore be the case that several factors impact children via indirect pathways through other factors. For example, as previously mentioned, income and parental employment are likely to impact

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whether the child needs to work, in turn affecting whether the child is able to go to school (Akesson & Sousa, 2019; Habib et al., 2019; Rizkalla et al., 2020). These practical or physical factors can also interact with social aspects of the environment. For example, high deprivation in an area can place a strain on social relationships within the community (Rizkalla et al., 2020).

Within the family environment, many factors are also likely interrelated. In particular, there is evidence that a caregiver's mental health affects their parenting and the parent-child relationship (Bryant et al., 2018; Sangalang et al., 2017; Sim, Bowes, et al., 2018; Van Loon et al., 2014). For example, parents struggling with their mental health tend to monitor their children less (Van Loon et al., 2014) and parent more harshly (Bryant et al., 2018; Sim, Bowes, et al., 2018).

Finally, within the individual level, there may be interplay between factors, such as between coping strategies and self-esteem (Cherewick et al., 2016), or between these factors and child mental health. In addition to being influenced by certain assets or strategies, it is also likely that a child's mental health in turn influences the resources that they are likely to utilise. For example, there is evidence that avoidance coping and depression have a bi-directional relationship (Grant et al., 2013).

1.4.4.2. Interplay between systems

Crucially, there is also interplay between systems. In fact, aspects of the wider environment may impact children primarily via closer systems such as the family, in a series of cascading effects, in line with EST (Bronfenbrenner, 1979). For example, certain aspects of the wider refugee environment, such as financial concerns and availability of resources, are traditionally the concern of caregivers rather than children. Indeed, refugee mothers report that feeling unable to provide for their children causes them distress (Rizkalla et al.,

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2020), while practical stresses have been linked with refugee caregiver anxiety and harsh parenting (Bryant et al., 2018; Sim, Fazel, et al., 2018). Parents also report that when they are worried about the environment they monitor their children and try to restrict their movements more, keeping them at home where they are safe (Akesson & Sousa, 2019). On the other hand, having employment affects the extent to which parental monitoring is possible. In this way, different factors can have competing and conflicting effects on caregivers. Importantly, a supportive wider environment and community can also help improve maternal mental health and reduce harsh parenting behaviours (Sim et al., 2019). As both caregiver mental health and parenting are often associated with refugee child mental health, it is likely that these environmental impacts on caregivers in turn influence children (Bryant et al., 2018; Sangalang et al., 2017). However, how specific aspects of the refugee environment relate to the family and child is currently not well understood.

As touched on above, in addition to the impacts of the various systems such as the family on children, it is important to acknowledge that the child can also impact the systems in which they are embedded. For example, child mental health can affect parenting (Rizkalla et al., 2020), such as in the case of a child exhibiting behavioural problems, where a caregiver might feel the need to parent more harshly, or monitor more closely. A child's mental health status can also impact relationships outside of the family; for example, noticeable symptoms could impact the social support they are able to access, due to peer stigmatisation (O'Driscoll et al., 2012). There is also considerable evidence from non-refugee populations that children's functioning can impact their caregivers and the extent to which they parent harshly (Obradović & Hipwell, 2010). However, despite acknowledgement of the importance of child agency, particularly in the resilience literature, there remains a lack of research on the impact a refugee child can have on their environment.

1.5. Remaining questions

Within the literature reviewed above, several prominent research gaps remain. First, Syrian refugee children living in ITSs in Lebanon, and refugees living in camps in LMICs more broadly, are an understudied group, despite their large number and increased vulnerability (Scharpf et al., 2021; Vossoughi et al., 2018). Therefore, though there is a relative abundance of research on predictors of refugee mental health generally, we do not know whether these findings apply to Syrian refugees in camp settings. This is important because of the inconsistencies we see between different samples, not only in terms of outcomes (Nickerson et al., 2022), but also in terms of the role purported risk and protective factors play (Betancourt, Salhi, et al., 2012; Elklit et al., 2012; Khamis, 2019a; Zwi et al., 2018).

Second, there is a general lack of studies of refugee children with more than one wave of data, particularly in LMICs (Scharpf et al., 2021). Cross-sectional data poses a problem for studying resilience as children could be struggling at one timepoint but recover at a later time (Hermosilla et al., 2021; Masten & Narayan, 2012; Müller, Gossmann, et al., 2019; Purgato et al., 2020). Not only is the process of adaptation dynamic, so too are refugee settings, particularly those that are more resource-scarce (Human Rights Watch, 2018; UNHCR et al., 2021). In addition to providing a more accurate understanding of this change and its association with child mental health, more than one wave of data can allow for estimation of the directionality of associations. This is important in order to establish whether purported predictors are influencing children's mental health, or if the effect is in the opposite direction. For example, does use of certain coping strategies lead to increases in mental health problems (Elklit et al., 2012), does worse mental health lead to increased use of strategies to cope, or can both be true (Grant et al., 2013). Finally, the combination of a lack of longitudinal data and an overwhelming focus on predictors of child outcomes means that few studies consider

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the reciprocal impact of the child on their environment. While certain factors, such as parenting, may have strong effects on children, it is important to remember that the child is also an actor within their environment, and a child's symptoms could influence the people around them or play a role in determining how they are treated by others (Obradović & Hipwell, 2010; O'Driscoll et al., 2012).

Third, although the topic of refugee resilience is popular due to its hopeful narrative, there remains a lack of studies looking at manifested resilience as measured across multiple dimensions in a way that is clearly defined, and using measures that have been validated for the context. Many studies investigating predictors of mental health in refugee children focus on how predictors relate to distinct, individual outcomes (Eltanamy et al., 2021; Eruyar et al., 2018; Khamis, 2019a). However, children can be doing poorly in one dimension and appear to be fine in another (Scherer et al., 2020). Over time, children can also show simultaneous improvements in some domains and deterioration in others (Hermosilla et al., 2021). Moreover, some predictors only seem to apply to certain outcomes (Braun-Lewensohn & Al-Sayed, 2018; Eruyar et al., 2018; Klasen et al., 2010). In order to gain a complete picture of functioning and understand what factors would be most impactful as targets for interventions, multiple dimensions of mental health need to be taken into consideration.

Fourth, war exposure is often not included in analyses, and is at best controlled for as a total score, not accounting for the different effects that specific types of war experience could have on children (Dehnel et al., 2021; Fayyad et al., 2017; Karam et al., 2019; Khamis, 2019a, 2019b; Müller, Büter, et al., 2019; Sleijpen et al., 2016; Speidel et al., 2021). This poses a problem for the 'diagnosis' of resilience, for which there needs to be information about the adversity that a child is resilient to (Ungar, 2015). Moreover, war experiences affect not only outcomes, but also the function that post-migration factors play in affecting those outcomes (Çeri & Nasiroğlu, 2018; Kliwer et al., 2021; Regev & Slonim-Nevo, 2019).

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Results are therefore likely to be confounded by the way in which children's specific war experiences affect how they interact with their current environment, if war exposure is not sufficiently accounted for.

Fifth and finally, there are as yet no studies looking at interactions between all the systems from the wider environment to the child in humanitarian settings that consider the details of the refugee environment, and do this at multiple timepoints. Practical and social aspects of the wider environment have inconsistent associations with child mental health (Betancourt, Salhi, et al., 2012; Zwi et al., 2018), but seem to be influential in regard to caregiver mental health (Sim, Bowes, et al., 2018; Sim et al., 2019). As caregiver mental health and parenting are some of the most consistent predictors of child outcomes (Eltanamy et al., 2021; Eruyar et al., 2018; Sangalang et al., 2017), it is crucial to understand what factors influence the family and how these pathways impact child mental health, in order to understand at what level to target interventions.

1.6. Thesis aims and structure

1.6.1. Objectives

The aim of this thesis is to address the gaps in the literature outlined above, and in so doing further our understanding of individual differences in risk and resilience in response to war and displacement, in a particular sample of Syrian refugee children living in informal camps in Lebanon. More specifically, this can be broken down into five individual aims:

1. Estimate the proportion of children who could be described as resilient.
2. Identify predictors of risk and resilience.
3. Investigate how mental health and resilience change over time.
4. Investigate reciprocal relationships between children and their environment.

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5. Investigate the mediating pathways through which environmental factors impact the child.

1.6.2. Thesis overview

I will address these aims over the course of the following five chapters. In Chapter 2, I introduce the sample of children that the work is based on and provide the details of recruitment, data collection, and measures. All data used in this thesis come from the BIOPATH study, a two-wave survey completed by Syrian refugee child-caregiver dyads living in ITSS in Lebanon. Children and their primary caregiver (primarily the mother) completed separate questionnaires via interview, reporting on their mental health, the child's war exposure, and a list of hypothesised risk and protective factors informed by the literature reviewed above. Questionnaires were completed at baseline with 1,600 dyads, and again at follow-up one year later with approximately two thirds of the baseline sample.

In Chapter 3, I take a categorical, person-centred approach to addressing the first two aims, and investigate what proportion of the children can be thought to demonstrate manifested resilience cross-sectionally at baseline, and what predicts whether children meet those criteria when war exposure is controlled for. I define resilience as scoring below clinically validated cut-offs for PTSD, depression, and externalising behaviour problems, while children scoring above any single cut-off are defined as having high levels of symptoms. I focus on these three outcomes as reliable and clinically meaningful indicators of mental health, according to validation in a subsample of the cohort. I match children meeting the resilience criteria with children who show high symptoms but who report the same pattern of war experiences, according to a novel matching approach, and investigate which individual, social, and socio-ecological measures predict group membership when war exposure is equal. I find that only 19.3% of children meet the resilience criteria, and that a

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range of predictors are associated with group membership. These findings emphasise the importance of considering multiple dimensions of mental health, and provide a series of factors with potential risk and protective functions.

In Chapter 4 I develop upon these findings by investigating resilience across two waves of data to address my third and fourth aims. First, I continue the categorical approach, extending the resilience groups into four groups (stable high symptom, stable low symptom, improving, deteriorating) depending on children's symptom scores at baseline and follow-up. Second, I investigate what factors differentiate these groups from one another. Third, I explore the factors that differed between groups using a dimensional, variable-centred approach, examining the directionality of their relationships with a continuous child mental health composite score, using cross-lagged panel models. I find that overall mental health improves in the sample from baseline to follow-up, but that over half (56.3%) of children remain at risk for mental health problems across both waves, and 10.3% deteriorate over time. I identify several predictors associated with child mental health, but also find evidence that child mental health may impact several aspects of the environment. In particular, self-esteem, maternal psychological control, child maltreatment, and caregiver depression show bi-directional relationships with child mental health. We can conclude from this that a family-wide approach is necessary to both understand and treat refugee children's mental health.

In Chapter 5, I address my fifth aim and narrow my focus to the family and refugee environments, in order to better understand how the predictors of child mental health identified in the previous two chapters might affect one another and the child. I apply a dimensional approach using structural equation models to test the mediating pathways from the refugee environment to caregiver mental health, the parent-child relationship, and child mental health. I run models separately for child PTSD, depression, and externalising

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behaviour problems, and repeat analyses at baseline and follow-up, in order to gain a more detailed understanding of how specific aspects of the environment affect different dimensions of child functioning, and test whether these pathways change over time. Notably, the wider refugee environment is predictive of child outcomes only indirectly, via effects on caregiver mental health, and physical aspects of the environment become more important at follow-up. Caregiver mental health also shows direct effects on child mental health, as well as indirect effects on child PTSD and depression via maltreatment. These results demonstrate the importance of a systems-based approach that considers the refugee context in addition to the family.

In Chapter 6, I synthesise my findings from the preceding three chapters, and offer a discussion of what conclusions can be drawn. In particular, I focus on answering my five aims: what can we conclude about the mental health and resilience of Syrian refugee children in Lebanon, what determines individual differences in response to war and displacement, how does the child shape their own environment, and how do different aspects of the environment have indirect effects on children via one another. I also discuss the limitations of my approach and what further research is needed. Finally, I make some suggestions as to how all of this information could be used to help children experiencing war and displacement.

Chapter 2: Methods and the BIOPATH Study

2. Methods Overview

All results in this thesis are based on data from the BIOPATH cohort study of Syrian refugees living in informal tented settlements (ITSs) in Lebanon (McEwen, Popham, et al., 2022). The cohort was established in 2017, to address the skew towards cross-sectional research in high income contexts in the existing refugee literature, and understand the pathways to individual differences in responses to war and displacement in a specific, highly vulnerable sample of Syrian refugee children living in refugee settlements in Lebanon. To this end, 1,600 children and their primary caregiver completed a broad range of questionnaires via interview in their settlements as a baseline, followed by repeat participation one year later by approximately two thirds of the baseline sample. Questionnaires included child war exposure, mental health outcomes, and a range of predictors previously associated with refugee child outcomes. All measures were assessed for validity in the study sample and modified where necessary. In this thesis I utilise these data to address my aim of understanding individual differences in responses to war and displacement in this vulnerable but understudied group of refugee children. For the purpose of the thesis, I additionally adapted the war exposure measure by combining child and caregiver report to improve reliability, and applied clinical cut-offs validated in a subsample of the study cohort (McEwen et al., 2020) to the child mental health outcomes to enable the creation of outcome groups.

This chapter details the setting and participants, methods, measures, and data preparation procedures for the BIOPATH study as a whole, provides the total sample characteristics, and describes the adaptations made to the war exposure and mental health measures. The contents are based partially on the profile paper for the study - *Cohort profile: biological pathways of risk and resilience in Syrian refugee children (BIOPATH)* - which has

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been published in *Social Psychiatry and Psychiatric Epidemiology* (McEwen, **Popham**, Moghames, Smeeth, de Villiers, Saab, Karam, Fayyad, Karam, & Pluess, 2022) and information from a study on a subsample of the cohort - *Validating screening questionnaires for internalizing and externalizing disorders against clinical interviews in 8 to 17-year-old syrian refugee children* – which has been published as a technical working paper (McEwen, Moghames, Bosqui, Kyrillos, Chehade, Saad, Abdul Rahman, **Popham**, Saab, Karam, Karam, & Pluess, 2020), but have been adapted into my own words. The specific methods relating to the sample selection and data analysis for each individual chapter can be found in their respective chapters.

2.1. Methods

2.1.1. Study design

The BIOPATH study was questionnaire-based, with the addition of hair and saliva samples that were collected for the sake of hormonal and genetic analyses, but not utilised in the current thesis. The study employed an accelerated longitudinal design, collecting data from children with a broad age range, at two waves one year apart. This allowed us to ask cross-sectional questions about predictors of risk and resilience, investigate changes in children's mental health, and investigate the relationship between mental health and predictors over time. This design also allowed us to control for the impact of age on processes of adaptation to war and displacement, in spite of the high mobility of the population, which precluded more waves of data collection. This thesis therefore utilises both cross-sectional and two-wave designs, in addition to combining categorical (i.e., person-centred) with dimensional (i.e., variable-centred) approaches to mental health and resilience.

In addition to the main cohort study, two subsequent related studies were conducted with subsamples of the BIOPATH cohort. First, the Validating Screening Tools (VaST) study

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was created to validate our measures of child mental health against clinical judgement, and create clinically and contextually relevant cut-offs for the scales (McEwen et al., 2020). This work has been used in the current thesis, so more details of the study and measures validation can be found in Section 2.3.3.2. of this chapter. Second, a randomised clinical trial (t-CETA) was conducted to trial a form of telephone therapy in the refugee settlement context (ClinicalTrials.gov ID: NCT03887312). None of the work from this trial is used in the current thesis, but we mention it here as it allowed us to offer free mental health services to any of the children from BIOPATH who expressed a need, as described in Section 2.1.2 below.

2.1.2. Ethics

The BIOPATH study was performed in accordance with the ethical standards as laid down in the 1964 Declaration of Helsinki and its later amendments or comparable standards. Ethical approval was granted by the Institutional Review Board of the University of Balamand/Saint George Hospital University Medical Center, Lebanon (ref: IRB/O/024-16/1815). The study was also reviewed by the Lebanese National Consultative Committee on Ethics and approved by the Ministry of Public Health. The sponsor, Queen Mary University of London, reviewed the study for compliance with all relevant legal and regulatory requirements.

Free mental health services were offered to anyone from participating communities, as an additional service not directly related to the study aims. Service access was not dependent on study participation, to reduce the risk of perceived pressure to participate. Services were provided by an international non-governmental organisation (NGO) that delivers primary care and mental health services in Lebanon, either as part of their standard services or through t-CETA.

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2.1.3. Participants and data collection

2.1.3.1. Participants

Syrian refugee child-caregiver dyads living in ITSs in the Beqaa region of Lebanon were recruited for the study. The ITSs were composed of informal shelters made from materials such as timber and canvas or plastic sheets and often comprising one single room housing many family members. The settlements tended to be crowded, containing up to approximately 70 shelters, and were located between agricultural fields, lakes, and farms. Floods, snow, fires, animals, and searches and evictions by security forces presented practical challenges common to the settlements. Families in these settlements experienced poverty, food insecurity, and did not have legal residence, necessitating reliance on informal, seasonal work. Families were eligible if (1) they had left Syria because of the war, no more than four years prior to recruitment, (2) the child was aged 8-16 years, and (3) a primary caregiver, typically the mother or the caregiver who spent the most time with the child, was available to participate.

2.1.3.2. Recruitment at baseline

Recruitment and baseline data collection were completed between October 2017 and January 2018. Purposive cluster sampling was used to select settlements to target for recruitment, to ensure settlements with varying levels of vulnerability were included. Seven municipalities were identified with sufficient ITSs from the three highest levels of vulnerability, out of a possible five levels according to the Multi-Deprivation Index, Lebanese population dataset, and refugee population figures (UNICEF, 2017). From these municipalities, small-to-medium sized ITSs were selected. Permission to access the settlements was secured from the Ministry of Defence, local army intelligence units, and from municipalities where necessary, as was agreement from the community leader

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(chawich) of each ITS to conduct the study. At baseline, 77 ITSs were visited. Recruitment took place on a day after the initial visit so that the community leader had time to inform residents of the ITS about the study. There was someone available to speak to the research team at 97.9% of the shelters within the settlements.

In each ITS, all present families were approached. Where more than one child in the family was eligible to participate, the child whose birthday was closest to the date of recruitment was selected, to avoid selection bias. Families who were interested and eligible (i.e., left Syria no more than four years previously, child aged 8-16, primary caregiver available to participate) completed the informed consent procedure. If the caregiver gave their informed consent, the child was also asked for their assent. The informed consent process was adjusted to account for low literacy and educational levels: the study was explained verbally by trained research staff and was supported by a written information sheet and a simplified easy-read version with photos demonstrating sample collection. Research staff checked participants' understanding of the study, addressed misunderstandings, answered questions, and discussed concerns. Caregivers and children were asked to sign consent/assent forms or provide a thumb print in place of a signature. Financial compensation was offered to families for their time, but families were not informed about this until after they had agreed to take part, to reduce the risk of coercion to participate.

At baseline, 2282 families were approached, 1,688 (78%) of whom were interested and eligible, and 1,600 (70.1%) of whom consented to participate and completed data collection (Figure 2.1). The majority of families who were not eligible did not have a child within the age range (63.6%), or had left Syria more than four years previously (52.8%). Of the eligible families who did not consent to participate, 35.2% gave no reason, and 50% did not want or were unable to provide hair and saliva samples.

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2.1.3.3. *Follow-up*

Follow-up was completed one year after recruitment and initial participation, between October 2018 and January 2019 ($M = 51.55$, $SD = 1.84$ weeks). Each community leader was contacted for permission to re-visit the ITS. To maximise the chance of being able to re-contact families, we asked the community leader and several families in each ITS (contacted by phone) to inform other families of the visit date. If families had moved, they were contacted over the phone to determine where they had moved to and their reason for moving. If they could not be contacted via phone, neighbours were asked about the location and reason for their move, but it was not always possible to get this information. Participants were eligible for follow-up if the same child and caregiver were available. If a child was no longer living with the same caregiver, the child was asked if there was another caregiver who knew them well enough to complete the survey; if not, they could opt to participate without a caregiver. Often, the caregiver was no longer available because the child had married, and in other cases the participating caregiver differed because the primary caregiver had either moved away or returned from abroad.

Given the known mobility of this population, we expected to follow-up approximately two-thirds of the initial sample. Consistent with our predictions, we were able to contact or find information about 1,438 families across 70 ITSs, 1,009 of whom consented to participate and completed data collection (re-participation rate 63%; Figure 2.1). Some ITSs from baseline were not visited, or were visited but not all families interviewed, because residents were working, bad weather prevented visits, or the study period had ended. Of the families the team re-contacted or found information about, 311 (21.6%) had relocated, the majority (71.4%) of whom it was known where they had moved to. Over a quarter (28.8%) were reported to have moved back to Syria or to another country. Residents of some ITSs had moved due to evictions. It was possible to follow up 17 families who had moved within the

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region where data collection was taking place; the majority of families who completed follow-up data collection (98.3%) were still living in the same location.

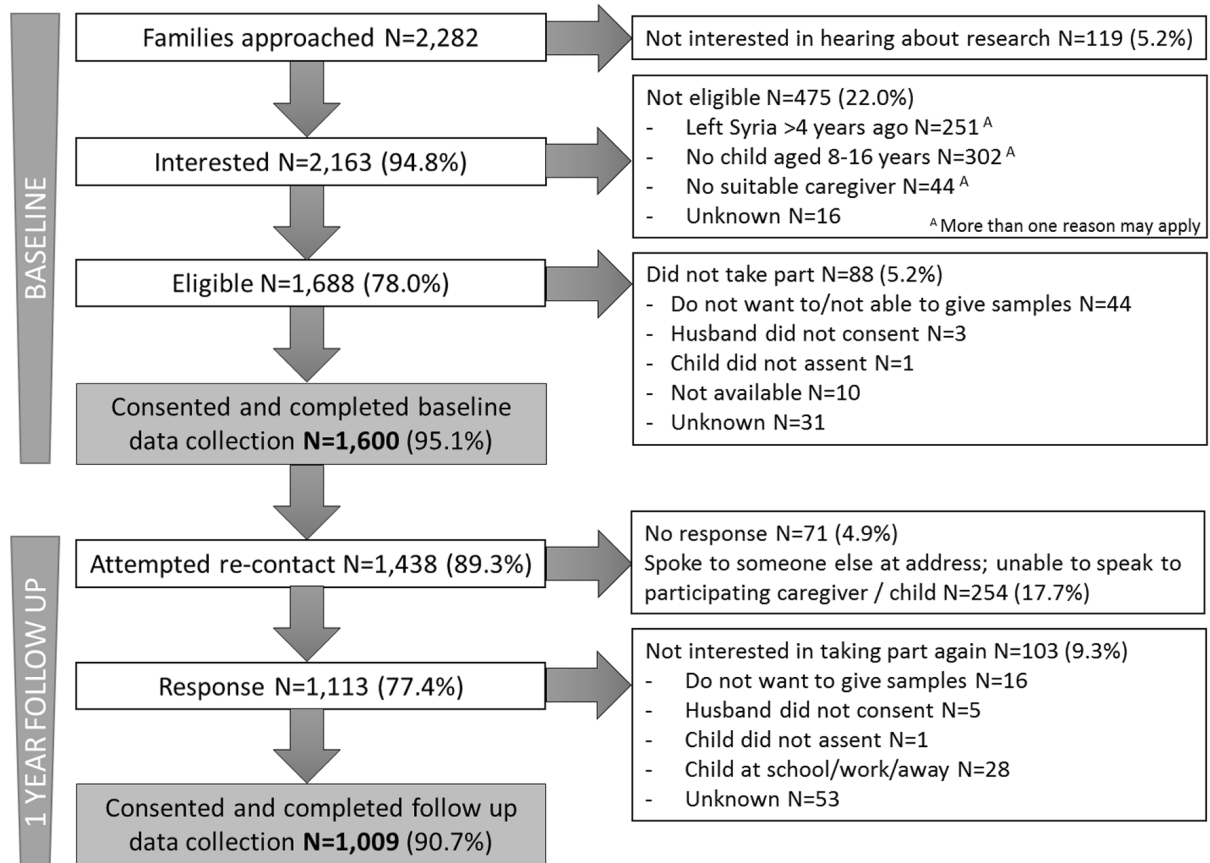


Figure 2.1. Numbers from BIOPATH recruitment and follow-up. From McEwen et al. (2022).

2.1.3.4. Data collection

Children and caregivers completed questionnaires in Arabic via interview separately but simultaneously, with different interviewers. Interviews were conducted in families' homes in the settlements. Where possible, interviews were conducted in different rooms to maintain privacy. Where families were living in shelters comprised of a single room, the child and caregiver were interviewed at opposite ends of the room, with their backs to one another, and the interviewers spoke in low voices to try to maximise privacy. Visual aids (e.g., Figure 2.2) were available, which participants could point at as an alternative to

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answering questions orally, providing a response format for any case in which children or caregivers did not want to answer out loud, due to privacy or other concerns. Interviews lasted approximately 50-60 minutes.

Interviewers were local, Lebanese, native Arabic speakers, with prior experience working with NGOs and collecting data as part of other research projects in the Beqaa region. All interviewers underwent training for the BIOPATH study specifically, including: introduction to mental health from a mental health clinical supervisor, communication skills with children, research ethics, data collection and documentation, identifying risk issues and taking referrals for mental health and gender based violence protection services, and a focus on Syrian Arabic dialects in relation to the survey questions.

Child: Dep.

I'm going to read you a list of the ways you might have felt or acted. Please tell me how much you have felt this way during the past month.

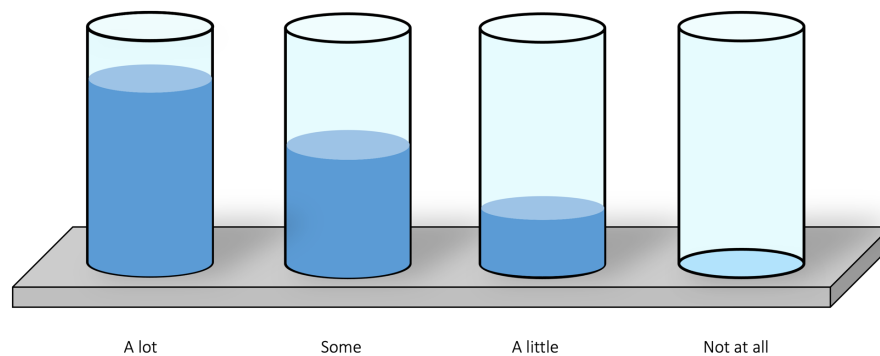


Figure 2.2. Visual aid for abridged CES-DC. This is an example of the visual aids provided to the children to aid understanding of response options on questionnaire items. The versions used in the study were in Arabic, with glass order moving from right to left with the response options. This version is for the abridged CES-DC; similar visual aids were used with each measure.

2.2. Sample

2.2.1. Data preparation

2.2.1.1. *Child age*

Reported age and date of birth were recorded at each wave of data collection. In order to meet eligibility criteria, children needed to be aged between 8 and 16 years at recruitment. However, in some cases caregivers did not know or have a record of the child's exact date of birth, meaning there was some uncertainty about the child's age. We did not exclude families without documentation that might have a date of birth recorded (e.g., UNHCR registration documents) in order to avoid biasing the sample away from the most vulnerable families, but at follow up most families (96.3%) were registered with UNHCR and paperwork was checked to confirm the child's identity. Date of birth was taken from UNHCR documentation where possible. However, it should be noted that UNHCR documents sometimes have an estimated date of birth if the family did not have other documentation stating the child's date of birth when registering with UNHCR.

Where both age and date of birth were available, data were inspected for consistency within and between waves (e.g., checking if reported age was consistent with date of birth and if baseline was consistent with follow-up). Based on the consistency of data, the date of birth that was judged most likely to be correct following discussion by the research team was used to calculate the age at each data collection point and the degree of confidence in the calculated age was defined. In the majority of cases, we judged that we could be very confident (68.5%) or fairly confident (19.8%) that the child's age was correct. In a minority of cases (11.7%) there was greater uncertainty about the exact age. Where date of birth was missing or clearly incorrect, only the reported age was used. The age variable reported in this paper is based on the calculated age rounded to the nearest year or, where date of birth was missing or not accurate, the reported age.

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Using this new age variable, the age range at recruitment was 6-19 years. While this means that some children fell outside of the age range we planned to sample, we did not automatically exclude the data from children on this basis. Data was excluded from one child who fell below the eligible age range (< 8 years) because the interviewers noted that they seemed young and struggled to understand the questions. Data were retained from other children who were possibly younger than 8 years, but for whom the interviewer did not express concerns about their understanding.

2.2.1.2. Time since leaving Syria

Caregivers reported when they left Syria at each wave of data collection as a time range (e.g., 0-6 months ago, 7-12 months ago, etc.). The earliest and latest dates they could have left Syria were calculated for each wave using this time range and the date of data collection. The earliest time category was unbounded (i.e., more than 4 years ago), so the start of the Syrian civil war (15th March 2011) was used as the earliest timepoint. For families with two waves of data we checked how consistent their reports of time since leaving were by examining how much the two reported date ranges overlapped. There were 591 (37.1%) families in which there were only data from baseline. In 512 (32.1%) families there were data both from baseline and follow-up, and the reported time ranges overlapped. In 389 (24.4%) families the reported ranges did not overlap but the gap was less than one year. In 103 (6.5%) cases the ranges did not overlap and the gap was greater than a year. To overcome any discrepancies in reported time between the two waves, we took the midpoint of each reported time range and took the average of the dates. This was then converted back into a categorical variable in 12 month bands.

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2.2.1.3. Exclusions

From the original 1,600 child-caregiver dyads recruited at baseline and 1,009 at follow-up, we excluded nine families: seven children who we later discovered had participated twice at baseline, one child who we discovered was under the age of 8 at baseline and whose interviewer believed they did not understand the questions, and one family who revealed they did not live in a settlement. This left us with a total sample of 1,591 families at baseline and 1,000 at follow-up.

2.2.2. Sample characteristics

2.2.2.1. Baseline ($N = 1,591$)

The final age range for the total baseline sample after data cleaning and exclusions ($N = 1,591$; Table 2.1) was 6-19, with an average age of 11.44 ($SD = 2.44$). The sample contained almost an equal number of boys and girls (52.5% female). A very small number (1.6%) of the children were married or engaged. 39.0% of children had no access to any form of education according to both self- and caregiver-report. 25.0% were classified as likely having some access to education, meaning that either the child or caregiver had reported none and the other had reported some, or that both had reported no current education but the caregiver said the child had some within the past six months. 35.9% were classified as having access to school, where both child and caregiver agreed that the child had some access.

The vast majority of caregivers were female (95.4%), predominantly the child's mother (89.4%). Other female caregivers included the child's stepmother, grandmother, aunt, or sister. Approximately half (46.7%) of the families reported leaving Syria within the three years before data collection, with the remainder having left more than three years prior. Families were primarily Syrian, although 1.4% of children and 0.9% of caregivers reported other nationalities. 96.8% of the sample were Sunni Muslim, the religious majority in Syria.

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Households had on average 7.71 ($SD = 2.59$) people living in the same shelter, with a range from 2 to 24 household members. The majority of families (78.6%) were all registered with UNHCR, and approximately 80% were living in the most and second most vulnerable localities (UNICEF, 2017), with the remainder living in the third most vulnerable, out of five categories. The majority of caregivers had received no or only basic education themselves (89.5%) and 20.5% of families reported no literacy at all in any of the adults in the household. The majority of caregivers were also not currently employed (86.8%). 63.6% of families reported receiving food assistance, and 35.9% reported cash assistance, but 74.1% reported an income of under 30 US Dollars (46,000 Lebanese Pounds) per week. However, reports of income and work may not be completely accurate, as refugees in Lebanon are typically not allowed to work and participants may have had concerns as to with whom this information might be shared.

For the sake of simplicity, the following umbrella terms will be used to refer to the sample from hereon: (1) ‘child’ will refer to all children and adolescents who participated, and (2) all participants will be referred to as Syrian, as all families had been living in Syria and were displaced by the war.

2.2.2.2. Follow-up ($N = 1,000$)

1,000 (62.9%) of the original baseline children completed follow-up approximately one year later (Table 2.1). Nine primary caregivers were not available at follow-up because the child was married and no longer living with their caregiver, and follow-up data from one caregiver was lost due to a technical issue. For those families, only the child completed the questionnaires. Of the 990 caregivers that completed follow-up, 93.1% were the same person as at baseline. For a small number of families the original caregiver was no longer available because they had moved or returned to Syria (1.5%), another caregiver had taken

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responsibility for the child (1.9%), or other reasons not given, in which cases a different caregiver took part.

The retained sample (i.e., families with follow-up data) consisted of children who were slightly younger at baseline compared to the baseline-only sample ($t(1185.9) = 3.84, p < .001, d = .07$). Retained families were also more likely to have the mother participating as the primary caregiver ($\chi^2(11) = 29.25, p = .002, \text{tau} = .003$), to have left Syria more than 3 years before baseline data collection ($\chi^2(1) = 22.79, p < .001, d = .12$), to be registered with UNHCR ($\chi^2(2) = 18.11, p < .001, d = -.08$), to receive food assistance ($\chi^2(1) = 9.81, p = .002, \text{tau} = .006$), and to have some literate adults in the household ($\chi^2(4) = 9.86, p = .043, d = .06$). The retained families were also less likely to be from the most vulnerable localities ($\chi^2(2) = 29.84, p < .001, d = .09$) and less likely to report that the primary caregiver had a job at baseline ($\chi^2(1) = 6.54, p = .011, \text{tau} = .004$), although more caregivers reported having a job at follow-up. Retained children were more likely to have some access to education at baseline ($\chi^2(2) = 21.24, p < .001, d = .11$), but access to education decreased at follow-up. However, all the effect sizes of these differences are small and therefore unlikely to have substantial effects on results.

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Table 2.1. Sample characteristics

Measure	Baseline sample (<i>N</i> = 1,591)	Follow-up sample (<i>N</i> = 1,000)	Comparison of baseline vs. follow-up sample	
			Test statistics	Details
Child age at baseline, M (SD) [range]	11.44 (2.44) [6-19]	11.26 (2.38) [7-19]	$t(1185.9) = 3.84, p < .001, d^a = .07$	Retained sample younger at baseline
Child gender, n (%) female	836 (52.5%)	535 (53.5%)	$\chi^2(1) = 0.98, p = .321$	
Caregiver age, M (SD) [range]	39.01 (8.58) [18-75]	38.79 (8.45) [18-75]	$t(1586) = 1.37, p = .172$	
Caregiver gender, n (%) female	1518 (95.4%)	962 (96.2%)	$\chi^2(1) = 3.82, p = .051$	
Caregiver relationship to child, n (%)				
Mother	1422 (89.4%)	909 (90.9%)	$\chi^2(11) = 29.25, p = .002, \text{tau}^b = .003$	Retained families more likely to have mother complete the study
Father	64 (4.0%)	32 (3.2%)		
Stepmother	25 (1.6%)	16 (1.6%)		
Grandmother	24 (1.5%)	15 (1.5%)		
Sister	20 (1.3%)	13 (1.3%)		
Aunt	16 (1.0%)	3 (0.3%)		
Brother	6 (0.4%)	5 (0.5%)		
Uncle	3 (0.2%)	1 (0.1%)		
Cousin	3 (0.2%)	3 (0.3%)		
Other	8 (0.5%)	3 (0.3%)		
Missing		11 (1.1%)		
Different caregiver at follow-up, n (%)		68 (6.8%)		
No caregiver at follow-up, n (%)		10 (1.0%)		
Time since leaving Syria at baseline, n (%) ≤ 3 years ago	743 (46.7%)	423 (42.3%)	$\chi^2(1) = 22.79, p < .001, d^c = .12$	Retained sample more likely to have left Syria more than 3 years ago

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Measure	Baseline sample (<i>N</i> = 1,591)	Follow-up sample (<i>N</i> = 1,000)	Comparison of baseline vs. follow-up sample	
			Test statistics	Details
0-12 months ago	295 (18.5%)	151 (15.1%)		
12-24 months ago	227 (14.3%)	131 (13.1%)		
24-36 months ago	221 (13.9%)	141 (14.1%)		
>3 years ago				
36-48 months ago	596 (37.5%)	332 (33.2%)		
>48 months ago	246 (15.5%)	245 (24.5%)		
Child nationality, n (%)				
Syrian	1568 (98.6%)	987 (98.7%)	$\chi^2(4) = 4.72, p = .317$	
Lebanese	8 (0.5%)	3 (0.3%)		
Palestinian	13 (0.8%)	9 (0.9%)		
Iraqi	1 (0.1%)	1 (0.1%)		
Other	1 (0.1%)			
Caregiver nationality, n (%)				
Syrian	1574 (98.9%)	990 (99.0%)	$\chi^2(3) = 4.11, p = .250$	
Lebanese	8 (0.5%)	4 (0.4%)		
Palestinian	5 (0.3%)	5 (0.5%)		
Iraqi	1 (0.1%)	1 (0.1%)		
Missing	3 (0.2%)			
Family religion, n (%)				
Sunni	1540 (96.8%)	967 (96.7%)	$\chi^2(5) = 9.61, p = .087$	
Shia	7 (0.4%)	4 (0.4%)		
Catholic	1 (0.1%)			
Other	3 (0.2%)	3 (0.3%)		

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Measure	Baseline sample (<i>N</i> = 1,591)	Follow-up sample (<i>N</i> = 1,000)	Comparison of baseline vs. follow-up sample	
			Test statistics	Details
None	13 (0.8%)	5 (0.5%)		
Prefer not to answer	24 (1.5%)	19 (1.9%)		
Missing	3 (0.2%)	2 (0.2%)		
Child married/engaged at baseline, n (%)	26 (1.6%)	11 (1.1%)	$\chi^2(1) = 0.08, p = .780$	
At follow-up		24 (2.4%)		
UNHCR vulnerability rating, n (%)				
Most vulnerable	613 (38.5%)	339 (33.9%)	$\chi^2(2) = 29.84, p < .001, d^c = .09$	Retained families less likely to be from the most vulnerable localities
Second most vulnerable	646 (40.6%)	450 (45.0%)		
Third most vulnerable	332 (20.9%)	209 (20.9%)		
Missing		2 (0.2%)		
Family members registered with UNHCR, n (%)				
All	1251 (78.6%)	809 (80.9%)	$\chi^2(2) = 18.11, p < .001, d^c = -.08$	Retained families more likely to be registered with UNHCR
Some	174 (10.9%)	111 (11.1%)		
None	162 (10.2%)	77 (7.7%)		
Missing	4 (0.3%)	3 (0.3%)		
Number of people in household at baseline, M (SD) [range]				
Adults	2.64 (1.48) [1-11]	2.64 (1.47) [1-11]	$t(1576) = 0.26, p = .794$	
Children	5.06 (2.12) [1-18]	5.03 (2.10) [1-18]	$t(1582) = 0.69, p = .488$	
Total	7.71 (2.59) [2-24]	7.67 (2.54) [2-24]	$t(1573) = 0.75, p = .456$	
At follow-up				

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Measure	Baseline sample (<i>N</i> = 1,591)	Follow-up sample (<i>N</i> = 1,000)	Comparison of baseline vs. follow-up sample	
			Test statistics	Details
Adults		2.70 (1.45) [1-11]		
Children		5.00 (2.05) [1-16]		
Total		7.70 (2.54) [2-22]		
Caregiver has current job at baseline, n (%)				
Yes	206 (12.9%)	113 (11.3%)	$\chi^2(1) = 6.54, p = .011, tau^b = .004$	Retained families less likely to report the primary caregiver had a job at baseline
Agriculture	169 (10.6%)	89 (8.9%)		
Manufacturing	6 (0.4%)	4 (0.4%)		
Construction	1 (0.1%)			
Wholesale/retail	1 (0.1%)	1 (0.1%)		
Other	24 (1.5%)	14 (1.4%)		
Missing	5 (0.3%)	5 (0.5%)		
At follow-up				
Yes		174 (17.4%)		
Agriculture		137 (13.7%)		
Manufacturing				
Construction				
Wholesale/retail		2 (0.2%)		
Other		34 (3.4%)		
Missing		1 (0.1%)		
Family income per week at baseline, n (%)			$\chi^2(5) = 2.92, p = .712$	
\$0-15/LBP 0-23,000	750 (47.1%)	471 (47.1%)		

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Measure	Baseline sample (<i>N</i> = 1,591)	Follow-up sample (<i>N</i> = 1,000)	Comparison of baseline vs. follow-up sample	
			Test statistics	Details
\$16-30/LBP 24,000-46,000	430 (27.0%)	276 (27.6%)		
\$31-50/LBP 47,000-76,000	242 (15.2%)	142 (14.2%)		
\$51-100/LBP 77,000-151,000	99 (6.2%)	66 (6.6%)		
\$101-150/LBP 152,000-227,000	27 (1.7%)	18 (1.8%)		
>\$151/>LBP 228,000	11 (0.7%)	7 (0.7%)		
Missing	32 (2.0%)	20 (2.0%)		
At follow-up				
\$0-15/LBP 0-23,000		432 (43.2%)		
\$16-30/LBP 24,000-46,000		253 (25.3%)		
\$31-50/LBP 47,000-76,000		165 (16.5%)		
\$51-100/LBP 77,000-151,000		59 (5.9%)		
\$101-150/LBP 152,000-227,000		22 (2.2%)		
>\$151/>LBP 228,000		15 (1.5%)		
Missing		54 (5.4%)		
Receive cash/voucher assistance, n (%)	571 (35.9%)	370 (37.0%)	$\chi^2(1) = 1.46, p = .228$	
At follow-up				
Receive food assistance, n (%)	1012 (63.6%)	665 (66.5%)	$\chi^2(1) = 9.81, p = .002, tau^b = .006$	Retained families more likely to receive food assistance at baseline
At follow-up				
		852 (85.2%)		

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Measure	Baseline sample (<i>N</i> = 1,591)	Follow-up sample (<i>N</i> = 1,000)	Comparison of baseline vs. follow-up sample	
			Test statistics	Details
Household adult literacy, <i>n</i> (%)				
Not at all	326 (20.5%)	204 (20.4%)	$\chi^2(4) = 9.86, p = .043, d^c = .06$	Retained families more likely to have adults in the household with some literacy
A little	578 (36.3%)	319 (31.9%)		
More or less	338 (21.2%)	212 (21.2%)		
Mostly	226 (14.2%)	128 (12.8%)		
Absolutely yes	118 (7.4%)	127 (12.7%)		
Missing	5 (0.3%)	10 (1.0%)		
Caregiver education, <i>n</i> (%)				
Did not attend school	898 (56.4%)	31 (3.1%)	$\chi^2(5) = 1.77, p = .880$	
Basic educational certificate	526 (33.1%)	19 (1.9%)		
General intermediate education	130 (8.2%)	5 (0.5%)		
General secondary education	25 (1.6%)	2 (0.2%)		
Diploma or Bachelor degree	7 (0.4%)	2 (0.2%)		
Higher diploma or Masters degree	1 (0.1%)			
Missing	4 (0.3%)	941 (94.1%)		
Child access to education, <i>n</i> (%)				
None	620 (39.0%)	350 (35.0%)	$\chi^2(2) = 21.24, p < .001, d^c = .11$	Retained children were more likely to have access to education at baseline
Some education	398 (25.0%)	252 (25.2%)		
School	571 (35.9%)	396 (39.6%)		
Missing	2 (0.1%)	2 (0.2%)		
At follow-up				
None		542 (54.2%)		

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Measure	Baseline sample (<i>N</i> = 1,591)	Follow-up sample (<i>N</i> = 1,000)	Comparison of baseline vs. follow-up sample	
			Test statistics	Details
Some education		209 (20.9%)		
School		248 (24.8%)		
Missing		1 (0.1%)		

^a Cohen's *d*; ^b Goodman-Kruskal tau; ^c Somers' *d*

2.3. Key measures

2.3.1. Preparation and piloting

Scales were chosen due to reported validity in other populations and availability of Arabic versions. Where Arabic versions were not available, a standard translation protocol was followed. Two local clinical psychology students, with a high level of Modern Standard Arabic (MSA) and English, as well as expertise in psychological research and clinical practise, independently completed forward translation from English to MSA. The two versions were synthesized into one version, which was then back translated from Arabic to English by two different students with equal qualifications. These back-translated versions were compared to the original version to check for discrepancies and refine the Arabic translation. The translated version was then reviewed independently by three local Syrian and Lebanese experts with knowledge of the target community and the constructs measured in the questionnaires (e.g., clinical psychologists working with Syrian refugees). In addition to the literal meaning of the translation, this process included consideration of how items would be understood in that specific context (Kyrillos et al., 2022).

Questionnaires which could have been challenging in the context or had been developed specifically for the study (future aspirations, self-efficacy, coping, environmental sensitivity, bullying, parental monitoring, parent-child conflict, parental presence, optimism, loneliness, child maltreatment, and some externalising items) were first piloted and discussed during focus group discussions with Syrian children and caregivers, where they answered the questions and gave feedback on what they would feel comfortable answering and what could be changed. All questionnaires were then piloted during a series of pilot studies (sample size $N = 30-100$ for each questionnaire). Interviewers again noted any feedback from children and caregivers as to what was confusing or did not make sense in the context, and any other concerns. According to this qualitative and quantitative feedback, measures were refined to

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maximise comprehensibility and good performance, and reduce burden on participants by abridging some scales. All abridged scales were tested and adjusted to maintain good internal consistency and factor structure. Other modifications to scales included minor changes to phrasing, supplementing the MSA with alternative words from Syrian Arabic dialect, and providing examples. For example, in piloting children needed explanation of the maternal acceptance item “[*My mother*] *Believes in showing her love for me*”, so the standardised example “(e.g., *by saying that she loves me or hugging me*)” was added to clarify the meaning. Newly developed scales are provided in Appendix A.

2.3.2. War exposure

2.3.2.1. Analytical approach

As is the case for the vast majority of refugee research, our measure of war exposure was retrospective, which creates some doubt as to the accuracy and reliability of reports (Panter-Brick et al., 2015). We used a combination of exploratory analyses and insights from the literature to address this point and modify our measure of war exposure accordingly.

Children and caregivers both reported which war experiences the child had been exposed to during the Syrian war on the War Events Questionnaire (WEQ; Karam et al., 1999) at baseline and follow-up. We expected there to be change in reporting over time, as children might forget about events that happened, or remember different events (Panter-Brick et al., 2015). We also anticipated that children and caregivers would report different events, as caregivers may not be aware of the events they were not present for, while children exposed at a young age may not remember specific events or have the capacity to report them. Reporting from children and caregivers may also be affected by concurrent mental health status (Oransky et al., 2013).

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We first tested reliability of the measure by looking at the test-retest reliability for each individual item on the scale using Cohen's kappa and the correlation for the scale total using Pearson's r between baseline and follow-up according to the child report, followed by caregiver report. We then looked at the item-level agreement and scale total correlation between child and caregiver report. Finally, we adapted the available war exposure data to create the final scale for use in subsequent analysis.

2.3.2.2. Results

Reports were not stable over time (Table 2.2); children's total scale scores at baseline and follow-up had a correlation of 0.47 ($p < .001$), and caregivers were not much more consistent in their reporting ($r = 0.54, p < .001$). At an individual item level, the test-retest reliability was fairly low for both children and caregivers; the majority showed a kappa (κ) between 0.1 and 0.3. The percentage of children who reportedly experienced each type of event was generally lower at follow-up than baseline. Children reported an average of 6.02 ($SD = 4.87$) war events at baseline and 4.68 ($SD = 4.98$) at follow-up. This pattern accords with findings of unstable trauma recall in previous refugee samples (Panter-Brick et al., 2015) but the reliability is slightly lower than the average test-retest reliability found in previous studies of adverse experience reporting (Pugach et al., 2021). However, the majority of this work is conducted in adults and non-war exposed samples, who nevertheless often show poor to moderate reliability ($\kappa = 0.3-0.5$). Child age, the length of time in between test and retest (approximately 12 months), and the nature of exposure (i.e., war, displacement, and post-displacement adversity) could all explain the lower reliability we observe.

The correlations between child and caregiver scale totals were similar to the correlations between waves: $r = 0.44$ ($p < .001$) at baseline, and $r = 0.49$ ($p < .001$) at follow-

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up. At an individual item level, the interrater reliability was also poor, showing similar agreement to previous work on child-caregiver agreement (Stover et al., 2010).

2.3.2.3. *Final war exposure measure*

For the final war exposure score, we combined child and caregiver reports from baseline. We focused on baseline reporting because we only had follow-up reports for a proportion of the total sample, and expected that baseline reports would be more accurate than those at follow-up, due to temporal proximity. We combined child and caregiver report based on recommendations for multiple informants (Goldin et al., 2003; Oh et al., 2018). Despite the poor agreement between children and caregivers, we included caregiver reports due to the likelihood that children's reports were incomplete, given the sample's age range, and the possibility that children were reporting on experiences from as early as four years old. As reporting of war trauma tends to decrease over time (Panter-Brick et al., 2015), which we also observe in the current sample, and the majority (81.5%) of the sample had left Syria more than one year before baseline, it was more likely that war events were under-reported than over-reported. Reports were therefore combined such that if either child or caregiver responded "yes" to an item, that item was considered to have occurred. This approach minimised the likelihood that children experienced any events not recorded.

According to this final combined war measure (Figure 2.3), children experienced an average of 9.59 ($SD = 5.53$) different types of war events. Bombardment-related events were most commonly experienced: 88% of children had experienced not being able to go outside because of bullets or bombardment, 81.3% witnessed explosions nearby, and 77.1% reported houses of people they knew were destroyed. Almost half (49.1%) reported their own house had been at least partially destroyed. High proportions of children also reported witnessing interpersonal violence, such as shooting (40.2%), and torture (35.5%), although very few

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reportedly experienced violence or harm to themselves, such as injury due to explosions (4.4%).

Age was significantly positively correlated ($r = .15, p < .001$) with the combined war exposure total score, such that older children tended to have more reported war experiences. Boys and girls did not show differences in total war scores. There was no difference in war scores according to how long it had been since the family had left Syria when the sample was split into those who had left more or less than three years prior, but when the sample was split into families who had left less than one year, 12-24 months, 24-36 months, 36-48 months, and more than 48 months prior to baseline, children who had a longer time since leaving showed lower war exposure scores ($F(4, 1578) = 20.53, p < .001$).

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Table 2.2. Individual war item agreement between child and caregiver reports and between waves

	Child baseline-follow-up agreement	Caregiver baseline-follow-up agreement	Child-caregiver agreement baseline	Child-caregiver agreement follow-up	Child-caregiver combined agreement between baseline and follow-up
Did you witness explosions close to you	0.26 [0.21, 0.32]	0.34 [0.29, 0.4]	0.3 [0.25, 0.35]	0.43 [0.37, 0.48]	0.32 [0.26, 0.38]
Were you not able to go outside house because of bullets or bombardment	0.18 [0.13, 0.24]	0.13 [0.07, 0.19]	0.21 [0.16, 0.26]	0.3 [0.24, 0.36]	0.16 [0.1, 0.22]
Were houses of people you know destroyed	0.26 [0.21, 0.32]	0.31 [0.26, 0.37]	0.29 [0.24, 0.33]	0.28 [0.22, 0.34]	0.28 [0.22, 0.35]
Did you witness it	0.27 [0.21, 0.33]				0.30 [0.24, 0.36]
Did you house get completely destroyed or part of it	0.26 [0.20, 0.32]	0.19 [0.12, 0.25]	0.26 [0.22, 0.31]	0.25 [0.19, 0.32]	0.31 [0.25, 0.36]
Did you witness it	0.25 [0.17, 0.33]				0.23 [0.17, 0.30]
Were you inside your house when it got bombarded	0.17 [0.08, 0.26]	0.18 [0.10, 0.25]	0.21 [0.15, 0.27]	0.23 [0.15, 0.32]	0.19 [0.12, 0.26]
Did you witness the kidnapping of someone	0.18 [0.09, 0.27]	0.22 [0.12, 0.31]	0.15 [0.08, 0.21]	0.16 [0.07, 0.24]	0.18 [0.10, 0.25]
Did any member of your family get kidnapped	0.1 [-0.02, 0.23]	0.15 [0.03, 0.26]	0.12 [0.04, 0.21]	0.15 [0.01, 0.29]	0.14 [0.05, 0.23]
Did you witness it	0.25 [0.01, 0.49]				0.15 [0.05, 0.26]
Did armed persons try to kidnap you	0.13 [-0.02, 0.28]	0.08 [-0.05, 0.21]	0.06 [-0.03, 0.14]	0.04 [-0.07, 0.15]	0.09 [-0.01, 0.20]
Did you witness someone getting beaten up	0.21 [0.14, 0.27]	0.25 [0.19, 0.32]	0.13 [0.08, 0.19]	0.19 [0.12, 0.26]	0.26 [0.20, 0.32]
Did armed people enter your house	0.28 [0.21, 0.35]	0.31 [0.25, 0.37]	0.25 [0.20, 0.30]	0.22 [0.16, 0.28]	0.36 [0.30, 0.41]
Did you witness it	0.26 [0.19, 0.34]				0.26 [0.19, 0.34]
Did you witness persons getting tortured	0.24 [0.17, 0.31]	0.27 [0.20, 0.34]	0.25 [0.20, 0.31]	0.21 [0.14, 0.28]	0.26 [0.20, 0.32]

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Did you get beaten to give information about your parents	-0.02 [-0.03, -0.01]	-0.01 [-0.02, -0.01]	0.04 [-0.04, 0.13]	0.12 [-0.05, 0.29]	0.00 [-0.06, 0.06]
Did you see an injured person (not on TV)	0.28 [0.22, 0.34]	0.36 [0.30, 0.42]	0.20 [0.16, 0.25]	0.31 [0.24, 0.37]	0.30 [0.24, 0.36]
Did you see armed persons shooting people	0.22 [0.15, 0.29]	0.26 [0.19, 0.32]	0.23 [0.18, 0.28]	0.23 [0.16, 0.30]	0.29 [0.23, 0.35]
Were you injured from explosions or bombarding	0.31 [0.13, 0.49]	0.41 [0.25, 0.58]	0.25 [0.12, 0.38]	0.30 [0.12, 0.47]	0.33 [0.19, 0.46]
Was any close person to you injured in war	0.19 [0.12, 0.25]	0.26 [0.19, 0.33]	0.19 [0.14, 0.25]	0.22 [0.15, 0.29]	0.26 [0.20, 0.32]
Did you witness it	0.26 [0.18, 0.34]				0.27 [0.20, 0.33]
Did you see a dead person (not on TV)	0.36 [0.29, 0.42]	0.37 [0.31, 0.43]	0.28 [0.23, 0.33]	0.32 [0.25, 0.39]	0.38 [0.32, 0.44]
Did you witness armed people killing someone	0.24 [0.16, 0.32]	0.23 [0.15, 0.31]	0.23 [0.17, 0.29]	0.21 [0.12, 0.29]	0.29 [0.22, 0.36]
Did a close person to you get killed	0.22 [0.15, 0.28]	0.25 [0.17, 0.32]	0.18 [0.13, 0.23]	0.16 [0.10, 0.22]	0.23 [0.17, 0.29]
Did you witness it	0.27 [0.18, 0.35]				0.25 [0.18, 0.32]

Note. Cohen's kappa with 95% confidence interval on an item-by-item basis. The final column shows the agreement between baseline and follow-up scores for the newly created child-caregiver combined scale.

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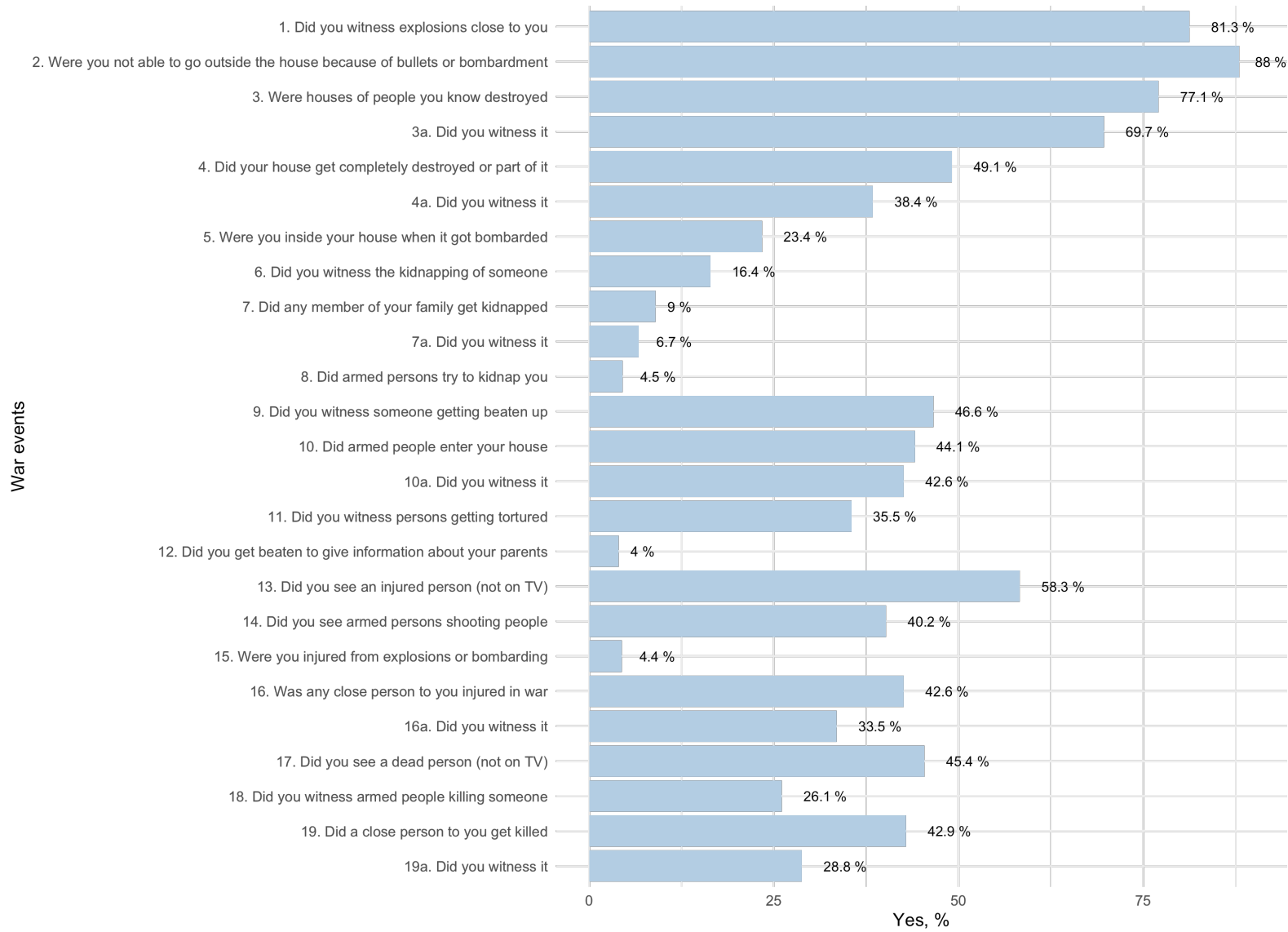


Figure 2.3. Exposure to war events: child-caregiver combined measure.

2. Methods and the BIOPATH Study

2.3.3. Child mental health

2.3.3.1. Individual symptom scales

2.3.3.1.1. Measures

Child mental health was measured using three primary outcomes: post-traumatic stress disorder (PTSD), depression, and externalising behaviour problems. PTSD was self-reported and measured using the Child PTSD Symptom Scale (CPSS; Foa et al., 2001) with some minor changes to phrasing (Table 2.4). Specifically, the clarification “(excluding times when you were disturbed by other people or noise)” was added to the item “Having trouble falling or staying asleep” to discount environmental reasons for disrupted sleep such as living in a tent with one room, where adults may be moving about after the child has gone to bed. Depression was self-reported and measured using the Centre for Epidemiological Studies Depression Scale for Children (CES-DC; Abdo, 2016; Faulstich et al., 1986; Weissman et al., 1980), abridged to 10 items (Table 2.5). Externalising was caregiver-reported using the externalising subscale of the Strengths and Difficulties Questionnaire (SDQ; Alyahri & Goodman, 2006; Goodman et al., 2010; Goodman, 1997) to which no changes were made due to licensing restrictions, combined with separately administered additional items related to DSM-5 criteria for conduct disorder (CD) and oppositional defiant disorder (ODD; Table 2.6). Sensitive areas, such as forced sexual activity, and more severe behaviours, such as firesetting or use of a gun, from the CD/ODD criteria were omitted due to acceptability concerns raised in piloting. Externalising behaviour problems were parent-reported, unlike PTSD and depression, due to low endorsement of items and low reliability of scales in the child report during piloting.

Child anxiety was also measured as part of the BIOPATH study using the Screen for Child Anxiety Related Emotional Disorders (SCARED; Birmaher et al., 1997), but scores on the questionnaire did not correspond to clinical judgement of anxiety levels in the VaST

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study (McEwen et al., 2020). It was therefore concluded that the child anxiety scale did not provide an adequate measure of symptoms related to anxiety disorders in the specific sample and context, and it was excluded from all subsequent analyses.

Child wellbeing was additionally measured as a positive dimension of child mental health, using the World Health Organisation – Five Wellbeing Index (WHO-5; Sibai et al., 2009). As the WHO-5 was created as a screener for depression, we did not include it as a primary outcome measure.

2.3.3.1.2. Descriptive statistics

At baseline, children scored an average of 15.84 ($SD = 12.31$) on the PTSD scale (range = 0-51 out of a possible 51), 8.24 ($SD = 7.05$) on the depression scale (range = 0-30 out of a possible 30), and 11.48 ($SD = 6.32$) on the externalising scale (range = 0-37 out of a possible 44). Mental health had improved on average at follow-up: average PTSD scores were significantly lower at follow-up ($M = 10.76$, $SD = 13.21$; $t(994) = 9.21$, $p < .001$), as were depression ($M = 6.35$, $SD = 6.89$; $t(996) = 6.77$, $p < .001$), and externalising scores ($M = 11.04$, $SD = 6.52$; $t(987) = 2.89$, $p = .004$; Figure 2.4).

At both waves, PTSD ($r_{w1} = 0.17$, $p_{w1} < .001$; $r_{w2} = 0.08$, $p_{w2} = .017$) and depression ($r_{w1} = 0.16$, $p_{w1} < .001$; $r_{w2} = 0.23$, $p_{w2} < .001$) were positively correlated with child age, whereas externalising ($r_{w1} = -0.14$, $p_{w1} < .001$; $r_{w2} = -0.12$, $p_{w2} < .001$) was negatively correlated with child age. Externalising scores were higher in boys ($M_{w1} = 12.68$, $SD_{w1} = 6.68$; $M_{w2} = 12.70$, $SD_{w2} = 6.66$) than girls ($M_{w1} = 10.37$, $SD_{w1} = 5.76$; $M_{w2} = 9.58$, $SD_{w2} = 6.02$; $t_{w1}(1497.4) = 7.36$, $p_{w1} < .001$; $t_{w2}(940.4) = 7.69$, $p_{w2} < .001$) at both waves, but PTSD and depression did not differ by gender. At baseline, depression scores differed according to the time since leaving Syria, such that children who had left in the past year had higher depression scores than those who had left 12-24, 36-48, and more than 48 months before

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($F(4,1578) = 4.85, p = .001$). At follow-up, PTSD scores were lower in the group of children who had left more than 48 months before baseline (60 months before follow-up) compared to other children ($F(4,994) = 2.49, p = .042$), but post-hoc comparisons did not survive multiple testing correction.

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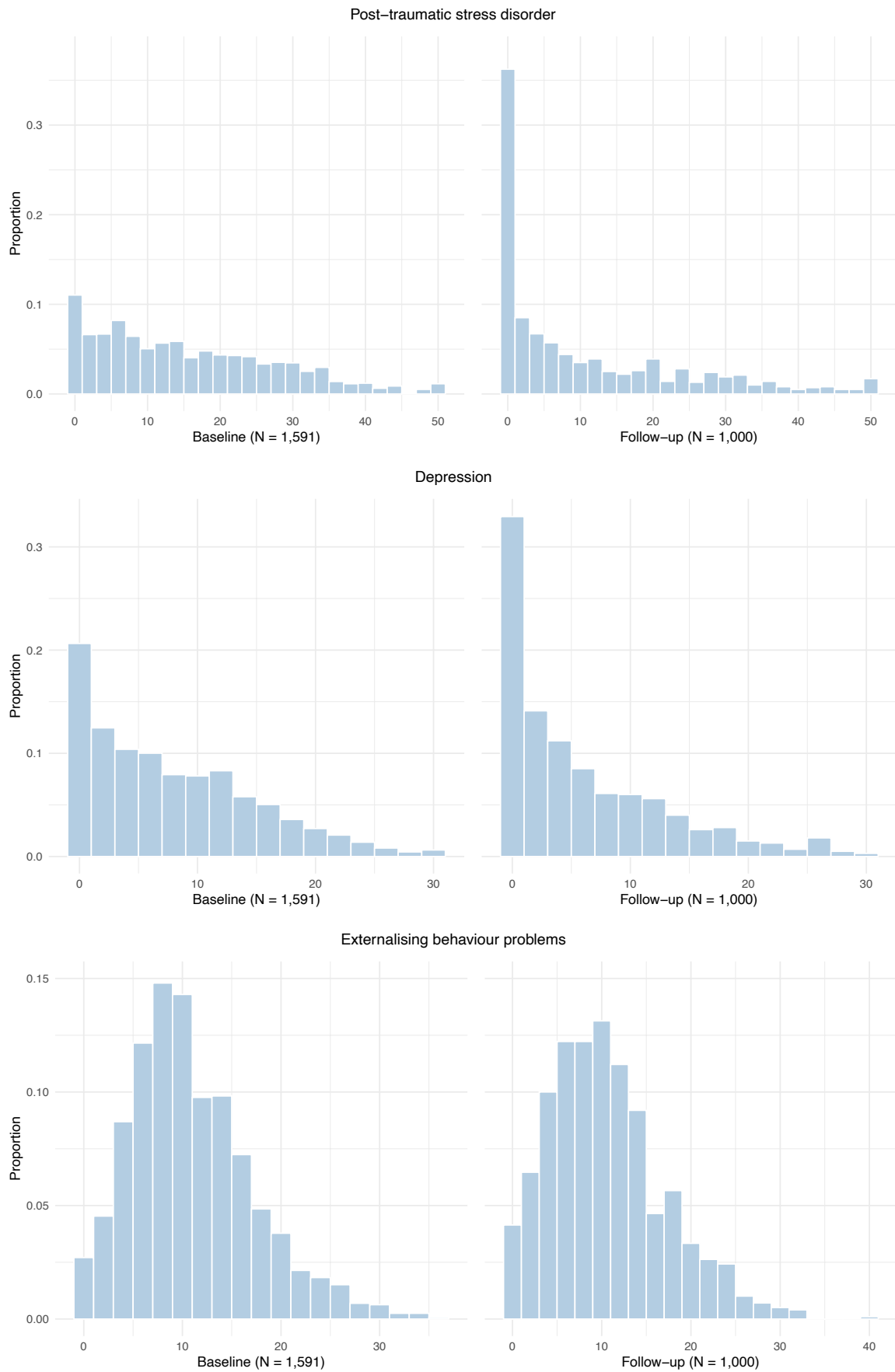


Figure 2.4. PTSD, depression, and externalising symptoms at baseline and follow-up.

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2.3.3.2. Clinical cut-offs: the VaST study

2.3.3.2.1. VaST methods and data collection

A subsample of the families from the BIOPATH study also participated in a study validating the mental health questionnaires used in BIOPATH against clinical diagnosis: the VaST study. VaST was used to create clinical cut-offs on symptom scales for PTSD, depression, and externalising behaviour problems, which informed the mental health outcome groups for Chapters 3 and 4 of this thesis.

Two to ten months after the BIOPATH follow-up data collection, 119 families completed additional measures including a clinical interview. Families were selected to be representative of the cohort in terms of (1) the proportion who had reported that their child had a need for mental health services and (2) the proportion with elevated symptoms of PTSD, depression, or externalising problems. At the time of selection (before data cleaning and exclusions) the subsample was also representative of the cohort in terms of age and gender.

The caregivers of children in the subsample completed the externalising (Goodman, 1997; McEwen, Popham, et al., 2022) questionnaire from BIOPATH, while the children repeated the PTSD (Foa et al., 2001) and depression (Faulstich et al., 1986) questionnaires, and completed structured clinical interviews using the MINI KID 6.0 (Sheehan et al., 2010). Additional information was gathered where appropriate, a Clinical Global Impression severity (CGI-s) score was assigned, and psychiatric diagnoses were agreed by consensus during supervision with an experienced clinical psychologist.

The clinical interviews were either conducted in the clinic or in settlements. Children aged above 12 years generally completed the interview alone, but further information was sought from caregivers post-interview for areas where the child's reporting may have been incomplete (e.g., conduct problems, which may be under-reported by children). Children

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aged 12 and under generally had their caregiver attend the interview, to provide additional information where necessary. The decision about whether to interview the child separately or together with the caregiver(s) was made jointly with each family. 70.1% of children completed the interview with a caregiver present and 29.9% completed the interview mostly alone.

All interviews were assigned CGI-s scores by the interviewer, 10 of which were additionally separately coded and assigned scores by a second rater to assess interrater reliability. Interrater reliability was good to excellent for all but CD and ODD, which required more adjustment according to context. Discrepancies were addressed in supervision with the clinical psychologist. PTSD, depression, and externalising questionnaires were administered on the same day as the interviews (n=101) or on a different day (n=18; median gap=20 days).

2.3.3.2.2. *Creation of cut-off scores*

Receiver operating characteristic (ROC) curve analysis was carried out to identify the cut-off on the questionnaires that achieved the best balance between sensitivity and specificity in identifying clinical cases according to the consensus clinical diagnosis in the subsample of children with clinical interviews (McEwen et al., 2020; Table 2.3). According to ROC curve analysis, the optimal cut-off for the PTSD scale was 12 (area under the curve/AUC = .70, $p < .001$; sensitivity = .83, specificity = .43, negative predictive value/NPV = .79). The CPSS was internally consistent (Cronbach's $\alpha=.94$), but it was difficult to achieve a good balance between sensitivity and specificity. This is in line with the one previous study in a war-exposed population, which also failed to achieve both good sensitivity and specificity (reporting moderate values for each and using a higher cut-off than used here) and had a very high false positive rate (Kohrt et al., 2011). The false negative rate here was low

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however, meaning children scoring below the cut-off are unlikely to have clinical levels of PTSD.

The optimal cut-off for the depression scale (abridged CES-DC) was 10 (AUC = .74, $p < .001$; sensitivity = .81, specificity = .56, NPV = .91). The scale was internally consistent (Cronbach's $\alpha = .89$), but it was not possible to achieve the same sensitivity and specificity as has been demonstrated previously with the complete CES-DC (Fendrich et al., 1990). Selecting a cut-off with good sensitivity resulted in low specificity and a high rate of false positives, with about two thirds of children scoring above cut-off being false positives. However, the rate of false negatives was low, meaning, as with PTSD, children scoring below the cut-off are unlikely to have clinical levels of depression.

The optimal cut-off on the externalising behaviour problems scale was 12 (AUC = .81, $p < .001$; sensitivity = .85, specificity = .71, NPV = .92). The scale was internally consistent (Cronbach's $\alpha = .80$) and sensitivity and specificity were better balanced on this scale compared to PTSD and depression. As with the two other scales, the sensitivity and NPV were high, meaning we can be confident that the majority of children scoring below cut-offs do not have clinical levels of symptoms.

Table 2.3. Validity statistics for mental health cut-off scores

	Cut-off	Does scale predict disorder better than chance? (AUC)	What proportion of cases detected? (Sensitivity)	What proportion of non-cases identified? (Specificity)	What proportion of positive results true? (PPV)	What proportion of negative results true? (NPV)
PTSD	12	.70	.83	.43	.48	.79
Depression	10	.74	.81	.56	.35	.91
Externalising	12	.81	.85	.71	.54	.92

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2.3.3.2.3. *Descriptive statistics*

886 (55.7%) children scored above the clinical cut-off of 12 on the PTSD scale at baseline, decreasing to 348 (34.8%) at follow-up. At baseline, 613 (38.5%) children scored above the depression cut-off of 10, decreasing to 271 (27.1%) at follow-up. Finally, 680 (42.7%) children scored above the externalising behaviour problems cut-off of 12 at baseline, and 412 (41.2%) at follow-up. 19.6% of the baseline sample scored below all three clinical cut-offs, 35.6% scored above just one, 31.8% above two, and 12.4% scored above all three. At follow-up, the proportion of children scoring below all three cut-offs increased to 32.9%, while 37.5% scored above one, 20.7% above two, and 7.8% above all three. PTSD was most often comorbid with the other outcomes: almost half (49.0%) of the children who scored above two cut-offs at baseline scored above PTSD and depression, followed by the 35.2% who scored above both PTSD and externalising cut-offs. At follow-up, almost equal numbers of children scored above both PTSD and depression or externalising (39.1% & 40.6% respectively), while 20.3% of children scoring above two cut-offs scored above depression and externalising.

It is necessary to note that, while cut-offs had the best possible balance of sensitivity and specificity for the current sample (McEwen et al., 2020), specificity fell below 80%. This means we can remain confident that children scoring below cut-offs do not have clinically relevant symptoms, but the groups above cut-offs may contain some false positives. Prevalence estimates adjusted for false positives and negatives are therefore lower than reported here: 39.6% PTSD, 20.1% depression, 26.9% CD/ODD (McEwen, Biazoli, et al., 2022). However, adjustments cannot be made at the individual level, and as Chapters 3 and 4 take person-centred approaches to resilience, for the purpose of the thesis we retain unadjusted estimates. This is an important consideration when interpreting prevalence, and will be revisited in individual chapters where relevant.

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Table 2.4. PTSD scale (17 items)

Items
Having upsetting thoughts or images about the event that came into your head when you didn't want them to
Having bad dreams or nightmares
Acting or feeling as if the event was happening again (hearing something or seeing a picture about it and feeling as if I am there again)
Feeling upset when you think about it or hear about the event (for example, feeling scared, angry, sad, guilty, etc)
Having feelings in your body when you think about or hear about the event (for example, breaking out into a sweat, heart beating fast)
Trying not to think about, talk about, or have feelings about the event
Trying to avoid activities, people, or places that remind you of the traumatic event
Not being able to remember an important part of the upsetting event
Having much less interest or doing things you used to do
Not feeling close to people around you
Not being able to have strong feelings (for example, being unable to cry or unable to feel happy)
Feeling as if your future plans or hopes will not come true (for example, you will not have a job or getting married or having kids)
Having trouble falling or staying asleep (excluding times when you were disturbed by other people or noise)
Feeling irritable or having fits of anger
Having trouble concentrating (for example, losing track of a story on the television, forgetting what you read, not paying attention in class)
Being overly careful (for example, checking to see who is around you and what is around you)
Being jumpy or easily startled (for example, when someone walks up behind you)

Note. CPSS (Foa et al., 2001) with a minor edit for clarification. Children were first asked to describe the most distressing events they experienced that still bothered them and how long ago they were, before answering how often the above items bothered them. Response format was a 4-point Likert scale from 0 (not at all or only one time) to 3 (5 or more times per week/almost always).

Table 2.5. Depression scale (10 items)

Items
I was bothered by things that usually don't bother me
I wasn't able to feel happy, even when my family or friends tried to help me feel better
I felt like I couldn't pay attention to what I was doing
I felt down and unhappy
I felt like I was too tired to do things
I was happy
I felt lonely, like I didn't have any friends

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Items
I felt like crying
I felt sad
It was hard to get started doing things

Note. Abridged version of CES-DC (Faulstich et al., 1986). Response format was a 4-point Likert scale from 0 (not at all) to 3 (a lot).

Table 2.6. Externalising behaviour problems scale (22 items)

Scale	Items
Items from SDQ externalising subscale	Restless, overactive, cannot stay still for long Often has temper tantrums or hot tempers Generally obedient, usually does what adults request Constantly fidgeting or squirming Often fights with other children or bullies them Easily distracted, concentration wanders Often lies or cheats Thinks things out before acting Steals from home, school or elsewhere Sees tasks through to the end, good attention span
Additional DSM-5 items	Often stays out at night despite parental prohibitions Runs away from home overnight (has happened at least twice) Often truants from school Uses weapons that can cause serious physical harm to others Is physically cruel to people Destroys things belonging to other people Often irritable, easily annoyed, or angry Argues a lot with parents or other adults Often deliberately annoys others Often blames others for his/her mistakes or misbehaviour Often spiteful or vindictive to people other than siblings Is physically cruel to animals

Note. SDQ externalising subscale (Goodman, 1997) and additional items aligned with DSM-5 criteria for conduct disorder and oppositional defiant disorder. Response format was a 3-point Likert scale from 0 (not true) to 2 (certainly true).

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2.3.4. Predictors

The final measures used were a range of hypothesised predictors, spanning from individual traits to aspects of the refugee environment. Inclusion of predictors was informed by the literature review detailed in Chapter 1. They can be categorised into three key domains, in line with Ecological Systems Theory (EST; Bronfenbrenner, 1979): (1) individual traits, strategies, and health; (2) immediate social environment; (3) wider refugee environment. The specific items in each domain are detailed in Table 2.7, along with details of the outcome measures, covariates, and the war exposure questionnaire.

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Table 2.7. Description of measures

Measure	Child or caregiver report	Instrument	Description/modifications
<i>Outcomes</i>			
Post-traumatic stress disorder	Child	Child PTSD Symptom Scale (CPSS; Foa et al., 2001)	Based on DSM-IV criteria for PTSD; instructions supplemented to clarify the types of events probed for and timing of events; clarification added to one symptom item; functional impairment scale not used; items added to probe for past episodes (not used in total symptom score)
Depression	Child	Centre for Epidemiological Studies Depression Scale for Children (CES-DC; Abdo, 2016; Faulstich et al., 1986; Weissman et al., 1980)	Reduced to 10 items following piloting; items added to probe for past episodes (not used in total symptom score)
Externalising behaviour problems	Caregiver	Strengths and Difficulties Questionnaire (SDQ): Externalising score (Alyahri & Goodman, 2006; Goodman et al., 2010; Goodman, 1997) Items aligned with DSM-5 conduct disorder and oppositional defiant disorder criteria (McEwen, Popham, et al., 2022)	SDQ administered in its entirety as published; conduct and hyperactivity subscales used as measure of externalising behaviour problems 12 items developed for this study, omitting sensitive areas (forced sexual activity) and more severe behaviours (e.g., firesetting, use of a gun)
Wellbeing	Child	World Health Organisation – Five Wellbeing Index (WHO-5; Bech, 2012; Sibai et al., 2009; Topp et al., 2015)	Minor changes to translation to improve comprehensibility
<i>Covariates</i>			
Age	Child		Age at baseline, rounded to the nearest year
Gender	Child		Binary male/female variable

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Measure	Child or caregiver report	Instrument	Description/modifications
Time since leaving Syria	Caregiver		Five categories: 0-12 months, 12-24 months, 24-36 months, 36-48 months, > 48 months ago
War exposure	Child & caregiver	War Events Questionnaire (WEQ; Karam et al., 1999)	Combined checklist of events completed by child and caregiver about child's war exposure
<i>Predictors</i>			
<i>Individual traits, strategies, & health</i>			
Optimism	Child	Youth Life Orientation Test (YLOT; Ey et al., 2005)	Four optimism items were selected, dropping two that might be less indicative of optimism in a refugee setting
Self-efficacy	Child	General Self-Efficacy Scale (GSE; Schwarzer & Jerusalem, 1995)	Selected four items most suitable for children; replaced one following piloting
Self-esteem	Child	Lifespan Self-Esteem Scale (LSE; Harris et al., 2018)	Selected one item following piloting (all 4 original items were perceived to mean the same): <i>"How do you feel about the kind of person you are?"</i> (5-point Likert scale <i>"Really sad"</i> – <i>"Really happy"</i>)
Child religiosity	Child	Items from NICHD Study of Early Child Care and Youth Development, and National Study of Youth and Religion Survey (NSYRS; Barber, 2001; Kessler & Ustün, 2004; Pearce et al., 2013)	Removed an item on attending religious meetings to avoid gender bias
Future orientation	Child	Future Aspirations and Plans (FAP; McEwen, Popham, et al., 2022)	New measure developed for this study, based on i) focus groups with Syrian refugee children in Lebanon; ii) Lindstrom Johnson et al. (2014) future orientation framework; iii) items adapted from Consideration of
Future aspirations			
Future expectations			

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Measure	Child or caregiver report	Instrument	Description/modifications
Future planning and motivation			Future Consequences scale (Strathman et al., 1994); Table A
Environmental sensitivity	Child	Highly Sensitive Child Scale (HSC; Pluess et al., 2018)	12 item version used; modified three items following pilot testing to reduce possible social desirability effects
Coping strategies Problem-focused Cognitive restructuring Distraction Avoidance Support-seeking	Child	Children's Coping Strategies Checklist (CCSC; Program for Prevention Research, 1999)	Reduced to 15 items, 3 per subscale, based on pilot testing
Child general health	Caregiver	Single item “ <i>Excellent</i> ” – “ <i>Very poor</i> ”	Higher scores indicate worse general health
<i>Parent-child relationship</i>			
Maternal acceptance	Child	Acceptance subscale - Child Report of Parent Behavior Inventory (CRPBI; Schaefer, 1965)	
Parental presence	Child	Positive Home Experiences (PHE; McEwen, Popham, et al., 2022)	Four items asking about presence of parents during day to day activities; Table A2
Parental monitoring	Child	Parental behavioural control (Barber, 1996)	
Maternal psychological control	Child	Psychological Control – Disrespect Scale (PCDS; Barber et al., 2012)	
Parent-child conflict	Child	Parent-adolescent conflict (Barber, 1999)	Response options were reduced from 6 to 5 and reworded to be consistent with items on positive home experiences

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Measure	Child or caregiver report	Instrument	Description/modifications
Child maltreatment	Child	ISPCAN Child Abuse Screening Tool (ICAST; Runyan et al., 2009)	Shortened to 22 items; sexual abuse items removed due to sensitivity and replaced by item enquiring about “ <i>private events</i> ” (the child was not required to disclose the details)
<i>Social environment</i>			
Perceived social support	Child	Multidimensional Scale of Perceived Social Support for Arab American Adolescents (MSPSS- AA; Ramaswamy et al., 2009)	Subscales for social support from family and friends; used 5-point rating scale instead of 3-point scale
Bullying	Child	Bullying of Refugee Children (BRC; McEwen, Popham, et al., 2022)	8 item scale developed for this study based on advice from agencies working with Syrian refugee children in Lebanon about types of victimisation commonly experienced and modified following piloting; Table A3
Loneliness and social isolation	Child	Loneliness in Refugee Children (LRC; Asher et al., 1984; McEwen, Popham, et al., 2022)	Two items adapted from Loneliness and Social Dissatisfaction Scale Items; two items were written to capture social isolation related to refugee context; Table A4
Caregiver depression	Caregiver	Center for Epidemiologic Studies Short Depression Scale (CES-DC 10; Radloff, 1977)	Items added to probe for past episodes (not used in total symptom score)
Caregiver PTSD	Caregiver	The PTSD Checklist for DSM-5 (PCL-5; Blevins et al., 2015)	Items added to probe for past episodes (not used in total symptom score)
Caregiver anxiety	Caregiver	Depression Anxiety and Stress Scale (DASS-21) anxiety subscale (Henry & Crawford, 2005)	Items added to probe for past episodes (not used in total symptom score)
Caregiver general health	Caregiver	Single item “ <i>Excellent</i> ” – “ <i>Very poor</i> ”	Higher scores indicate worse general health

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Measure	Child or caregiver report	Instrument	Description/modifications
<i>Wider environment</i>			
Human insecurity	Caregiver	Human Insecurity Scale (Ziadni et al., 2011)	
Perceived refugee environment	Caregiver	Perceived Refugee Environment Index (PREI; McEwen, Popham, et al., 2022)	Developed for this study as multidimensional measure to assess the quality of the refugee environment; subscales: livelihood, basic needs, housing, access to services, family environment, community environment, working situation, future mobility (not included in total score), learning environment; Table A5
Collective efficacy	Caregiver	Collective Efficacy (Sampson et al., 1997)	
Access to education	Child & Caregiver	Single item “No school”/“Some education”/“Attends school” (McEwen, Popham, et al., 2022)	Created from child single item “Do you go to school?” combined with caregiver PREI school items
Parent abroad	Child	Single item “Does either of your parents live most of the time in another country?”	
Child responsibilities	Child	Sum of the time child spent doing house chores, caring for family and livestock, work in the fields, other work outside the home, and seasonal jobs	
Parent deceased	Caregiver	Single item “Spouse/child’s other parent deceased”	
Household size	Caregiver	Sum of total number of adults and children in the household.	
Family income	Caregiver	Single item “Family income per week”	
Caregiver working	Caregiver	Single item “Do you have a job?”	
Household adult literacy	Caregiver	Single item “Can parent/household adults read and write?”	

2.4. Missing data

Finally, there remained some missing data after cleaning. 14 (0.9%) of the 1,591 children at baseline were missing at least one scale out of the three key outcome measures (PTSD, depression, externalising), our three key demographic measures (age, gender, time since leaving Syria), and the war exposure measure. The children missing any of these measures did not differ from the rest of the sample in any way. 13 (1.3%) of the 1,000 children at follow-up were missing at least one of those key measures. This group were older and more likely to be female compared to the follow-up group not missing any key measures. This pattern is due to the number of children who were married between baseline and follow-up; 11 out of the 13 missing any of these key scales were female and had married, meaning they no longer spent enough time with a primary caregiver for caregiver data to be useful. These 11 children were therefore missing caregiver reports at follow-up. Because these are primary measures for all analyses contained in this thesis, whose missingness is unrelated to factors that would bias results, the children missing data on PTSD, depression, externalising, age, gender, time since leaving, or war exposure were excluded from all analyses in the following chapters.

Missingness on other variables included in analyses was assessed individually for each results chapter, due to the different variables and samples used in each. However, to summarise our overall approach, in each chapter the final sample for the specific analysis was decided upon, and the number of children missing scales needed for the analysis calculated. At no point were more than 12.3% of child-caregiver dyads missing scales. We then explored the data to determine whether it was missing completely at random (MCAR) or was likely to be missing at random (MAR). Data that are MCAR are a random subset of all observations (Little & Rubin, 1987), meaning the missing and observed values have similar distributions. In other words, data is not missing due to any associations with observed or unobserved

2. Methods and the BIOPATH Study

variables. MAR means that the missing data can be explained by observed variables within the dataset, but missingness does not depend on any unobserved variables. This is necessarily an assumption, as missing data cannot be tested. However, due to our method of data collection (interviewers asked children all questions and recorded all answers), and the comprehensive nature of the dataset (including variables that are likeliest to affect missingness e.g., demographics and mental health), it is likely to be a reasonable assumption. For each individual chapter, we explored the missing data and ultimately determined the MAR assumption was appropriate.

For Chapters 3 and 4, we performed multiple imputation to impute the missing data. Data were imputed 10 times using Fully Conditional Specification in the mice package (van Buuren & Groothuis-Oudshoorn, 2011). The individual imputed datapoints were examined, and group means compared across datasets, to assess the quality of the imputation. All main analyses were then run both in the imputed and complete case datasets, enabling discussion of any potential bias introduced by the imputation method. For Chapter 5, we used structural equation models (SEM) and therefore dealt with missing data using the Full Information Maximum Likelihood (FIML) approach, utilising all available data without imputation (Enders & Bandalos, 2001). Full details regarding the missing data, including descriptive analyses, can be found in the main text and appendices related to each results chapter.

Chapter 3: Cross-Sectional Predictors of Risk and Resilience

3. Abstract

War-exposed refugee children are at elevated risk for mental health problems, but a notable proportion appear resilient. A range of predictors of refugee child mental health have been identified, but the majority of evidence is based on single outcomes, does not consider the effects of war exposure, and is from high income contexts. In this chapter, I aimed to investigate the proportion of Syrian refugee children that can be considered resilient, and applied a novel matching approach to identify factors associated with mental health outcomes, controlling for children's specific war experiences. The sample included 1,528 war-exposed children and their primary caregiver from the BIOPATH study. Children were classed as Low Symptom (LS) if they scored below clinical cut-offs for post-traumatic stress disorder, depression, and externalising problems. Children scoring above any cut-off were classed as High Symptom (HS). Each LS child was matched with one HS who reported similar war exposure. 19.3% of the children met resilience criteria and were considered LS. At the individual level, protective traits (e.g., self-esteem ; OR = 1.51, 95% CI [1.25, 1.81]) predicted LS classification, while risk factors such as environmental sensitivity (OR = 0.69, 95% CI [0.59, 0.82]) and certain coping strategies (e.g., avoidance; OR = 0.90, 95% CI [0.85, 0.96]) predicted HS classification. Socio-ecological predictors included perceived social support (OR = 1.23, 95% CI [1.02, 1.49]), loneliness (OR = 0.85, 95% CI [0.80, 0.90]), and caregiver mental and general health (e.g., depression; OR = 0.94, 95% CI [0.92, 0.97]). Future research should take multiple dimensions of functioning into account and consider the identified predictors as potential targets for intervention. This chapter is based on the paper *Predictors of psychological risk and resilience among Syrian refugee children* published in the *Journal of Child Psychology and Psychiatry* (Popham, McEwen, Karam, Fayyad, Karam, Saab, Moghames, & Pluess, 2022).

3.1. Introduction

Of the approximately 2.7 million Syrian refugee children worldwide, the majority have been exposed to a wide variety of potentially traumatic war-related events, in addition to ongoing adversities including lack of basic resources, unstable accommodation, and limited access to education (Gormez et al., 2018; Habib et al., 2019; UNHCR et al., 2021). These adversities can have a significant psychological impact. Recent reports estimate that anywhere between 23.7% and 83% of Syrian refugee children score above at least one clinical cut-off when assessing post-traumatic stress disorder (PTSD), depression, and anxiety (Kandemir et al., 2018; Scherer et al., 2020). However, while there seems to be a substantial mental health need, not all children that experience significant adversity develop psychological problems. In other words, some appear to show psychological resilience. Although definitions in the literature vary, resilience can be broadly described as *functioning better than expected in the context of adversity* (Masten, 2016; Miller-Graff, 2020). Previous research in refugee populations has identified a range of factors across individual and socio-ecological systems that predict mental health outcomes and could explain why some children are able to do better than expected despite experiences of war and displacement (Arakelyan & Ager, 2021; Scharpf et al., 2021). However, refugee children living in the most challenging contexts, such as refugee camps in low and middle income countries (LMICs), are underrepresented in the literature (Fazel et al., 2012; Scharpf et al., 2021). Moreover, most studies are not able to exclude the possibility that differences in mental health simply reflect different levels of war exposure. In other words, are children doing well due to certain resilience factors or did they have lower risk exposure to begin with?

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3.1.1. Resilience in refugee children

Understanding why some children appear resilient to war exposure and displacement can help to inform interventions to support positive adaptation. However, the study of resilience in refugees has been restricted by inconsistency in the ways in which it is defined and measured (Cosco et al., 2017; Karadzhev, 2015; Windle et al., 2011). While some define resilience based on available resources, others focus on developmental outcomes of a putative process of resilience (i.e., manifested resilience; Miller-Graff 2020). In order to investigate which resources (or risk factors) are important for the current sample, we focus on manifested resilience; investigating mental health outcomes with the understanding that it is a cross-section of a dynamic process. Given the extreme nature of the adversity refugee children face, we argue that children exposed to war but showing no evidence of mental health problems demonstrate manifested resilience, defined as functioning better than expected in the context of adversity (Yule et al., 2019).

The domains in which children are functioning better than expected must be considered. Children can appear to do well in one domain whilst struggling in another (Scherer et al., 2020), but refugee children also often show high levels of comorbidity (Kandemir et al., 2018; McEwen, Biazoli, et al., 2022). Studying single dimensions of mental health therefore cannot give the full picture of children's psychological status, or what is important for overall functioning. A measure of manifested resilience needs to take into account multiple dimensions of mental health (Miller-Graff, 2020). Although the majority of refugee research focuses on individual outcomes, a small number of studies have explicitly measured resilience in war-affected youth as a composite of different outcomes including PTSD, depression, anxiety, behavioural problems, general emotional problems, and/or hope (Aitcheson et al., 2017; Fayyad et al., 2017; Klasen et al., 2010; Purgato et al., 2020). These estimate anywhere between 13.2% and 40.3% of children may be resilient (Aitcheson et al.,

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2017; Purgato et al., 2020), although Purgato and colleagues (2020) note that their estimate of 13.2% increases to 34.6% at follow-up four to six months later, meaning that resilience increased over time. However, in the case of refugees, longitudinal data is rare (Scharpf et al., 2021), and manifested resilience predominantly investigated using outcomes at a single timepoint (Schultze-Lutter et al., 2016).

3.1.2. Predictors of refugee children's mental health

The majority of research on predictors of refugee children's mental health has not explicitly focused on resilience, but Chapter 1 illustrates that many predictors of mental health in refugee children have been identified, which may also represent potential resilience factors. Aspects from all ecological systems levels seem to be important, spanning from individual traits to the wider resources available. For example, traits such as optimism can have protective or promotive effects (Sleijpen et al., 2016; Speidel et al., 2021), while sensitivity to the environment may exacerbate the effects of war exposure (Karam et al., 2019), and the strategies children use to cope with their adverse experiences can have either adaptive or maladaptive functions (Khamis, 2019b). At the social level, aspects of the family environment such as parenting and caregiver mental health can either buffer or exacerbate the impact of adversity on children's mental health (Bryant et al., 2018; Eltanamly et al., 2021; Khamis, 2019b), as can relationships outside of the family (Park et al., 2017; Samara et al., 2020). Finally, characteristics of or factors related to the refugee environment such as school access (Nasiroğlu et al., 2018), caregiver employment (Sapmaz et al., 2017; Zwi et al., 2018), and family separation (Beni Yonis et al., 2020; Zwi et al., 2018) have all been associated with refugee child mental health.

A limitation of this evidence is that many studies have focused on individual outcomes, such as PTSD, rather than mental health as a whole (Eltanamly et al., 2021; Eruyar

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et al., 2018; Khamis, 2019a). Of those that operationalise resilience as a composite of mental health measures, the results tend to agree with single-outcome studies regarding the importance of some predictors, including a range of individual assets such as optimism and self-regulation, family-related factors including domestic violence and family coherence, and wider socio-ecological factors such as socio-economic situation (Aitcheson et al., 2017; Klasen et al., 2010). However, this evidence is limited and more work is needed to understand which factors are important for resilient functioning across psychological domains.

Additionally, the majority of work reviewed above has been conducted in high income contexts, disproportionate to the number of refugee children worldwide who are living in LMICs (UNHCR, 2022a). Investigating whether prevalence estimates and proposed predictors of resilience apply in different settings is crucial. Children in lower income and camp contexts might be more vulnerable to mental health problems (Nickerson et al., 2022), and the effects that different factors have on mental health may depend on the context. For example, active coping strategies such as problem-solving tend to serve protective functions (Fayyad et al., 2017), but have been associated with worse mental health in some studies of refugee children (Elklit et al., 2012). This may be a function of the context or the type of adversity a child has been faced with, if they present challenges that cannot be solved (Wolтин et al., 2018). For example, the living environment likely presents a particular source of risk for those in camp settings, but children have little control over it. Redressing the balance in the literature by increasing representation of more vulnerable groups of children will therefore increase the nuance in our understanding of how to help children depending on their circumstances.

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3.1.3. The effects of war exposure

A final consideration is the influence of the adversity context. In order to infer resilience, exposure to adversity must be sufficiently severe to threaten usual functioning (Ungar, 2015). Additionally, beyond that severity threshold there remains a wide range of different war experiences that Syrian refugee children might have been exposed to. As would be expected, the number of war-related events a child experiences often has a strong impact on their mental health (Çeri & Nasiroğlu, 2018; Müller, Büter, et al., 2019; Purgato et al., 2020), but, as reviewed in Chapter 1, the quality of exposure is also crucial (Amone-P'Olak & Ovuga, 2017; Gormez et al., 2018; Regev & Slonim-Nevo, 2019). Given this strong association between war trauma and psychological outcomes, if war exposure is not sufficiently controlled for in analyses, differences in outcomes observed between children could be a function of differences in war experiences, rather than a demonstration of resilience.

In addition to affecting psychological outcomes, war exposure may also affect which risk and resilience factors are most influential. In other words, a child's pre-migration experience could affect how their post-migration situation affects them. For example, family support appears to only be beneficial for children exposed to certain types of trauma (Kliwer et al., 2021). Therefore, in order to investigate which factors promote or impede resilience, we need to take into account both the quantity and quality of the adversities that children have been exposed to. Despite this, very few studies on post-migration predictors of mental health consider the quality or type of war exposure. In the cases where war exposure is accounted for in analysis, it is generally controlled for as a total sum score (Dehnel et al., 2021; Fayyad et al., 2017; Karam et al., 2019; Khamis, 2019a, 2019b; Müller, Büter, et al., 2019; Sleijpen et al., 2016; Speidel et al., 2021).

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3.1.4. The current study

Our aim was to first identify the proportion of children with low risk for mental health problems despite adversity (i.e., displaying manifested resilience) in a sample of Syrian refugees in informal tented settlements (ITSs) in Lebanon, and second to investigate what differentiated those meeting our resilience criteria from others exposed to the same war events but doing poorly at the time of assessment. A better understanding of these factors is important in order to promote resilience and prevent mental health problems through intervention. Crucially, controlling for the specific war events children have experienced allows us to separate out the effects of pre- and post-migration experiences to investigate resilience in a new way. Based on the literature (Kandemir et al., 2018; Purgato et al., 2020), we expected that approximately 30% of children would show evidence of manifested resilience and that both individual and social factors would differentiate children with high and low symptoms of PTSD, depression, and externalising problems.

3.2. Methods

3.2.1. Study design

We employed a cross-sectional design using baseline data from the BIOPATH sample. We applied clinically validated cut-offs to measures of PTSD, depression, and externalising behaviour problems and used them to categorise children into low (LS) and high (HS) symptom groups. LS and HS children were paired according to their specific war exposure, age, gender, and time since leaving Syria using a novel matching technique to create a balanced subsample of cases with high and low symptoms of psychopathology but equal reported war exposure. We then investigated the relationships between potential risk and resilience factors and mental health outcomes in the matched subsample using logistic regression analyses.

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3.2.2. Setting and participants

For the analyses presented in this chapter, we used the baseline sample ($N = 1,591$) described in Chapter 2. In order to conduct a careful exploration of resilience to war, we excluded children with no reported war exposure ($n = 49$). We also excluded any families missing data on child age, gender, or time since leaving Syria, and any children missing the total scale score for PTSD, depression, or externalising behaviour problems ($n = 14$).

3.2.3. Data collection

All participants completed the questionnaires via interviews in their homes in the settlements, conducted by trained, native, Arabic-speaking interviewers. Different interviewers conducted the child and caregiver interviews simultaneously. Visual aids (Figure 2.2) for each scale were available where necessary to enhance understanding and privacy. For detailed information on data collection please see Chapter 2, Section 2.1.3.4.

3.2.4. Measures

3.2.4.1. War exposure

War exposure was measured with the combined child and caregiver report version of the War Events Questionnaire (WEQ; Karam et al., 1999) measured at baseline, as described in Chapter 2. The WEQ consists of 25 yes/no items, such as “*Did you witness explosions close to you?*” (Figure 2.3). The combined measure was created such that if either the child or caregiver reported that the child experienced an event, the event was considered to have occurred.

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3.2.4.2. *Resilience*

We measured resilience by creating two groups of children (HS or LS) according to how they scored in relation to the clinically validated cut-offs for the PTSD, depression, and externalising behaviour problems scales described in Chapter 2. PTSD was measured using self-report on the CPSS with a minor edit for clarification (Table 2.4; Foa et al., 2001). Depression was measured using self-report on the abridged CES-DC (Table 2.5; Abdo, 2016; Faulstich et al., 1986; Weissman et al., 1980). Externalising behaviour problems were measured by combining caregiver report on the SDQ externalising subscale (Alyahri & Goodman, 2006; Goodman et al., 2010; Goodman, 1997) and additional items related to conduct (CD) and oppositional defiant disorder (ODD; Table 2.6). The clinical cut-off scores, representing whether or not a child was likely to have clinical levels of symptoms and validated against clinical judgement in a subsample of the cohort (McEwen et al., 2020) were 12 out of 51 on the CPSS, 10 out of 30 on the abridged CES-DC, and 12 out of 44 on the combined externalising scale total. The negative predictive value for each cut-off was high (PTSD = .79; depression = .91; externalising = .92), meaning the majority of children scoring below cut-offs were true non-cases. However, the proportion of children scoring above the cut-off that were true clinical cases in the subsample of children with clinical interviews was fairly low (positive predictive value = .48 for PTSD, .35 for depression, and .54 for externalising). Therefore, while children scoring above cut-offs report elevated symptoms of PTSD, depression, or externalising problems, the symptoms may not necessarily be causing meaningful impairment, or reach the severity necessary for clinical diagnosis for all children. For more detailed information see Chapter 2, Section 2.3.3.2.2.

Our measure of resilience combined PTSD, depression, and externalising, in order to identify children functioning better than expected across three mental health problems commonly developed in response to war and displacement (Kien et al., 2019), and based on

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recommendations to look at overall mental health problems in severely traumatised samples (Jongedijk et al., 2020). We created the categorical composite to operationalise resilience using the clinically validated cut-offs: if participants scored below all three cut-offs they were considered to be at low risk for mental health problems and classed into the Low Symptom (LS) group, whereas if participants scored above the cut-off for any of the three measures, they were classed as High Symptom (HS). Children scoring below all three cut-offs were unlikely to have any clinically meaningful symptoms of PTSD, depression, or externalising problems, and so could be considered to demonstrate manifested resilience, given their exposure to war. If a child scored above any single one of the clinical cut-offs, they no longer met our strict multi-dimensional criteria for resilience. In order to investigate whether the LS group was also doing better on a measure of positive functioning (Bonanno, 2012), we used an independent samples t-test to compare subjective wellbeing between the two groups, as measured by the World Health Organisation – Five Wellbeing Index (WHO-5; Sibai et al., 2009).

Finally, we created a continuous mental health composite score from the PTSD, depression, and externalising scales for use in sensitivity analyses, to check whether our person-centred approach had introduced bias to the results. We adjusted the three scale totals for the number of items in the scale, and computed the average of the adjusted scores, with lower scores reflecting greater resilience.

3.2.4.3. Predictor variables

We investigated a broad variety of individual and social predictors that have been associated with mental health outcomes in previous research, as reviewed in Chapter 1. Individual-level predictors included optimism (Ey et al., 2005), self-efficacy (Schwarzer & Jerusalem, 1995), a single self-esteem item (Harris et al., 2018), the temperament trait of

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environmental sensitivity (Pluess et al., 2018), coping strategies (Program for Prevention Research, 1999), future orientation (Table A1; McEwen, Popham, et al., 2022), and a single item on the child's general health (Table 2.7; McEwen, Popham, et al., 2022). For the social environment we included positive and negative aspects of the caregiver-child relationship (parental monitoring, Barber, 1996; parent-child conflict, Barber, 1999; maternal psychological control, Barber et al., 2012; parental presence, Table A2, McEwen, Popham, et al., 2022; child maltreatment, Runyan et al., 2009; maternal acceptance, Schaefer, 1965), the caregiver's own mental and general health (PTSD, Blevins et al., 2015; anxiety, Henry & Crawford, 2005; general health, McEwen, Popham, et al., 2022; depression, Radloff, 1977), and relationships within and beyond the family (loneliness and social isolation, Table A4, Asher et al., 1984; bullying, Table A3, McEwen, Popham, et al., 2022; perceived social support, Ramaswamy et al., 2009). Finally, children reported their home and employment responsibilities and caregivers reported their literacy, income, employment status, household size, and aspects of the wider environment (perceived refugee environment, Table A5, McEwen, Popham, et al., 2022; collective efficacy, Sampson et al., 1997; human insecurity, Ziadni et al., 2011). For detailed information, including modifications to measures, see Table 2.7 in Chapter 2.

3.2.5. Statistical methods

3.2.5.1. Matching and logistic regression

All analyses were conducted in RStudio 2021.09.2+382. Children categorised into LS and HS groups were matched using nearest neighbour matching according to Mahalanobis distance in the MatchIt package (Ho et al., 2011). The groups were matched according to their specific pattern of responses across all the individual war exposure items, in addition to child age, gender, and time since leaving Syria, such that each group had the same proportion

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of boys and girls, almost identical mean age and time since leaving Syria, and an almost identical number of children who experienced each war event (Standardised Mean Difference between groups < 0.1 for every item).

We then examined whether any of the variables of interest predicted LS or HS group membership using binary multivariable logistic regressions. We first ran separate individual models for each predictor. All predictors with a significant effect in their individual model were then entered simultaneously into a single combined model to identify which predictors had distinct effects when controlling for all statistically significant variables. The Benjamini-Hochberg procedure was applied to all regression models in order to correct for multiple testing (Benjamini & Hochberg, 1995). Bivariate correlations between predictors in the combined model were computed to identify potential collinearities (Table 3.2).

3.2.5.2. Missing data

72 (4.7%) of the children included in analysis were missing scale totals for at least one of the predictors of interest. According to Little's Missing Completely at Random (MCAR) test, data were not MCAR: $\chi^2(317) = 512.54, p < .001$. Children with any missing scale totals had lower PTSD scores ($M = 13.14, SD = 12.10$), compared to children with no missing data ($M = 16.15, SD = 12.34; t(1526) = 2.02, p = .044, d = 0.25$), and higher ($M = 13.61, SD = 8.78$) externalising scores ($M = 11.42, SD = 6.19; t(74.61) = -2.12, p = .037, d = 0.29$). Due to the nature of the dataset, we decided that the assumption that data were missing at random (MAR) was appropriate, as explained in Chapter 2, Section 2.4. In order to maximise the sample retained for analysis, we decided to impute the missing data. As these effect sizes were not large, we did not expect imputation to bias results, but in order to test this we also repeated the primary logistic regression analysis without imputation, using only the children with complete data.

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To impute the missing data, we applied multiple imputation using Fully Conditional Specification (FCS) in the mice package (van Buuren & Groothuis-Oudshoorn, 2011). We ran 10 imputations, and imputed all missing measures for the analysis, bar demographic variables, war exposure, and child mental health. Imputations were checked to ensure that imputed values fell within the original distributions, and that the average scores on imputed scales did not differ between datasets. This imputed dataset was used to create the matched groups and run the main analysis, as described above.

For the complete case analysis, we used the same matched groups from the main (imputed dataset) analysis, but excluded all participants missing any scale totals. Where one matched child was excluded due to missing data, we also excluded the child matched with them, to ensure the matched sample remained balanced. We then repeated the same logistic regression steps in this complete case matched sample: individual logistic regression models for each predictor, with low or high symptom group membership as the outcome, followed by a combined logistic regression model including all individually significant predictors, and the Benjamini-Hochberg correction applied to all models (Benjamini & Hochberg, 1995). All estimates presented in this chapter are based on analysis in the imputed dataset. Complete case results can be found in Appendix B (Table B2).

3.2.5.3. *Continuous sensitivity analysis*

In order to assess whether our low/high symptom grouping and matching method created bias, we conducted one main sensitivity analysis in the total sample, using continuous measures of mental health outcomes and war exposure. We used the same imputed data as for the main logistic regression, but retained the whole sample of 1,528 children. As with the other analyses, we first ran individual multiple linear regression models looking at single predictors of mental health outcomes, then combined each individually significant predictor

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together into a single model. The outcome variable was the continuous mental health composite score calculated from taking the average of the PTSD, depression, and externalising behaviour problem symptom scores, adjusted for the number of items in each scale. In each model we included child age, gender, time since leaving Syria, and the war exposure scale total as covariates. The Benjamini-Hochberg procedure was applied to all models in order to correct for multiple testing (Benjamini & Hochberg, 1995).

3.2.5.4. Additional analysis

Finally, we additionally repeated the logistic and linear models separately for the three outcome dimensions (PTSD, depression, & externalising), in order to investigate whether results differed according to the specific outcome of interest. The results can be found in Appendix B (Tables B1 & B3).

3.3. Results

3.3.1. Descriptive data

Excluding 14 families missing key demographic or symptom data and 49 children with no reported war exposure, the final sample included 1,528 children (52.6% female; *mean age* = 11.48, *SD* = 2.43) and their primary caregivers (89.5% mother). According to the combined child and caregiver report, children experienced an average of 9.90 (*SD* = 5.34) war events. The majority of children had experienced a bombardment-related event, such as witnessing explosions (84%), but many had also experienced more direct interpersonal violence. For example, 36.6% reported witnessing torture and 44.4% reported that someone close to them was killed. Of this total sample, 56.2% scored above the cut-off for PTSD, 38.9% for depression, and 43.1% for externalising problems.

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The sample did not differ from the total baseline sample of 1,591 child-caregiver dyads described in Chapter 2 on any demographic measures, including child age and gender, time since leaving Syria, access to education, and household income. There was also no difference on child war exposure, PTSD, depression, or externalising problems.

3.3.1.1. Low and high symptom cases

295 (19.3%) children qualified as LS when combining the cut-offs for PTSD, depression, and externalising behaviour, while 1,233 (80.7%) scored above at least one of the three clinical cut-offs and were categorised into the HS group. In addition to scoring below the cut-offs on all three psychopathology measures, the LS cases reported significantly higher levels of general wellbeing ($M = 74.03$, $SD = 21.08$) than HS cases ($M = 65.02$, $SD = 26.60$); $t(542) = 6.25$, $p < .001$, $d = .38$). They also had slightly lower war exposure ($M = 8.02$, $SD = 4.78$) compared to HS cases ($M = 10.35$, $SD = 5.37$; $t(488) = -7.35$, $p < .001$, $d = .46$).

3.3.1.2. Matched sample

The matched sample comprised 295 LS-HS pairs, meaning that a suitable match was found for all LS cases. The matched groups showed almost identical response patterns on the WEQ (Figure 3.1), had the same proportion of boys and girls (58.3% girls), and were evenly matched on age and time since leaving Syria (Table 3.1). The selected HS cases had significantly higher scores on the continuous mental health composite score than LS cases ($t(399.8) = 23.72$, $p < .001$, $d = 1.95$), providing evidence that they had elevated mental health problems (Figure 3.2). A slightly lower proportion of the matched HS sample scored above multiple cut-offs compared to the total HS sample (Figure 3.3).

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War Exposure Item

- 1 Did you witness explosions close to you
- 2 Were you not able to go outside the house because of bullets or bombardment
- 3 Were houses of people you know destroyed
- 3a Did you witness it
- 4 Did your house get completely destroyed or part of it
- 4a Did you witness it
- 5 Were you inside your house when it got bombed
- 6 Did you witness the kidnapping of someone
- 7 Did any member of your family get kidnapped
- 7a Did you witness it
- 8 Did armed persons try to kidnap you
- 9 Did you witness someone getting beaten up
- 10 Did armed people enter your house
- 10a Did you witness it
- 11 Did you witness persons getting tortured
- 12 Did you get beaten to give information about your parents
- 13 Did you see an injured person (not on TV)
- 14 Did you see armed persons shooting people
- 15 Were you injured from explosions or bombarding
- 16 Was any close person to you injured in war
- 16a Did you witness it
- 17 Did you see a dead person (not on TV)
- 18 Did you witness armed people killing someone
- 19 Did a close person to you get killed
- 19a Did you witness it

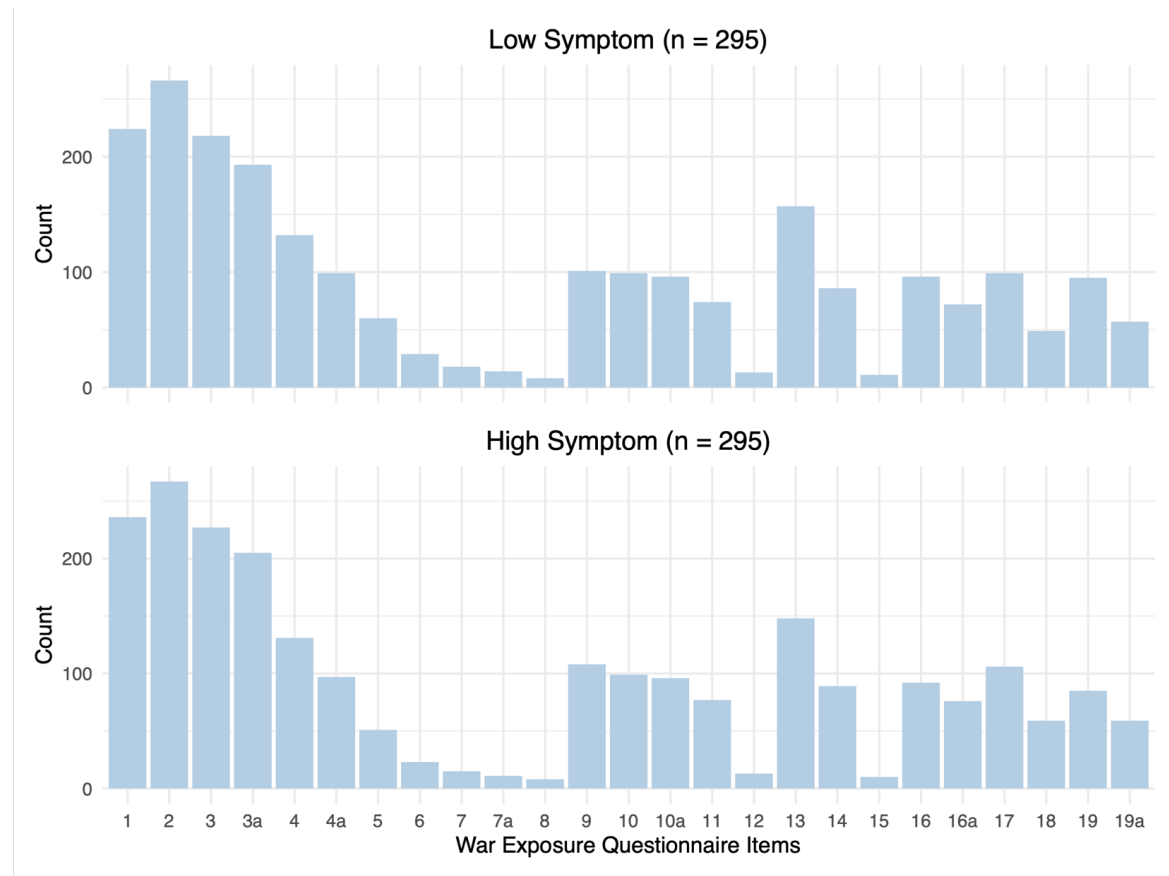


Figure 3.1. War exposure response pattern in matched groups. Number of children in the matched Low and High Symptom groups who reportedly experienced each war event, according to the child-caregiver combined report war exposure measure. Items displayed in the table to the left correspond to the item numbers in the bar chart.

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Table 3.1. Sample characteristics: whole sample and matched groups

	Whole sample (N = 1,528)	Matched Low Symptom group (n = 295)	Matched High Symptom group (n = 295)	Comparison between matched LS and HS groups
Child age, mean (SD)	11.48 (2.43)	11.10 (2.13)	11.13 (2.29)	$t(584.79) = 0.17, p = .867$
Child gender, n (%) female	803 (52.6%)	172 (58.3%)	172 (58.3%)	N/A
Caregiver relationship to child, n (%) mother	1,367 (89.5%)	265 (89.8%)	258 (87.5%)	$\chi^2(9) = 11.42, p = .248$
Time since leaving Syria, n (%) ≤ 3 years	731 (47.8%)	140 (47.5%)	132 (44.7%)	$\chi^2(1) = 0.44, p = .509$
Child war exposure, mean (SD)	9.90 (5.34)	8.02 (4.78)	8.09 (5.45)	$t(578.06) = 0.18, p = .860$
Child symptoms, mean (SD) ^a	0.28 (0.14)	0.11 (0.05)	0.30 (0.13)	$t(399.8) = 23.72, p < .001, d^b = 1.95$
PTSD, n (%) above cut-off	859 (56.2%)	0	188 (63.7%)	N/A
Depression, n (%) above cut-off	594 (38.9%)	0	133 (45.1%)	N/A
Externalising, n (%) above cut-off	659 (43.1%)	0	146 (49.5%)	N/A
Above multiple cut-offs, n (%)	683 (44.7%)	0	140 (47.5%)	N/A

^a Child mental health symptom composite score (average of PTSD, depression, and externalising symptom scores, adjusted for number of items); ^b Cohen's *d*

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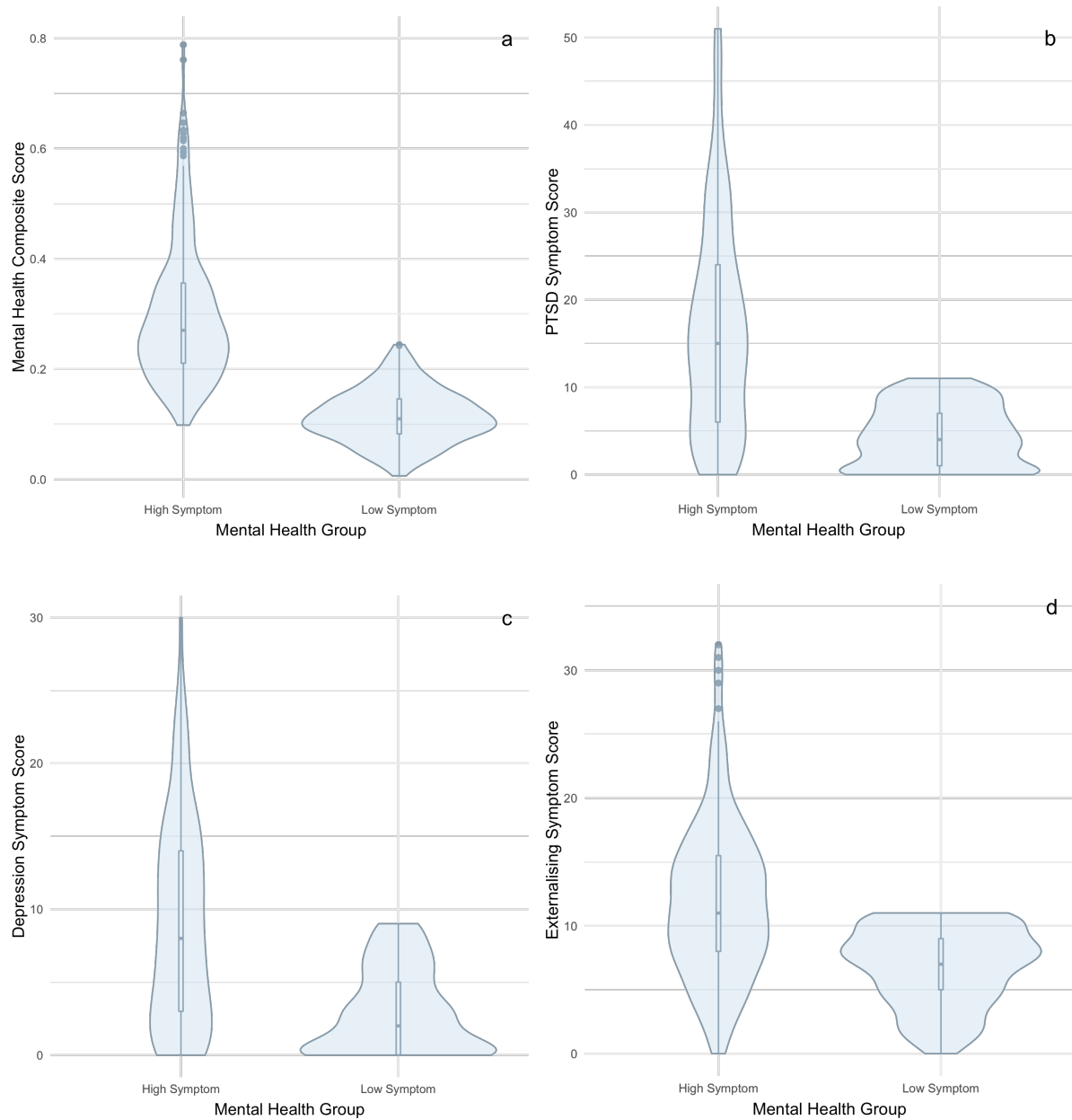


Figure 3.2. Mental health symptom scores in the matched groups. Comparison between matched high and low symptom groups on a) continuous mental health composite, b) PTSD, c) depression, and d) externalising behaviour problems. Groups represented here are after matching. Low Symptom n = 295; High Symptom n = 295. Scores on continuous measures overlap between groups due to the High Symptom group criteria: children in the High Symptom group only needed to score above one cut-off, and so could have low scores on the other dimensions.

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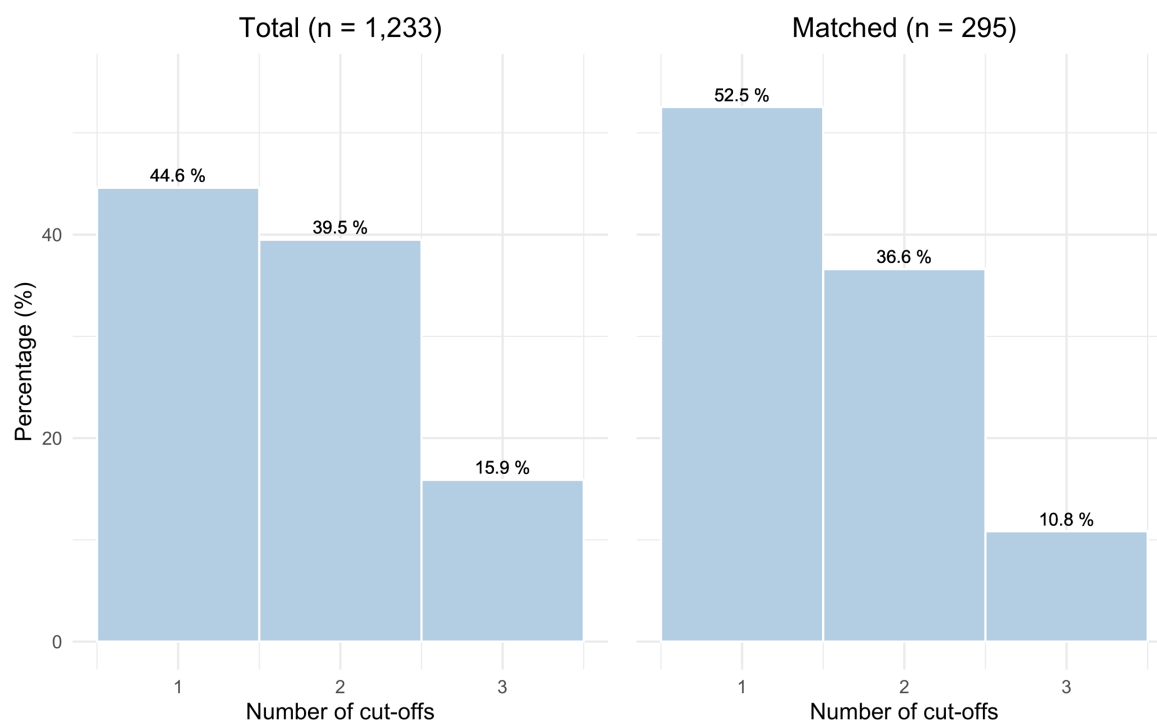


Figure 3.3. High symptom group comorbidity. Proportion of children from the total and matched high symptom groups that score above one, two, or three cut-offs.

3.3.2. Main results

When LS and HS participants were matched on war exposure, several factors predicted group membership (Figure 3.4; Table B1). In individual models, self-esteem, optimism, and perceived social support increased the odds of classification into the LS group. Poor child general health, environmental sensitivity, support-seeking, problem-focused coping, avoidance-based coping, child maltreatment, bullying, loneliness, maternal psychological control, and caregiver general and mental health were all associated with decreased odds that a child belonged to the LS group.

The logistic regression model combining all individually significant predictors explained 20.6% of the variance. Self-esteem (OR = 1.38, 95% CI [1.17, 1.62]), optimism (OR = 1.07, 95% CI [1.01, 1.13]), environmental sensitivity (OR = 0.83, 95% CI [0.72, 0.95]), loneliness and social isolation (OR = 0.90, 95% CI [0.86, 0.95]), child maltreatment

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(OR = 0.97, 95% CI [0.96, 0.99]), caregiver PTSD (OR = 0.99, 95% CI [0.98, 1.00]), and caregiver depression (OR = 0.96, 95% CI [0.93, 0.99]) survived correction for multiple testing in the combined model. Bivariate correlations between the predictors included in the combined model ranged from small to moderate ($r = -.28-.65$; Table 3.2).

The same analysis in the complete case data ($n = 542$) largely supported the main results, with some minor differences (Table B2). Support seeking was not predictive of group membership in the complete case data, whereas maternal acceptance was predictive. Fewer predictors remained significant in the combined model in the complete case data, likely due to lower power, but maternal psychological control did remain significant, unlike the imputed results. However, the direction of associations remained the same and effect sizes were similar.

The continuous sensitivity analysis looking at predictors of the continuous mental health composite score ($n = 1,528$) supported the main results, indicating that our matching technique did not introduce bias (Figure 3.5; Table B3). Every significant predictor in the main logistic regression remained so in the linear regression.

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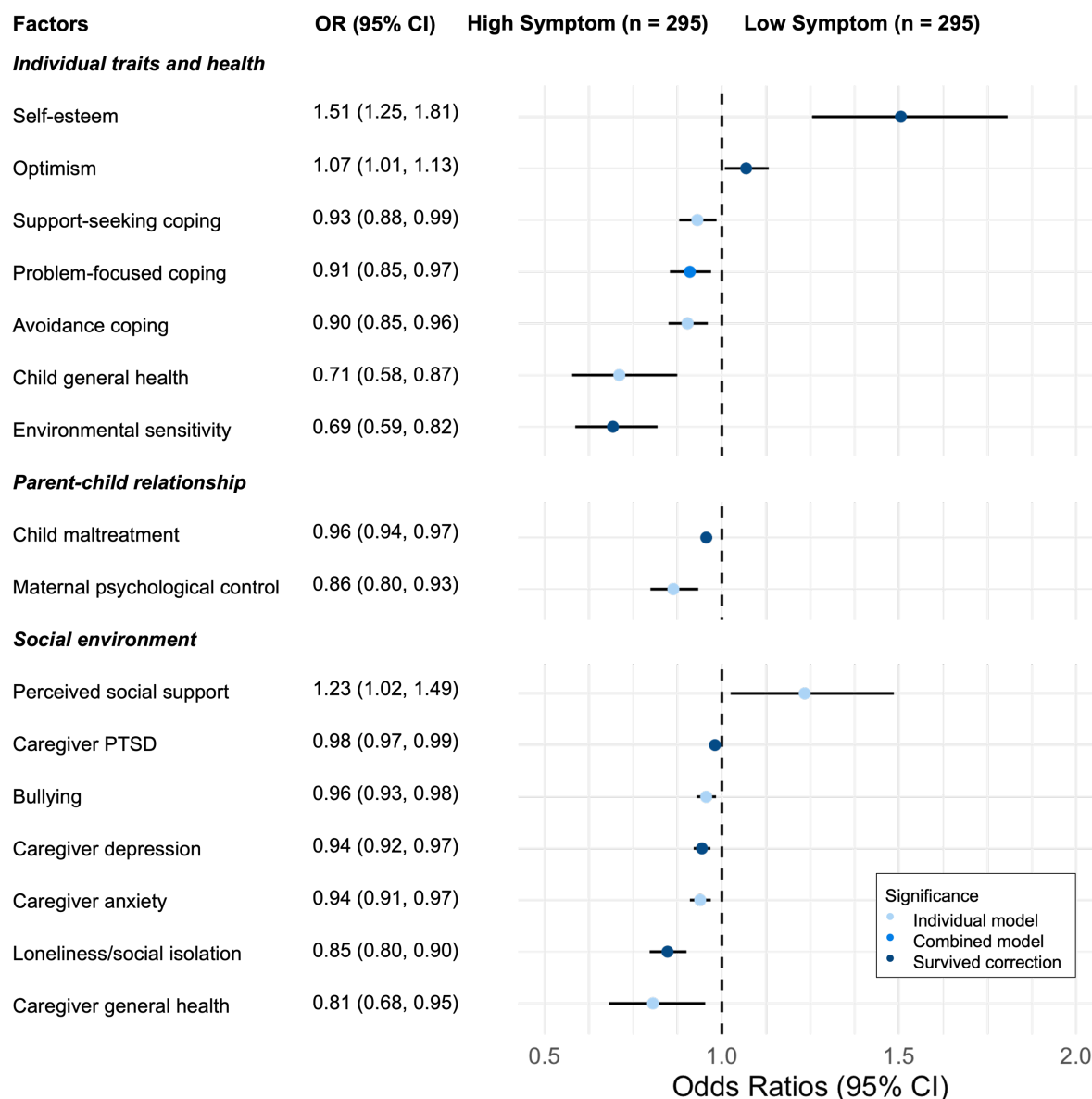


Figure 3.4. Logistic regression results. Forest plot and associated table, showing the odds ratios and 95% confidence intervals from the individual logistic regression models for the factors that significantly predicted LS or HS group membership. Factors highlighted light blue for ‘*Individual model*’ were significant predictors of group only in individual models. Those highlighted royal blue for ‘*Combined model*’ remained significant when entered into the model combining all individually significant predictors. Those highlighted dark blue for ‘*Survived correction*’ are the factors that remained significant when correction for multiple testing was made in the combined model. OR = Odds Ratio; CI = Confidence Interval.

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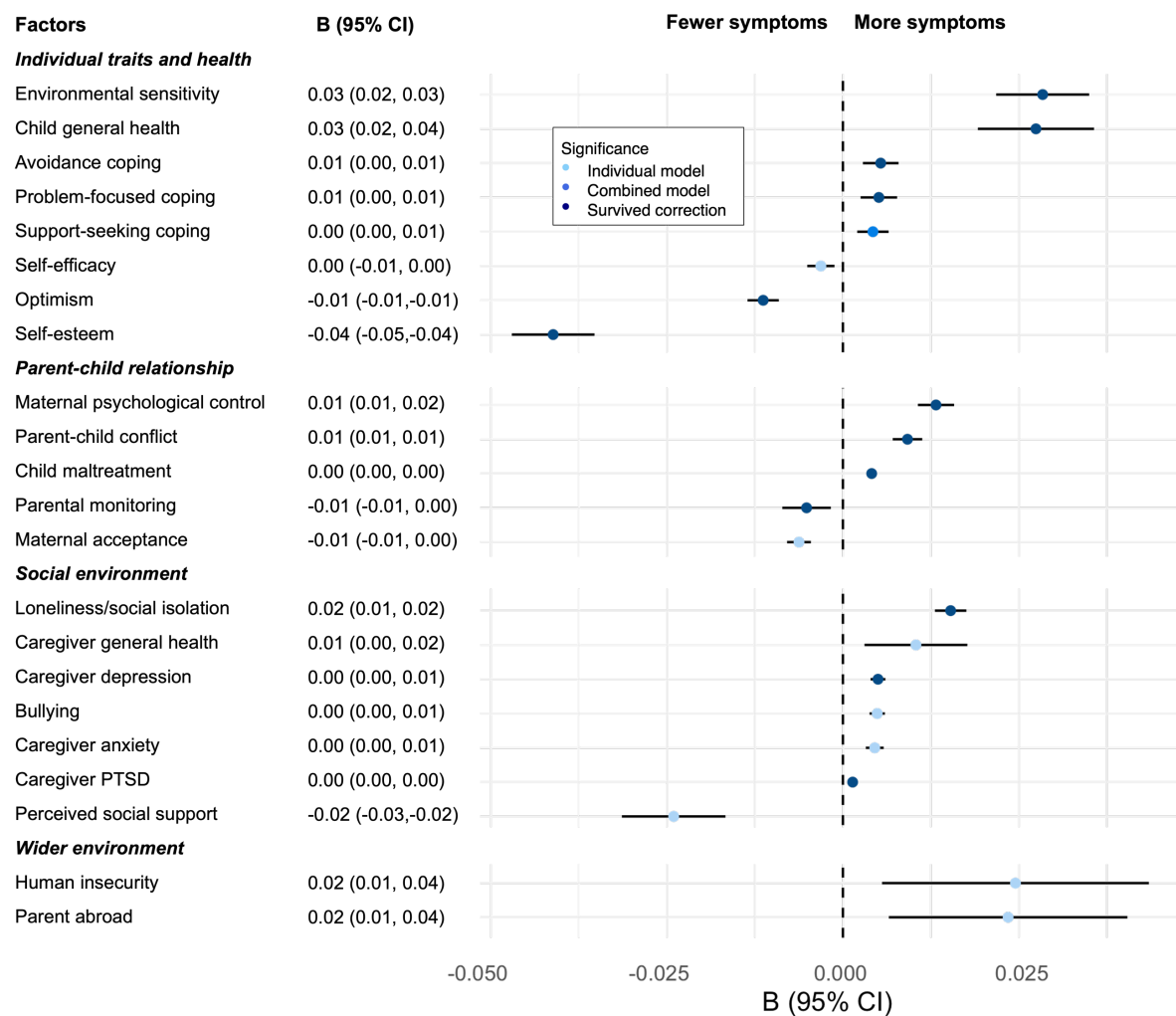


Figure 3.5. Sensitivity analysis: whole sample multiple linear regression results. Forest plot and associated table, showing the unstandardised regression coefficients and 95% confidence intervals from the individual linear regression models for the factors that significantly predicted the mental health composite score. Factors highlighted light blue for ‘*Individual model*’ were significant predictors of group only in individual models. Those highlighted royal blue for ‘*Combined model*’ remained significant when entered into the model combining all individually significant predictors. Those highlighted dark blue for ‘*Survived correction*’ are the factors that remained significant when correction for multiple testing was made in the combined model. B = Unstandardised Coefficient, CI = Confidence Interval.

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Table 3.2. Bivariate correlations between predictors combined in regression models

	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.	14.	15.
1. Optimism															
2. Self-esteem	0.25***														
3. Environmental sensitivity	0.12***	-0.08**													
4. Problem-focused coping	0.24***	0.03	0.25***												
5. Avoidance coping	0.22***	-0.01	0.21***	0.61***											
6. Support-seeking coping	0.15***	0.01	0.21***	0.52***	0.44***										
7. Child general health	-0.02	-0.10***	0.11***	-0.01	0.04	-0.05									
8. Maternal psychological control	-0.08**	-0.20***	0.05*	0.03	0.12***	0.02	0.01								
9. Child maltreatment	-0.11***	-0.21***	0.06*	0.13***	0.15***	0.09***	0.03	0.34***							
10. Perceived social support	0.32***	0.30***	0.02	0.16***	0.14***	0.23***	-0.06*	-0.15***	-0.17***						
11. Bullying	-0.13***	-0.12***	0.03	0.05	0.06*	0.05*	0.03	0.17***	0.45***	-0.11***					
12. Loneliness/social isolation	-0.22***	-0.28***	0.08***	-0.08**	-0.01	-0.02	0.04	0.24***	0.20***	-0.24***	0.15***				

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	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.	14.	15.
13. Caregiver depression	-0.11***	-0.10***	0.08**	-0.02	0.00	-0.01	0.23***	0.05*	0.14***	-0.08**	0.08**	0.12***			
14. Caregiver PTSD	-0.11***	-0.07**	0.08**	-0.09***	-0.04	-0.03	0.19***	0.06*	0.04	-0.11***	0.01	0.14***	0.57***		
15. Caregiver anxiety	-0.10***	-0.06*	0.14***	-0.05*	-0.04	-0.02	0.25***	-0.01	0.01	-0.05*	0.02	0.10***	0.65***	0.58***	
16. Caregiver general health	0.00	-0.08**	0.03	0.01	0.08**	-0.04	0.25***	0.01	0.04	-0.08**	0.02	0.06*	0.33***	0.21***	0.31***

Note. Pearson's correlation coefficients. * $p < .05$, ** $p < .01$, *** $p < .001$

3.4. Discussion

Our aims were to identify which children in the BIOPATH sample could be considered to show resilience, and why, using a matching method to ensure mental health differences did not reflect different levels of war exposure. We found that relatively few (19.3%) cases met our criteria for manifested resilience and showed overall low symptoms of PTSD, depression, and externalising problems. Several specific factors on the individual and social levels predicted individual differences in mental health.

3.4.1. Resilience

Due to the high levels of adversity faced by the current sample, children who scored below the cut-offs on all three outcome measures can be considered as demonstrating resilience in the context of war exposure. The relatively small number of resilient children compared to studies focusing on single outcomes (Khamis, 2019a) emphasises the importance of applying a multi-dimensional approach. The absence of symptoms on one dimension does not necessarily mean that a child is doing well overall. However, the current sample also shows higher prevalence of mental health problems than some studies that did account for multiple dimensions (Çeri et al., 2018; Scherer et al., 2020). This may be due to the substantial challenges specific to this sample, who continue to experience ongoing adversity as refugees in Lebanon, with difficulty accessing basic necessities, services, and work (McEwen, Popham, et al., 2022). Worse mental health might therefore be expected compared to refugee populations resettled in more stable and less adverse conditions (Nickerson et al., 2022). However, it is important to note that children scoring above cut-offs, that we considered as at risk for mental health problems, may still recover over time (Masten & Narayan, 2012).

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3.4.2. Predictors of risk and resilience

Several factors differentiated children with high and low symptoms. At the individual level, optimism and self-esteem predicted LS group membership, whereas poor general child health and the temperament trait of environmental sensitivity predicted HS group membership, all in agreement with previous research (Karam et al., 2019; Lau et al., 2018; Marley & Mauki, 2019; Speidel et al., 2021). More surprisingly, coping strategies (support-seeking, problem-focused, and avoidant coping) predicted HS group membership. While avoidant coping is generally maladaptive, support-seeking and problem-focused coping are considered adaptive coping strategies (Masel et al., 1996), and have been shown to be protective in other war-exposed samples (Fayyad et al., 2017; Khamis, 2019a). However, the specific context and nature of the adversity the current sample were exposed to likely play an important role here; problem-focused strategies may be maladaptive when the problem is too complex to fix (Elklit et al., 2012; Woltin et al., 2018). This demonstrates that certain factors can have either a risk or resilience function, depending on the context. Alternatively, use or report of coping strategies may be affected by the experiences or current mental health status of children. There is evidence that trauma exposure may lead to increased use of active (e.g., problem-solving) coping strategies, likely due to increased need (Jenzer et al., 2020). Similarly, worse mental health might also lead to increased reporting of coping strategies. With cross-sectional data, we cannot conclude which direction this relationship takes, although Jenzer and colleagues (2020) suggest there is a bi-directional relationship between coping and trauma reporting. Regardless, these findings emphasise the importance of considering the context and population characteristics when considering which individual assets or strategies should be promoted as resilience factors in interventions.

At the social level, negative aspects of social relationships (bullying, loneliness & social isolation, child maltreatment, maternal psychological control) and caregiver mental

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and general health problems were predictive of HS group membership, in keeping with previous research (Karam et al., 2019; Khamis, 2019b; Scharpf et al., 2021). The key implication is that risk factors in the immediate social environment seem particularly important for children's mental health, compared to aspects of the living environment and socio-economic factors. These might therefore represent the most valuable targets to consider for interventions. The nonsignificant findings for some factors, such as access to education, are unexpected, and may also be due to the specific characteristics of the sample. For example, even the children with reported access to education often do not attend formal school, so there may not be enough variance in the sample to see significant associations.

3.4.3. Interplay between predictors

Although we have identified a series of predictors that are important in determining which children may be more able to adapt to war exposure in the particular context faced by the current sample, we must consider that these predictors likely interact with one another. The combined model results and bivariate correlations suggest that some predictors share variance, but most correlated predictors retain distinct predictive power even when combined. For example, caregiver depression is correlated with maltreatment, which could indicate a mediating pathway whereby caregiver mental health affects children via parenting (Bryant et al., 2018). However, caregiver depression and child maltreatment both remain significant in the combined model, indicating that they have separate effects on child mental health. On the other hand, individual predictors that are not significant in the combined model could indicate shared effects on child mental health. For example, the correlations between the social relationship measures could explain why the effect of bullying does not survive in the combined model. The specific experience of bullying may not have additional effects on children when controlling for maltreatment in the home and social isolation. Future research

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should further investigate these interrelationships and the mediating pathways through the social environment that affect child mental health. In Chapter 5 we address part of this issue, by investigating mediating pathways through the family environment.

3.4.4. Sensitivity analyses: robustness of results

Our findings were supported by the logistic regression in the complete case data, and the linear regression in the total sample, but there were some small differences to note. Support seeking was non-significant and maternal acceptance was significant in the complete case analysis, but effect sizes were almost identical to the imputed estimates. Additionally, fewer predictors remained significant in the complete case combined model, likely due to decreased power from the smaller sample size. However, maternal psychological control remained significant in the combined model in the complete case but not the imputed data. This could be explained by associations between predictors; maternal psychological control is correlated, and probably co-occurs with, other social risk factors, such as child maltreatment, as well as with child self-esteem, which is likely negatively impacted by controlling caregiver actions. The additional children in the imputed data may have increased the power to detect distinct effects beyond shared variance, but may also have tipped the balance as to exactly which predictors were significant in that specific model given these relationships. The individual predictor models indicate a number of measures likely key to the current sample's adaptation to war exposure, but the complex interrelationships between predictors require further exploration.

3.4.5. Implications

The key implication of the findings presented here is that in order to gain an accurate picture of mental health in refugee children, multiple dimensions of functioning need to be

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taken into account. Here, we identified a smaller proportion of resilient children than expected when taking into account PTSD, depression, and externalising behaviour problems. Future research in populations with better access to services such as healthcare or education could also consider somatic symptoms, and external indicators of functioning such as academic achievement, in order to gain a more complete picture of child resilience. We also identified several modifiable factors (e.g., maltreatment, caregiver depression) that predict outcomes regardless of war exposure, which could represent potential targets for intervention. The unexpected finding regarding problem-focused coping emphasises the importance of research in different settings and with more than one wave of data, in order to investigate the functions that factors play depending on the setting and to investigate the direction of associations between predictors and child outcomes. This would provide valuable information as to what effect skills-based interventions might have according to the context. Finally, the primary analysis in the war exposure-matched groups and the continuous sensitivity analysis controlling for the war exposure total score provided similar results. This similarity suggests that a total score representing the range of different war events children have experienced might provide sufficient detail to control for the effects of war exposure on analysis, at least in the current sample. However, more research is still needed into the influence of specific war experiences on post-migration adaptation and the best way to account for this.

3.4.6. Strengths and limitations

Overall, our findings provide important information on a unique and under-studied population, suggesting that the mental health needs of Syrian refugee children living in ITSs in Lebanon may be more severe than one could infer from some of the previous research on other samples of Syrian refugees (Scherer et al., 2020). They also provide evidence on

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predictors of mental health outcomes when controlling for the effects of war exposure, that may be particularly applicable to refugees in LMICs and camp settings.

Despite these strengths, there are certain limitations to the results that warrant discussion. First, we focused on resilience at one single timepoint, although we know that refugee children's mental health changes over time (Hermosilla et al., 2021; Müller, Gossmann, et al., 2019; Purgato et al., 2020). Those classified as HS may be able to successfully adapt in future, while the resilient sample will not necessarily be impervious to future challenges. In the next chapter, we investigate multi-dimensional resilience across two waves of data to address this problem. However, identifying these two groups at baseline provides us with a valuable first step to understanding resilience in the current sample, and focusing on the entire baseline sample allowed us to explore the war exposure matching technique to investigate predictors of mental health outcomes when war exposure is held equal, whilst retaining the most power possible.

Secondly, cross-sectional data precludes interpretations of the directionality of associations, meaning that it is difficult to separate outcomes and predictors. For example, while factors such as future orientation or self-esteem can be stable traits (Brent Donnellan et al., 2012) they could also reflect current mental wellbeing. Directionality is therefore an important element to consider, which is not often tested for in research on predictors of refugee child mental health (Arakelyan & Ager, 2021; Scharpf et al., 2021). This will also be explored in detail in the following chapter. However, there is evidence that hopeful thinking patterns can be stable in children affected by conflict (Purgato et al., 2020), which indicates they may be trait characteristics and supports our use of them as predictors here.

Third, according to our results, the individual effects of some predictors were small. One conclusion to draw from this is that single predictors alone, such as a caregiver's PTSD symptoms, may not have strong effects on children, particularly if other protective factors,

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such as strong social support, are present. However, the cumulative effect of an overall unsupportive environment that includes loneliness, harsh parenting, and a caregiver with symptoms of PTSD, may greatly increase a child's risk for mental health problems. We address this in Chapter 5, by further investigating the relationships between some of these aspects of the environment.

Fourth, the complete case combined model results differed slightly from those in the imputed data. However, according to further checks, imputation did not significantly change patterns of responding, and the effect sizes remained very similar, meaning it is unlikely that the imputation introduced bias.

In addition to these points, there are a few limiting characteristics of the BIOPATH sample as a whole that should be mentioned briefly. First, a potential selection bias in recruitment cannot be excluded due to restricted access to certain settlements and reliance on presence of families during recruitment. Second, our measures were reported rather than observed, and some, such as war exposure, were retrospective, introducing potential recall bias confounded by participants' current state, in addition to challenges regarding reliability when collecting data from children (Panter-Brick et al., 2015). However, research on refugee war experiences is necessarily retrospective, and our combined child and caregiver report version of the war exposure scale was designed to improve reliability as far as possible (Oh et al., 2018). Finally, we were limited by evaluating mental health with established symptom scales, some of which had to be translated, and reported by different informants. However, scales were extensively piloted and the most reliable selected, and, where possible, modified to be appropriate for the dialect, literacy, and context of the families, as described in Chapter 2. Furthermore, we derived cut-offs through clinical assessment in a subsample, choosing cut-offs with the best balance of sensitivity and specificity specifically for the current sample (McEwen et al., 2020). It is important to note that, despite this, specificity fell below 80%,

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meaning that the HS group will contain false positives, and the true proportion of resilient children is likely to be higher. Prevalence estimates adjusted for false positives and negatives are therefore lower than reported here (McEwen, Biazoli, et al., 2022), but adjustments cannot be applied at the individual level, so we retain unadjusted estimates.

3.5. Conclusion

Applying a multi-dimensional approach to child mental health in the context of war exposure, we provided an estimate of the proportion of resilient, or low symptom, children in a sample of Syrian refugees in Lebanon, and identified multiple predictive factors that could provide important targets for future mental health programmes. About one in five children from the sample showed no significant risk for mental health problems despite substantial war exposure. Multiple individual and social factors predicted outcomes, replicating findings from other conflict-affected groups in this vulnerable but understudied population, but single factors alone accounted for small proportions of the overall variance in mental health. Our findings likely reflect the simultaneous consideration of multiple outcomes and of multiple predictors, emphasising the importance of characterising adaptation across multiple dimensions rather than focusing on individual disorders, and of exploring the interrelationships between risk and resilience factors, particularly within the family environment.

Chapter 4: Predictors of Risk and Resilience Over Time

4. Abstract

Children's responses to war and displacement are varied; many struggle, while others appear resistant to the effects of war or recover over time. However, research into these outcomes disproportionately focuses on cross-sectional data in high income countries. In this chapter, I aimed to (1) investigate change in resilience across two timepoints in the current sample of Syrian refugee children, (2) explore predictors of mental health problems across time, and (3) investigate the directionality of those pathways. The sample included baseline and follow-up data from 982 Syrian child-caregiver dyads from the BIOPATH study. I categorised children into symptom groups (Stable High Symptom, Deteriorating, Improving, Stable Low Symptom) according to their scores relative to clinical cut-offs for post-traumatic stress disorder, depression, and externalising problems at both timepoints. The sample showed overall improvement in mental health from baseline to follow-up. Just over half the children had consistently high symptoms and 10.3% deteriorated over time, but almost one quarter showed meaningful improvement, and 9.2% had consistently low symptoms. Several predictors differentiated the groups, particularly social measures. According to cross-lagged panel models, maternal acceptance ($\beta = -0.07$) predicted child symptoms. Factors including self-esteem ($\beta = -0.08$), maternal psychological control ($\beta = 0.10$), and caregiver depression ($\beta = 0.08$) had bi-directional relationships with child symptoms. Finally, child symptoms were predictive of a range of factors. Our results show that risk and resilience are dynamic and the family environment plays a key role, but children also have a significant impact on their social environment. Interventions should consider family-wide mechanisms. This chapter is based on the paper *The dynamic nature of refugee children's resilience: a cohort study of Syrian refugees in Lebanon* published in *Epidemiology and Psychiatric Sciences* (Popham, McEwen, Karam, Fayyad, Karam, Saab, Moghames, & Pluess, 2022).

4. Predictors of Risk and Resilience Over Time

4.1. Introduction

Syrian refugee children are at greatly increased risk for mental health problems such as post-traumatic stress disorder (PTSD), depression, and externalising problems (Gormez et al., 2018; Kandemir et al., 2018; Özer et al., 2016; Uysal et al., 2022). However, a notable proportion show no evidence of such difficulties (Scherer et al., 2020) and the mental health of conflict-affected children generally improves over time (Hermosilla et al., 2021; Müller, Gossmann, et al., 2019; Purgato et al., 2020). Given the extreme nature of the adversity refugee children tend to face, we argue these children demonstrate manifested resilience, defined as *functioning better than expected in the context of adversity* (Masten, 2016; Miller-Graff, 2020). Many individual and socio-ecological factors, such as coping strategies or social support, have been linked to refugee child mental health, but the majority of these findings are based on cross-sectional data (Scharpf et al., 2021). This prevents us from investigating why some children improve while others deteriorate, and whether these factors affect children's mental health, or are simply correlated. In the previous chapter, we operationalised resilience by creating low and high symptom groups according to children's symptoms of PTSD, depression, and externalising behaviour problems at baseline, and then investigated what predicted group membership when carefully controlling for the effects of war exposure. In this chapter, we ask how those groups change over time, and what the direction of effects is between identified predictors of child symptoms.

4.1.1. Changes in mental health over time

Research thus far suggests that the mental health of conflict-affected children generally improves over time (Purgato et al., 2020), perhaps reflecting a combination of temporal distance from war exposure and adaptation to the resettlement context. However, the process of adapting to war can take different trajectories; children struggling at one

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timepoint may recover, while continuing accumulation of stressors may cause a child originally doing well to deteriorate (Müller, Gossmann, et al., 2019). Previous follow-up studies of war-exposed children's mental health suggest that low distress across both waves and improvement over time are the most common trajectories. For example, PTSD and depression symptoms improved over time in 30.6% and 29.2%, respectively, of a sample of asylum-seeking children in Germany (Müller, Gossmann, et al., 2019). In contrast, smaller, but still notable, groups of children seem to deteriorate over time. The relatively small proportion (19.3%) of children meeting our resilience criteria in the previous chapter might therefore increase when looking at mental health over two timepoints, although the number of children with deteriorating mental health appears to be higher in samples living in camps or lower income contexts (Panter-Brick et al., 2015).

However, these estimates focus on individual outcomes, whereas some children show simultaneous improvements in some areas and deterioration in others (Hermosilla et al., 2021). This could be particularly complex in populations exposed to ongoing adversity, such as refugees living in camps. For example, children might show improvements in PTSD as they recover from the traumatic experiences of war, but living in a camp with limited access to resources such as education could lead to increases in emotional or behavioural problems (Scherer et al., 2020). Indeed, there is evidence that living context and the ability to meet basic needs can have long-term effects on refugees' mental health and the rate at which it improves (Nickerson et al., 2022). This emphasises the importance of conducting research in lower income and camp contexts.

4.1.2. Directionality of relationships

In addition to the refugee environment, many other individual and socio-ecological factors have been associated with refugee children's mental health. Our results in the

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previous chapter chime with the primarily cross-sectional research so far, in showing that individual resources and coping strategies, social relationships, and caregiver mental health are all important predictors of child outcomes (Betancourt, Salhi, et al., 2012; Eruyar et al., 2018; Khamis, 2019b; Speidel et al., 2021). The more limited longitudinal research to date particularly emphasises the importance of the family environment: caregiver mental health, parenting, and other aspects of family functioning are predictive of later emotional and behavioural problems in refugee children (Bryant et al., 2018; Panter-Brick et al., 2014; Sangalang et al., 2017).

However, the directionality of associations between these purported predictors of mental health outcomes and refugee child mental health remain unclear. For example, certain individual assets such as optimism may reflect stable traits that influence a child's ability to adapt, or they may reflect another dimension of functioning that is affected by a child's general mental health (Purgato et al., 2020). Coping strategies provide another example; in the previous chapter, we identified that greater use of support-seeking and problem-focused coping strategies was associated with reduced likelihood of being classed as low symptom, or resilient. However, while these coping strategies could be leading to increases in distress, possibly because of the low levels of control children have over their environment, the effect could be in the opposite direction. Increased distress may lead to increased need for and reporting of said strategies (Jenzer et al., 2020).

Children's mental health can also impact their environment. Although the focus of research is often on how socio-ecological factors impact the child, Syrian refugee mothers report how their children's mental health can also affect their own mental health and parenting (Rizkalla et al., 2020). In a study of anger within refugee families, parents often cited their child's misbehaviours as the reason for their anger (Hinton, Rasmussen, Nou, Pollack, & Good, 2009). Particularly among refugees where the whole family could be

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traumatized by their war and migration experiences, caregivers might more easily react harshly to their child's externalising behaviours. Outside of the family, children's mental health status can also affect their exposure to environments or events. For example, behavioural problems might increase engagement in risky behaviours or exposure to peer stigmatisation (Midouhas et al., 2021; O'Driscoll et al., 2012). Further longitudinal research is needed to investigate such reciprocal relationships between children and their environment.

4.1.3. The current study

The broad objective of the current study was to address the lack of research on the mental health of refugee children with more than one wave of data in a refugee camp context. Specifically, we had three key aims: (1) identify the proportion of children with low, high, and changing risk for mental health problems over time in a sample of Syrian refugee children living in camps in Lebanon; (2) identify predictors of change in risk and resilience; (3) investigate the directionality of the relationships between identified predictors and mental health symptoms over time. We extended the approach from the previous chapter and used low symptoms across PTSD, depression, and externalising problems to approximate manifested resilience. We expected that, while some children would have high symptoms across both waves, a substantial proportion would show improvements over time. We also expected that a range of individual and socio-ecological factors would be predictive of child symptoms, but that child symptoms may also predict factors such as caregiver mental health.

4.2. Methods

4.2.1. Study design

We addressed our aims using baseline and follow-up data from the BIOPATH sample, combining person- and variable-centred approaches. First, we created four groups

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based on change in risk for mental health problems from baseline to follow-up: (1) children with low symptoms of PTSD, depression, and externalising behaviour problems at both waves (Stable Low Symptom/SLS), (2) children with low symptom scores on all three outcomes at baseline whose symptoms meaningfully worsened at follow-up (Deteriorating), (3) children with high symptoms at baseline who showed meaningful improvement at follow-up (Improving), and (4) children with continuously high symptom scores on any outcomes at both waves (Stable High Symptom/SHS). We ran group comparisons to determine what factors characterised each of the four groups, and finally investigated the directionality of associations between children's mental health symptoms and the predictors identified in group comparisons using cross-lagged panel models (CLPMs).

4.2.2. Setting and participants

For the analyses presented in this chapter, we used child-caregiver dyads who had data from baseline and follow-up ($N = 1,000$) in order to allow comparisons across time. Any families missing data on child age, gender, or time since leaving Syria, and any children missing the total scale score for PTSD, depression, or externalising behaviour problems at either wave were excluded from analysis ($n = 18$).

4.2.3. Data collection

All participants completed the questionnaires via interviews in their homes in the settlements, conducted by trained, native, Arabic-speaking interviewers. Different interviewers conducted the child and caregiver interviews simultaneously. Visual aids (Figure 2.2) for each scale were available where necessary to enhance understanding and privacy. All measures were repeated one year later with approximately two thirds of the original baseline sample. For detailed information on data collection please see Chapter 2, Section 2.1.3.4.

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4.2.4. Measures

4.2.4.1. *War exposure*

War exposure was measured with the combined child and caregiver report version of the War Events Questionnaire (WEQ; Karam et al., 1999) measured at baseline, as described in Chapter 2. The WEQ consists of 25 yes/no items, such as “*Did you witness explosions close to you?*” (Figure 2.3). The combined measure was created such that if either the child or caregiver reported that the child experienced an event, the event was considered to have occurred. We used the total war exposure score, representing the range of different events children had been exposed to, as a covariate in all analyses.

4.2.4.2. *Mental health outcomes*

To address the aims of this chapter, we combined categorical and dimensional approaches to mental health outcomes. For the first two aims, we extended the two groups described in Chapter 3 to reflect four groups according to change in mental health across the two waves (Stable High Symptom/SHS, Deteriorating, Improving, Stable Low Symptom/SLS). For the third aim, we used the continuous mental health composite score.

As in the previous chapter, the primary outcomes were self-reported PTSD (Child PTSD Symptom Scale; Table 2.4; Foa et al., 2001), self-reported depression (Center for Epidemiological Studies Depression Scale for Children, abridged; Table 2.5; Faulstich et al., 1986), and parent-reported externalising behaviour problems, measured using the externalising subscale of the Strengths and Difficulties Questionnaire (SDQ; Goodman, 1997) and additional items related to conduct disorder (CD) and oppositional defiant disorder (ODD) administered separately (Table 2.6). The clinically validated cut-off scores were 12 out of 51 on the adjusted CPSS, 10 out of 30 on the adjusted CES-DC, and 12 out of 44 on the combined externalising scale total (McEwen et al., 2020). Cut-offs had sensitivity of 81-

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85%, but specificity fell below 80%, meaning that some children flagged as at risk may not represent clinical cases. Children below cut-offs likely do not have clinical symptoms (negative predictive value of 79-91%). For more detailed information see Chapter 2, Section 2.3.3.2.2. The creation of the groups is described below (Section 4.2.5.1.).

Finally, to address our third aim we used the continuous mental health composite score combining PTSD, depression, and externalising symptoms. We adjusted the three scale totals for the number of items in the scale, and computed the average of the adjusted scores.

4.2.4.3. Predictor variables

We investigated the same collection of predictors as in Chapter 3, in order to investigate their relationship with child outcomes over time. Individual-level predictors included optimism (Ey et al., 2005), self-efficacy (Schwarzer & Jerusalem, 1995), a single self-esteem item (Harris et al., 2018), the temperament trait of environmental sensitivity (Pluess et al., 2018), coping strategies (Program for Prevention Research, 1999), future orientation (Table A1; McEwen, Popham, et al., 2022), and a single item on the child's general health (Table 2.7; McEwen, Popham, et al., 2022). For the social environment we included positive and negative aspects of the caregiver-child relationship (parental monitoring, Barber, 1996; parent-child conflict, Barber, 1999; maternal psychological control, Barber et al., 2012; parental presence, Table A2, McEwen, Popham, et al., 2022; child maltreatment, Runyan et al., 2009; maternal acceptance, Schaefer, 1965), the caregiver's own mental and general health (PTSD, Blevins et al., 2015; anxiety, Henry & Crawford, 2005; general health, McEwen, Popham, et al., 2022; depression, Radloff, 1977), and relationships within and beyond the family (loneliness and social isolation, Table A4, Asher et al., 1984; bullying, Table A3, McEwen, Popham, et al., 2022; perceived social support, Ramaswamy et al., 2009). Finally, children reported their home and employment

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responsibilities and caregivers reported their literacy, income, employment status, household size, and aspects of the wider environment (perceived refugee environment, Table A5, McEwen, Popham, et al., 2022; collective efficacy, Sampson et al., 1997; human insecurity, Ziadni et al., 2011). For detailed information, including modifications to measures, see Table 2.7 in Chapter 2.

4.2.5. Statistical methods

4.2.5.1. Aim 1: Creating risk and resilient groups

All analyses were conducted in RStudio 2021.09.2+382. In order to investigate risk and resilience over time, we created the four outcome groups (SHS, Deteriorating, Improving, SLS) using a two-step approach. At each wave, we created high and low symptom groups using the validated clinical cut-offs for PTSD, depression, and externalising problems, following the same method as described in Chapter 3. If participants scored above the cut-off for any of the three measures, they were classed in the high symptom group, but if participants scored below all three cut-offs, they were classed in the low symptom group (i.e., resilience). We then adjusted the groupings at follow-up according to which children showed meaningful change, defined as crossing the relevant cut-off(s) from baseline to follow-up to meet the low or high symptom criteria (i.e., below all cut-offs vs. above any) paired with a change in symptom score of at least 20% on the relevant scale. For example, if a child scored below all cut-offs at baseline but at follow-up their PTSD symptom score increased by 20% or more to score above the cut-off, this would be counted as meaningful change. However, if the PTSD score had crossed the cut-off but increased by less than 20% (i.e., one or two points on the symptom scale) they would remain in the low symptom group. This ensured that small amounts of variability in reporting over time were not counted as categorical change. Children who moved from the low symptom to the high symptom group were termed

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Deteriorating, while children who moved from the high symptom to the low symptom group were termed Improving. Children who did not show meaningful change were classed as Stable High/Low Symptom.

We also compared the wellbeing of the low and high symptom groups as measured by the World Health Organisation – Five Wellbeing Index (WHO-5; Bech, 2012; Topp et al., 2015) using independent samples t-tests at baseline and follow-up separately, to investigate whether low symptom children were additionally scoring better on a measure of positive functioning (Bonanno, 2012).

4.2.5.2. Aim 2: Group characteristics

Specific characteristics of the four groups were identified with a series of individual analyses of covariance (ANCOVAs) for each predictor to compare their baseline scores and the change over time from baseline to follow-up. For each predictor, we considered the effect of group membership on the baseline score controlling for change score, then on the change over time while controlling for the baseline score. In each model we also controlled for the effects of war exposure, age, gender, and time since leaving Syria. The significance level of each model was corrected using the Benjamini-Hochberg correction to account for the total number of models tested (Benjamini & Hochberg, 1995).

4.2.5.3. Aim 3: Directionality of predictor - mental health relationships

Each predictor that was significantly associated with group differences in Aim 2 was further investigated using CLPMs in order to test the directionality of effect. However, in place of the categorical grouping, we used the continuous mental health symptom composite score to improve power. We ran a series of CLPMs using the semTools package (Jorgensen et al., 2021) containing the child mental health symptom composite at both waves, and the

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predictor of interest (e.g., self-esteem) at both waves. The models included autoregressive and cross-lagged paths, and within-time covariance. As with Aim 2, we controlled for the effects of age, gender, time since leaving Syria, and war exposure on baseline and follow-up scores for the predictor variable and symptom score (Figure 4.1 illustrates the model format).

4.2.5.4. Missing data

121 (12.3%) of the children included in the analysis were missing scale totals for at least one of the predictors of interest, at either baseline, follow-up, or both. According to Little's Missing Completely at Random (MCAR) test, data were not MCAR: $\chi^2(1164) = 1382.69, p < .001$. Children with any missing scale totals had lower baseline PTSD scores ($M = 13.21, SD = 11.07$), compared to children with no missing data ($M = 15.80, SD = 12.42$; $t(165.49) = 2.37, p = .019, d = 0.22$), and higher ($M = 14.17, SD = 8.31$) baseline externalising scores ($M = 11.30, SD = 5.89$; $t(137.42) = -3.67, p < .001, d = 0.40$). Due to the nature of the dataset, we decided that the assumption that data were missing at random (MAR) was appropriate, as explained in Chapter 2, Section 2.4. In order to maximise the sample retained for analysis, we decided to impute the missing data. As these effect sizes were not large, we did not expect imputation to bias results, but in order to test this we also repeated analysis without imputation, using only the children with complete data.

Multiple imputation using Fully Conditional Specification in the mice package (van Buuren & Groothuis-Oudshoorn, 2011) was applied to impute the missing data, using the same methods as in the previous chapter. We ran 10 imputations, and imputed all missing measures for the analysis, except demographic variables, war exposure, and child mental health. Imputations were checked to ensure imputed values fell within the original distributions, and that the average scores on imputed scales did not differ between datasets. We ran all analyses in both the imputed ($N = 982$) and original ($N = 861$) datasets and report

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the pooled imputation estimates in the main text of this paper. Complete case analyses are reported in Appendix C.

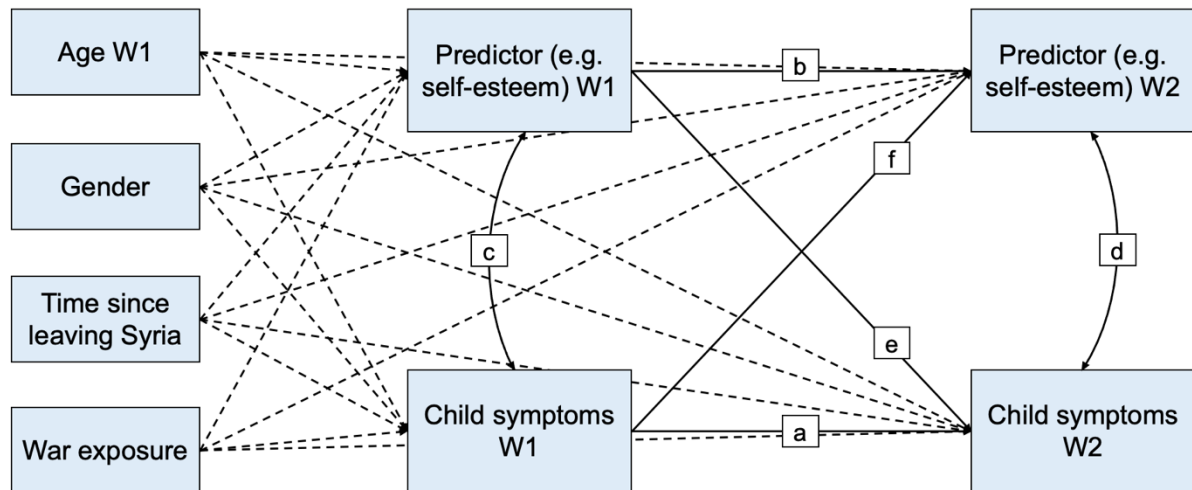


Figure 4.1. Cross-lagged panel models: full model illustration. Structural illustration of the full cross-lagged panel models tested, including the pathways controlling for age, gender, time since leaving Syria, and war exposure. Pathways: a = child symptom auto-regressed pathway; b = predictor auto-regressed pathway; c = W1 covariance; d = W2 covariance; e = cross-lagged pathway: predictor → symptoms; f = cross-lagged pathway: symptoms → predictor. W1 = baseline, W2 = follow-up

4.3. Results

4.3.1. Descriptive data

The final sample consisted of 982 child-caregiver dyads with data at both waves (Table 4.1). Approximately half (52.9%) the children were female, and at baseline children's average age was 11.22 years ($SD = 2.34$), 42.4% had left Syria in the past three years, and the remainder had left more than three years previously. Children reportedly experienced up to 24 ($M = 9.57$, $SD = 5.47$) different types of war events. The majority (91.1%) of participating caregivers were the child's mother. The proportion of children above clinical cut-offs at baseline and follow-up was 54.9% and 34.4% respectively for PTSD, 37.8% and 27.0% for depression, and 43.9% and 41.9% for externalising behaviour problems.

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This longitudinal sample represented 61.7% of the total baseline sample of 1,591 child-caregiver dyads, and did not differ from the original baseline sample in terms of child gender, caregiver relationship to the child, household size, child access to education, household income, or registration with UNHCR. There was also no difference on child war exposure, PTSD, depression, or externalising problems. Included children were slightly younger at baseline than in the total baseline sample ($t(2145.5) = 2.37, p = .018, d = 0.09$), and were more likely to have left Syria more than three years before recruitment ($\chi^2(1) = 4.99, p = .025, d = .04$). They were also less likely to be from the most vulnerable localities ($\chi^2(2) = 6.91, p = .032, d = 0.03$). However, all these differences were of small effect size, and therefore unlikely to create bias.

4.3.2. Aim 1: Change in risk and resilience

The percentage of children meeting the low symptom criteria increased from 19.5% at baseline to 33.4% at follow-up, but all four groups (SHS, Deteriorating, Improving, SLS) were represented in the data (Figure 4.2). Of the originally 791 high symptom cases at baseline, 553 (69.9%) remained in the high symptom group (scoring above at least one cut-off) at follow-up (SHS), while 238 (30.1%) moved below all cut-offs (Improving), showing a substantial reduction in symptoms of at least 20% ($M = 65.0%$) on the relevant outcomes. Of the 191 children with low symptoms at baseline, 90 (47.1%) remained below all cut-offs at follow-up (SLS) whilst 101 (52.9%) showed increased symptoms and scored above at least one cut-off at follow-up (Deteriorating), with an increase in symptoms of at least 20% ($M = 166.7%$).

At baseline and follow-up, children meeting low symptom criteria reported significantly higher wellbeing ($M_{w1} = 74.79, SD_{w1} = 19.44; M_{w2} = 78.12, SD_{w2} = 18.85$) compared to those meeting high symptom criteria ($M_{w1} = 65.47, SD_{w1} = 26.95; t_{w1}(387.19) =$

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-5.47, $p_{w1} < .001$, $d_{w1} = 0.4$; $M_{w2} = 66.61$, $SD_{w2} = 29.39$; $t_{w2}(918.16) = -7.41$, $p_{w2} < .001$, $d_{w2} = 0.47$). SHS children had significantly higher reported war exposure ($M = 10.47$) compared to all other groups ($M_D = 7.54$; $M_I = 8.98$; $M_{SLS} = 7.88$; $F(3, 978) = 13.87$, $p < .001$). Girls were more likely to be SLS ($\chi^2 = 11.19$, $p = .011$). See Table 4.1 for further group comparisons.

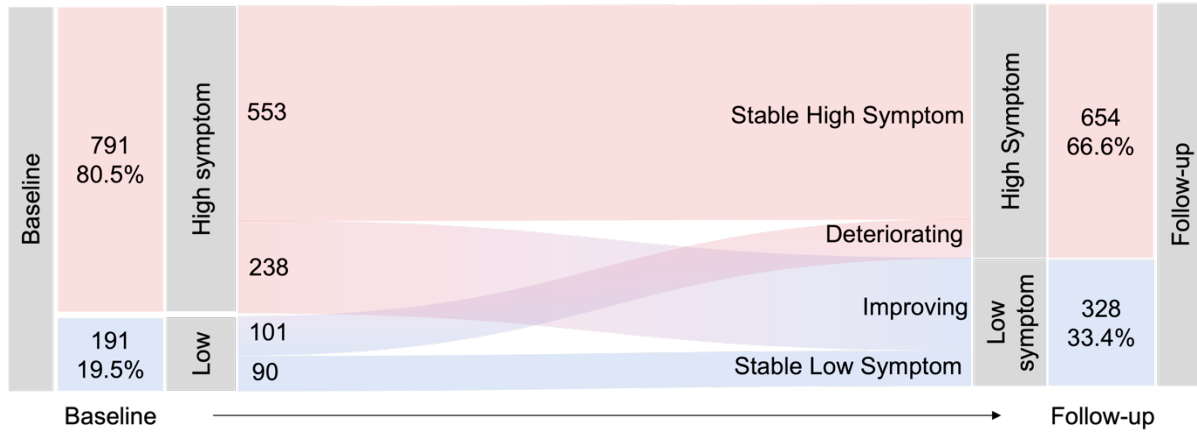


Figure 4.2. Mental health change from baseline to follow-up. This illustrates the number of children in each of the four resilience groups. Red sections represent children with high symptoms (scoring above PTSD, depression, or externalising cut-offs) and blue sections represent children with low symptoms (below all cut-offs).

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Table 4.1. Sample characteristics: whole sample and mental health groups

	Whole sample (N = 982)	Stable High Symptom (SHS) (n = 553)	Deteriorating (D) (n = 101)	Improving (I) (n = 238)	Stable Low Symptom (SLS) (n = 90)	Comparison between symptom groups	Likelihood/post-hoc comparisons
Child age, mean (SD)	11.22 (2.34)	11.3 (2.39)	10.75 (2.22)	11.29 (2.40)	11.06 (1.90)	$F(3,978) = 1.76, p = .153$	
Child gender, n (%) female	519 (52.9%)	274 (49.5%)	52 (51.5%)	132 (55.5%)	61 (67.8%)	$\chi^2(3) = 11.20, p = .011, d^a = .08$	Girls more likely to be SLS
Caregiver relationship to child, n (%) mother	895 (91.1%)	501 (90.6%)	96 (95.0%)	216 (90.8%)	82 (91.1%)	$\chi^2(3) = 2.16, p = .540$	
Time since leaving Syria, n (%) ≤ 3 years	416 (42.4%)	242 (43.8%)	37 (36.6%)	101 (42.4%)	36 (40.0%)	$\chi^2(3) = 2.01, p = .571$	
Child war exposure, mean (SD)	9.57 (5.47)	10.47 (5.55)	7.54 (4.98)	8.98 (5.24)	7.88 (4.96)	$F(3,978) = 13.87, p < .001$	D / I / SLS < SHS
Wave 1 child symptoms, mean (SD) ^b	0.28 (0.14)	0.33 (0.13)	0.12 (0.05)	0.29 (0.11)	0.10 (0.04)	$F(3,978) = 172.72, p < .001$	SLS/D < I < SHS
Wave 2 child symptoms, mean (SD) ^b	0.22 (0.15)	0.30 (0.14)	0.26 (0.12)	0.09 (0.05)	0.09 (0.06)	$F(3,978) = 245.93, p < .001$	SLS/I < D < SHS
Wave 1 PTSD, n (%) above cut-off	539 (54.9%)	375 (67.8%)	0	164 (68.9%)	0	N/A	
Wave 2 PTSD, n (%) above cut-off	338 (34.4%)	289 (52.3%)	49 (48.5%)	0	0	N/A	
Wave 1 depression, n (%) above cut-off	371 (37.8%)	275 (49.7%)	0	96 (40.3%)	0	N/A	

4. Predictors of Risk and Resilience Over Time

	Whole sample (N = 982)	Stable High Symptom (SHS) (n = 553)	Deteriorating (D) (n = 101)	Improving (I) (n = 238)	Stable Low Symptom (SLS) (n = 90)	Comparison between symptom groups	Likelihood/post-hoc comparisons
Wave 2 depression, n (%) above cut-off	265 (27.0%)	232 (42.0%)	33 (32.7%)	0	0	N/A	
Wave 1 externalising, n (%) above cut-off	431 (43.9%)	335 (60.6%)	0	96 (40.3%)	0	N/A	
Wave 2 externalising, n (%) above cut-off	411 (41.9%)	353 (63.8%)	53 (52.5%)	0	5 (5.6)	N/A	
Wave 1 above multiple cut-offs, n (%)	429 (43.7%)	329 (59.5%)	0	100 (42.0%)	0	N/A	
Wave 2 above multiple cut-offs, n (%)	283 (28.8%)	254 (45.9%)	29 (28.7%)	0	0	N/A	

Note. Descriptive statistics on key demographics and change in mental health. Tukey's post-hoc tests reported for significant ANOVAs.

^a Somers' d; ^b Child mental health symptom composite score (average of PTSD, depression, and externalising symptom scores, adjusted for number of items).

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4.3.3. Aim 2: Group characteristics

The four groups differed significantly on a range of variables at baseline and in change over time (Table 4.2). The Improving group was characterised by higher perceived refugee environment quality at baseline compared to the other groups. The SHS group differed from the other groups on a larger number of variables, characterised by lower baseline scores on several protective/promotive factors, higher baseline scores on a range of social risk factors, and greater increases in loneliness and social isolation and maternal psychological control over time. Change in a range of factors significantly differentiated children with low symptoms at follow-up (Improving and SLS groups) from those with higher symptoms (Deteriorating and SHS groups).

Complete case results were primarily the same as results in the imputed data, bar three exceptions (Table C2). Perceived social support, which was lower in the SHS group compared to all others at baseline in the imputed analysis, did not reach significance in the complete case analysis. However, the difference between imputed groups was small, so it likely did not reach significance in the complete case analysis due to reduced power. In contrast, the groups differed significantly on positive cognitive restructuring and access to school according to the complete case analysis, but not in the imputed dataset. However, the estimates were similar between the two sets of results, meaning it is unlikely that these results are evidence of bias in the imputed dataset.

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Table 4.2. Analyses of covariance: significant model results

Factor		Mental health group M(SD)				F	Adj. R Square	Post-hoc comparisons
		Stable High Symptom (SHS)	Deteriorating (D)	Improving (I)	Stable Low Symptom (SLS)			
Optimism	Baseline	8.82 (3.14)	9.65 (2.51)	9.5 (2.73)	9.87 (2.43)	9.71***	0.42	SHS < D / I / SLS
	Change	0.45 (4.21)	0.2 (3.93)	0.71 (3.66)	0.67 (3.27)	6.03**	0.40	SHS < I / SLS
Self-esteem	Baseline	3.88 (1.27)	4.41 (0.64)	4.13 (1.04)	4.44 (0.69)	10.76***	0.47	SHS < D / I / SLS
	Change	0.1 (1.41)	-0.3 (1.04)	0.21 (1.15)	-0.07 (0.99)	5.86**	0.41	SHS / D < I / SLS
Future planning	Baseline	3.03 (0.9)	3.05 (0.78)	3.01 (0.88)	2.94 (0.95)	2.01		
	Change	0.05 (1.19)	-0.08 (1.11)	-0.22 (1.22)	0.03 (1.19)	4.95**	0.40	I < SHS
Environmental sensitivity	Baseline	5.1 (1.01)	4.76 (0.98)	5.07 (1.05)	4.87 (0.93)	6.78***	0.52	I / SLS < SHS
	Change	-0.23 (1.34)	0.16 (1.31)	-0.56 (1.24)	-0.26 (1.21)	10.97***	0.50	I / SLS < SHS / D
Distraction coping	Baseline	6.45 (2.3)	6.45 (2.19)	6.45 (2.29)	6.38 (1.88)	2.78		
	Change	-0.71 (3.16)	-1.16 (2.71)	-0.26 (3.11)	-0.06 (2.59)	6.20**	0.42	SHS / D < I / SLS
Child general health ^a	Baseline	2.37 (0.82)	2.13 (0.91)	2.28 (0.79)	2.12 (0.73)	7.00***	0.47	I / SLS < SHS
	Change	-0.31 (1.01)	-0.08 (1.19)	-0.48 (0.94)	-0.35 (0.92)	7.45***	0.46	I / SLS < SHS / D
Maternal acceptance	Baseline	26.79 (4.4)	27.82 (3.18)	27.41 (3.66)	28.28 (2.61)	7.90***	0.34	SHS < D / I / SLS
	Change	0.24 (5.39)	-0.04 (4.09)	0.63 (4.54)	0.52 (3.54)	3.69*	0.32	SHS < I / SLS
Maternal psychological control	Baseline	11.61 (2.86)	10.52 (1.5)	10.86 (2.05)	10.3 (1.65)	14.96***	0.49	D / I / SLS < SHS
	Change	-0.66 (3.29)	-0.31 (1.98)	-0.6 (2.21)	-0.13 (2.23)	4.68**	0.47	SHS < D / I / SLS

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Factor		Mental health group M(SD)				F	Adj. R Square	Post-hoc comparisons
		Stable High Symptom (SHS)	Deteriorating (D)	Improving (I)	Stable Low Symptom (SLS)			
Parent-child conflict	Baseline	6.12 (3.25)	5.74 (2.97)	5.93 (3.29)	5.06 (2.33)	8.23***	0.37	SLS / I < SHS SLS < D
	Change	1.72 (4.97)	1.34 (4.53)	0.53 (4.52)	1.09 (3.8)	9.10***	0.38	I / SLS < SHS
Child maltreatment	Baseline	13.82 (13.52)	7.46 (8.27)	11.08 (11.81)	7.23 (8.21)	20.30***	0.50	I < SHS SLS < D < SHS
	Change	-3.09 (15.1)	1.41 (10.84)	-5.99 (13.63)	-3.3 (10.11)	17.13***	0.48	I / SLS < SHS / D
Perceived social support	Baseline	5.5 (0.97)	5.68 (0.8)	5.61 (0.81)	5.72 (0.76)	3.27*	0.37	SHS < D / I / SLS
	Change	0.13 (1.31)	0.22 (1.2)	0.19 (1.05)	0.13 (1.03)	2.40		
Bullying	Baseline	5.7 (6.83)	3.18 (5.31)	3.98 (5.79)	2.78 (4.54)	12.52***	0.50	D / I / SLS < SHS
	Change	-1.23 (7.93)	0.58 (6.68)	-1.94 (7.09)	-0.82 (5.55)	8.03***	0.45	I < SHS / D SLS < SHS
Loneliness and social isolation	Baseline	8.72 (3.02)	7.02 (2.37)	8.23 (2.69)	7.01 (2.49)	23.77***	0.50	D < SHS SLS < I < SHS
	Change	-0.96 (4.12)	-0.19 (4.05)	-1.61 (3.78)	-0.88 (3.39)	12.65***	0.47	I < SHS SLS < D < SHS
Caregiver depression	Baseline	16.19 (6.35)	12.44 (6.33)	15.2 (6.33)	13.12 (6.43)	24.1***	0.36	SLS < I / D < SHS
	Change	-0.31 (7.87)	1.46 (7.71)	-4.52 (8.64)	-3.79 (8.26)	37.93***	0.36	I / SLS < SHS / D
Caregiver PTSD	Baseline	35.95 (17.33)	27.64 (14.62)	34.93 (17.9)	29.01 (18.25)	14.12***	0.47	SLS < D < SHS I < SHS
	Change	-8.08 (22.39)	-2.42 (20.7)	-17.75 (25.19)	-13.04 (21.22)	23.82***	0.45	I / SLS < SHS / D

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Factor		Mental health group M(SD)				F	Adj. R Square	Post-hoc comparisons
		Stable High Symptom (SHS)	Deteriorating (D)	Improving (I)	Stable Low Symptom (SLS)			
Caregiver anxiety	Baseline	8.69 (5.39)	6.25 (4.83)	8.36 (5.34)	7.28 (5.36)	9.35***	0.43	D / I / SLS < SHS
	Change	-0.88 (6.58)	0.13 (5.72)	-3.08 (6.56)	-2.34 (6.89)	14.30***	0.41	I / SLS < SHS / D
Caregiver general health ^a	Baseline	3.04 (0.9)	2.84 (0.97)	2.97 (0.92)	2.8 (0.93)	4.12*	0.37	I / SLS < SHS
	Change	-0.18 (1.06)	-0.07 (1.07)	-0.41 (1.06)	-0.09 (1.13)	6.00**	0.37	I < SHS / D SLS < I
Human insecurity	Baseline	3.7 (0.37)	3.64 (0.41)	3.67 (0.43)	3.7 (0.42)	5.08**	0.51	I < SHS
	Change	0.08 (0.47)	0.15 (0.51)	-0.02 (0.61)	-0.03 (0.6)	7.71***	0.51	I / SLS < SHS / D
Perceived refugee environment	Baseline	3.21 (0.51)	3.27 (0.53)	3.28 (0.5)	3.14 (0.51)	9.39***	0.46	SHS / D / SLS < I
	Change	0.03 (0.6)	0.04 (0.61)	0.21 (0.61)	0.29 (0.63)	15.64***	0.42	SHS / D < I / SLS
Child responsibilities	Baseline	4.41 (3.49)	3.62 (2.81)	4.22 (3.28)	4.18 (2.75)	1.97		
	Change	1.08 (4.09)	1.76 (3.91)	0.47 (4.11)	1.2 (4.06)	4.48**	0.36	I < SHS / D

Note. Table representing descriptive statistics and analyses of covariance (ANCOVAs) from significant predictors using imputed data (N = 982). Child age, gender, time since leaving Syria, and war exposure were entered as covariates into all ANCOVAs. Baseline models controlled for change scores, and change models controlled for baseline scores. F statistic is based on test against null model including only covariates. Adjusted R Square is based on full model. Post-hoc comparisons are based on Tukey's test. Means and SDs are unadjusted estimates, all other statistics are based on adjusted means according to the ANCOVA models; post-hoc comparisons therefore may not perfectly align with presented means. See Table C1 for all ANCOVA results. P-values based on Benjamini-Hochberg correction for multiple testing (Benjamini & Hochberg, 1995). ^a Higher scores on child and caregiver general health indicate worse health. * p < .05, ** p < .01, *** p < .001

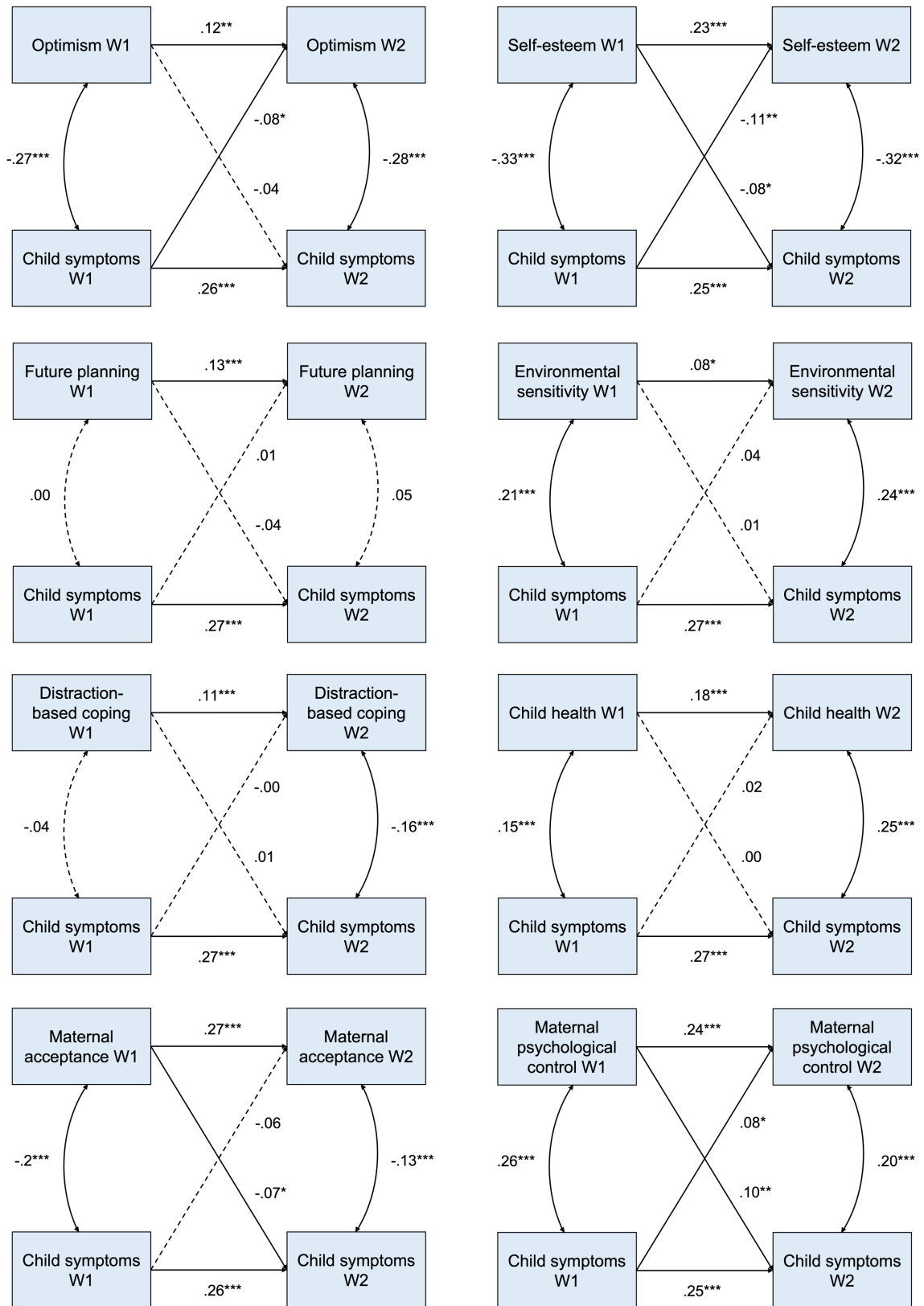
4. Predictors of Risk and Resilience Over Time

4.3.4. Aim 3: Directionality of predictor – mental health relationships

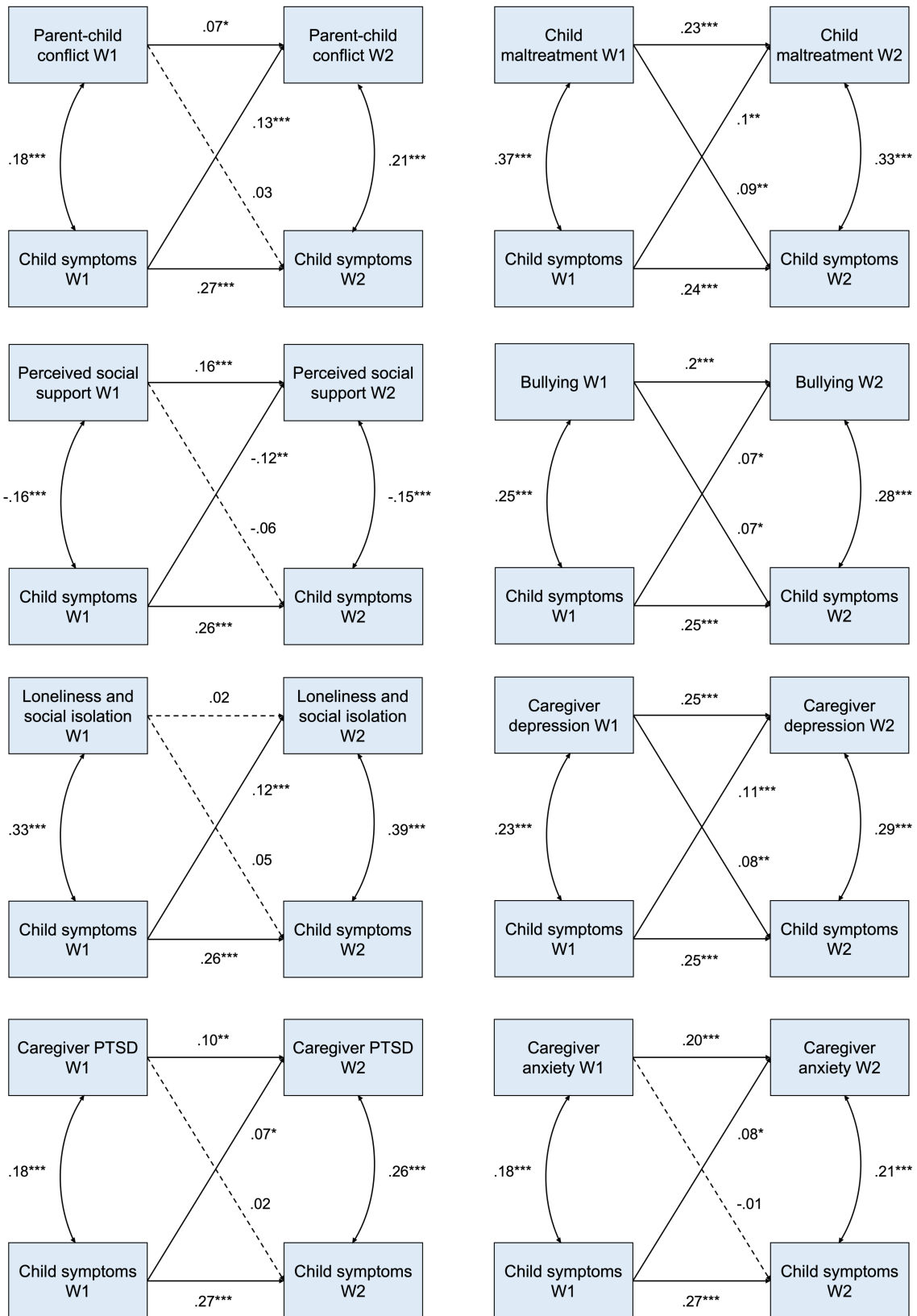
For every predictor whose baseline or change score significantly differed between groups, CLPMs were used to investigate the direction of relationship between the predictor in question and the continuous composite mental health symptom score. All CLPMs were just identified so there was no information about fit. Several cross-lagged pathways emerged as significant (Figure 4.3). Baseline maternal acceptance ($\beta = -0.07, p = .046$) was predictive of later child mental health symptoms. Caregiver depression at baseline was predictive of child mental health symptoms at follow-up ($\beta = 0.08, p = .009$) and vice versa ($\beta = 0.11, p < .001$), as was the case for maternal psychological control ($\beta_{pc-mh} = 0.10, p_{pc-mh} = .003; \beta_{mh-pc} = 0.08, p_{mh-pc} = .011$), child maltreatment ($\beta_{m-mh} = 0.09, p_{m-mh} = .009; \beta_{mh-m} = 0.1, p_{mh-m} = .005$), bullying ($\beta_{b-mh} = 0.07, p_{b-mh} = .046; \beta_{mh-b} = 0.07, p_{mh-b} = .045$), and self-esteem ($\beta_{se-mh} = -0.08, p_{se-mh} = .033; \beta_{mh-se} = -0.11, p_{mh-se} = .003$). Baseline child mental health symptoms were predictive of optimism, loneliness and social isolation, perceived social support, parent-child conflict, caregiver PTSD, caregiver anxiety, and the perceived refugee environment at follow-up, but none of these predictors significantly predicted child symptoms at follow-up.

Several models with significant cross-lagged pathways in the imputed dataset (self-esteem, bullying, maternal acceptance, maternal psychological control, & child maltreatment) did not have significant cross-lagged paths in the complete case analysis (Figure C1). However, in all cases the pathway estimates were either similar or identical. We therefore concluded that the difference in results was due to insufficient power in the complete case sample, and not bias created by the imputation. Human insecurity was significantly predicted by child symptoms in the complete case but not the imputed data analysis, but likewise showed similar path estimates in the two analyses.

4. Predictors of Risk and Resilience Over Time



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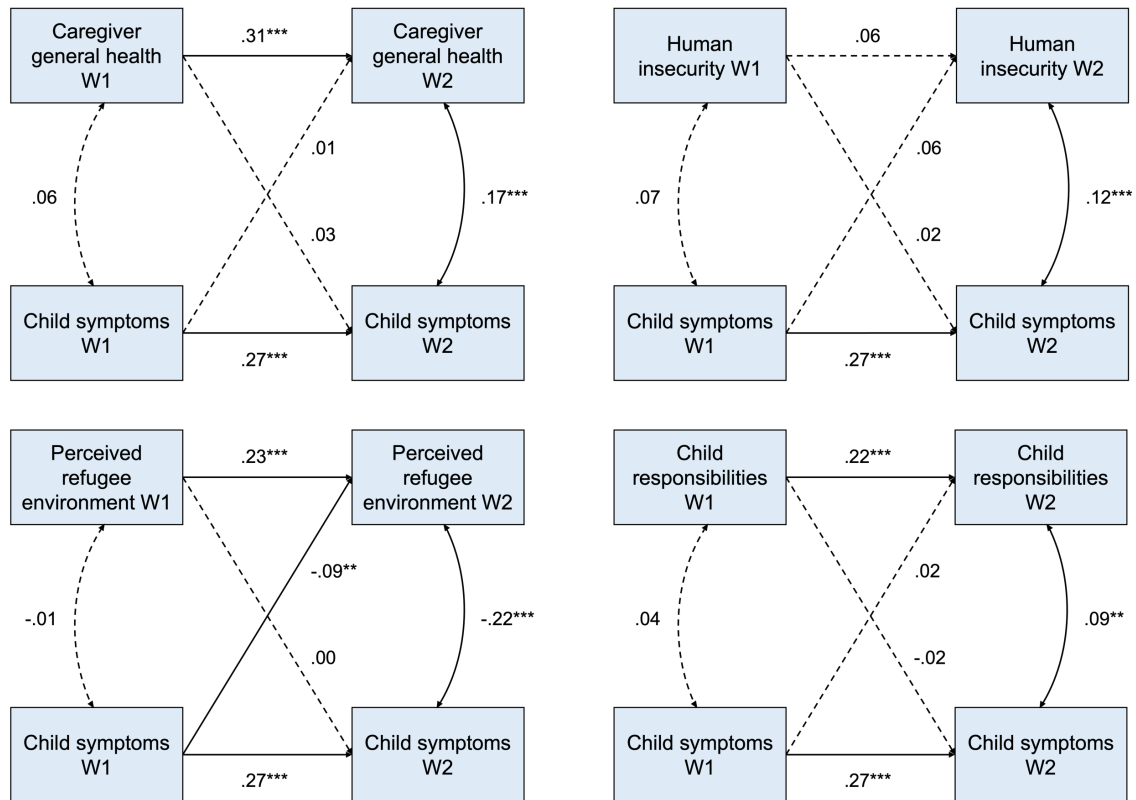


Figure 4.3. Cross-lagged panel models. Pathways depict coefficients from 20 individual cross-lagged panel models, for all predictors that emerged as significant in the ANCOVAs. Not shown are pathways controlling for the effects of child age, gender, time since leaving Syria, and war exposure, which were included as predictors for both predictor and child composite symptom score (depression, PTSD, and externalising) at both waves (Figure 4.1). Dashed pathways are non-significant.

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

4.4. Discussion

The aim of this chapter was to investigate change in and predictors of risk and resilience over time in a sample of Syrian refugee children living in a particularly challenging context in Lebanon. The children were categorised into four groups based on their change in symptoms of PTSD, depression, and externalising behaviour problems across two timepoints one year apart: Stable High Symptom, Deteriorating, Improving, and Stable Low Symptom. We found that almost a quarter of the sample improved over time and some had low symptoms across both waves, but more children than expected had high symptoms at follow-up. Many predictors differentiated these groups from one another, but social and familial

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predictors were of particular importance, and showed reciprocal relationships with children's symptoms.

4.4.1. Change in risk and resilience over time

Children's mental health was dynamic, and overall improved; a greater proportion of children were at low risk for mental health problems at follow-up compared to baseline. 9.2% of the sample showed low symptoms at both waves (SLS) and 24.2% improved from showing likely clinical levels of PTSD, depression, and/or externalising behaviour problems at baseline to scoring below all three cut-offs at follow-up (Improving). We used this as an indicator of resilience; children that met the SLS or Improving criteria demonstrated evidence of resistance to or recovery from the psychological impact of war and displacement, and can therefore be described as resilient (Masten, 2016).

These results fit with recent research finding overall improvements over time in children affected by conflict (Hermosilla et al., 2021; Müller, Gossman, et al., 2019; Purgato et al., 2020) and show that even in challenging post-displacement contexts some children demonstrate manifested resilience. However, the proportion of children meeting externalising criteria remained notably higher than in previous reviews (Blackmore et al., 2020; Kien et al., 2019), and the proportion of children with persistently high general risk was larger than seen in children resettled in Europe (Müller, Gossman, et al., 2019). 10.3% of the sample also deteriorated over time from showing generally low symptoms to meaningfully worsened symptoms at follow-up, in keeping with previous reports (Müller, Gossman, et al., 2019; Panter-Brick et al., 2015). This emphasises the need for longitudinal research in a variety of contexts, as children doing relatively well across multiple measures can begin to struggle, and those doing poorly can improve. The key question is what helps or hinders the resilience process.

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4.4.2. Predictors of mental health and resilience

Results from our second and third aims provide some answers to this question. Predictors at the individual, family, and community levels were associated with children's mental health at baseline and over time, but CLPMs showed mental health at follow-up was primarily predicted by aspects of the immediate family context. The one individual asset we identified that was predictive of child mental health was self-esteem, the baseline scores for which were associated with general low symptoms at follow-up a year later, and vice versa. Within the family, baseline maternal acceptance was predictive of later low child symptoms, while maternal psychological control, child maltreatment, and caregiver depression showed reciprocal relationships with child symptoms, and child symptoms were predictive of but not predicted by parent-child conflict and caregiver anxiety and PTSD. Child symptoms were also predictive of several factors in the wider social environment, including loneliness and perceived social support.

These results indicate some predictors that may be causally related to child mental health, in line with previous findings (Bryant et al., 2018; Panter-Brick et al., 2014; Sangalang et al., 2017), but also reflect a more complex story. The individual asset of self-esteem, thought to represent a stable trait (Brent Donnellan et al., 2012), was not stable over time in the current sample, and showed a reciprocal relationship with child symptoms. Improvements in child symptoms might lead to improvements in self-esteem and vice versa. This fits with evidence from a non-refugee sample that showed bi-directional relationships between self-esteem and depression over the course of multiple waves of data from adolescence through to adulthood (Johnson et al., 2016). While this could suggest that self-esteem represents another facet of mental health rather than a stable trait, its dynamic nature and association with negative dimensions of mental health means it may be valuable to

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consider as a distinct dimension and potential target for treatment, with which to promote more positive adaptation.

In contrast, the bi-directional relationships between children's symptoms and social factors demonstrate a vicious cycle of risk. For example, emotional or behavioural problems could significantly impact caregiver mental health and the parent-child relationship, resulting in increases in harsh parenting, which in turn negatively affects the child. This accords with personal accounts from Syrian mothers, who report that both their children's and their own mental health impacts their parenting (Rizkalla et al., 2020). Beyond the family, noticeable symptoms may also impact social support due to peer stigmatisation (O'Driscoll et al., 2012) which could explain why child symptoms predict higher bullying and loneliness scores, and lower symptoms are associated with better social support. This may also be the reason that child symptoms are predictive of the perceived quality of the refugee environment; problematic child behaviours or stigma around mental health problems might negatively impact how the family are treated in the community (Midouhas et al., 2021). However, we found that maternal acceptance was predictive of better child mental health, but was not affected by it. There may be positive aspects of the parent-child relationship that are robust to changes in a child's behaviour and could serve as important assets for resilience.

4.4.3. Implications

The results presented here have several practical implications. As in the previous chapter, the mental health of this sample was worse than expected; a number of children deteriorated over time, and the proportion of children with consistently high symptoms at both waves was higher than in previous research (Müller, Gossmann, et al., 2019). This indicates a real need for intervention in this population, as fewer children appear to spontaneously recover compared to other settings. The direction of the associations we

4. Predictors of Risk and Resilience Over Time

observed provide some evidence as to what types of intervention might be most useful. For example, good self-esteem may be an asset that can help improve other dimensions of psychological health, but it does not seem robust to other changes. Interventions promoting dimensions of wellbeing such as self-esteem whilst also treating mental health problems should therefore be considered.

The evidence that child symptoms are predictive of a range of social factors suggests that treatment of child symptoms in this way could also improve access to social resources. Child-based interventions could have ripple effects throughout the family and social environment (Erdemir, 2020). However, the finding that caregiver depression and aspects of the parent-child relationship are predictive of later child symptoms emphasises the importance of a family-wide approach to treatment. Parenting interventions may be helpful for some families, but previous research suggests that parenting is also influenced by caregivers' own trauma and psychological distress (Bryant et al., 2018; Sangalang et al., 2017). There are multiple possible stressors in the refugee context, such as poor housing or food insecurity, which could additionally impact caregivers', and therefore children's, mental health (Li et al., 2016). In fact, we observed that Improving children reported higher baseline refugee environment quality scores than others. This has parallels with the results reported by Nickerson and colleagues (2022) that having basic needs met whilst in refugee camps was associated with faster improvement of mental health after resettlement in Australia, for a sample of refugee adults. Psychological support for caregivers or systemic family therapy could bolster resources within the family, but practical and community-level support may provide a baseline from which other interventions are more effective in the longer term. In order to explore this further, in Chapter 5 we investigate the impact the wider environment has on caregivers and the family system, and how this might affect the child.

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4.4.4. Strengths and limitations

In this chapter, we provide novel findings looking at changes in risk and resilience over two waves of data, and the directionality of predictors of refugee mental health. Nevertheless, our methods had some limitations. Firstly, we focused on children's scores across PTSD, depression, and externalising problems, but these individual dimensions may be differentially associated with some of the factors measured. However, we used the composite symptom score to complement our categorical approach, identify potential resilience factors, and identify associations between a child's general symptomatology and their environment, particularly given the comorbidity in the current sample. In fact, some researchers have argued that general symptomatology may be more useful to focus on than individual outcomes in severely traumatised samples (Jongedijk et al., 2020). Nevertheless, we argue that in addition to identifying predictors of overall child symptoms, it is important to investigate whether some predictors are particularly important for specific outcomes, and so address this in the following chapter.

Secondly, CLPMs with only two waves of data are unable to account for individual differences in stable traits, and are therefore limited from making causal conclusions (Hamaker et al., 2015). However, it was only possible to collect two waves of data from the BIOPATH sample due to their high mobility. Given the mobility of refugees generally, particularly those in informal settlements, studies with more than a single wave of data remain relatively rare in comparison to the majority of research with refugee children (Scharpf et al., 2021), so this contribution represents a substantial step forward despite not being fully longitudinal in nature. Importantly, we refer only to directionality throughout the chapter, and do not make any claims to proving causal effects.

Third and finally, there were some small differences between results from the imputed and complete case analyses. However, some difference is to be expected due to the difference

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in sample sizes, and all estimates were similar between the two sets of analysis, indicating that the imputation did not introduce bias or produce misleading results.

In addition to those points, as in the previous chapter, here we provide a reminder of the limitations of the dataset as a whole. First, a selection bias in recruitment at baseline and retention at follow-up cannot be excluded due to restricted access to certain settlements, reliance on presence of families during recruitment, and the high mobility of the sample. However, differences between the baseline and follow-up samples were small (Table 2.1), meaning any substantial retention bias is unlikely. Second, we measured mental health using self-reported symptom scales. We ameliorated this issue as far as practicable through extensive piloting of scales and modification to ensure they were context-appropriate, where possible. Furthermore, we derived cut-offs through clinical assessment in a subsample, choosing cut-offs with the best balance of sensitivity and specificity specifically for the current sample (McEwen et al., 2020). However, specificity fell below 80%, and consequently the high risk groups may contain some false positives. Prevalence estimates adjusted for false positives and negatives are therefore lower than reported here (McEwen, Biazoli, et al., 2022), but adjustments cannot be applied at the individual level, so we retain unadjusted estimates.

4.5. Conclusion

Extending our multi-dimensional approach to child mental health across two waves of data, many children showed meaningful changes in risk and resilience from baseline to follow-up one year later. The overall proportion of children with no evidence of clinical symptoms of PTSD, depression, or externalising behaviour problems, from which we can infer demonstration of resilience, increased over time, although approximately half of the originally low risk children deteriorated from one year to the next. Our results agree with

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previous research on the importance of specific social and familial factors (Bryant et al., 2018; Sangalang et al., 2017; Scharpf et al., 2021) for risk and resilience but also provide evidence of directionality over time. In particular, findings indicate reciprocal relationships between children and caregiver's mental health, and aspects of the parent-child relationship, and identify ways in which child mental health impacts the social environment. Our results are most useful when considered in the context of environmental challenges that refugee families face, and their agency in the face of that challenge. However, more longitudinal research is needed with multiple repeated assessment to better understand the impact of the refugee environment on children.

Chapter 5: The Role of Mothers and the Refugee Environment

5. Abstract

Refugee children are at increased risk for mental health problems, including post-traumatic stress disorder (PTSD), depression, and externalising problems. The refugee environment, maternal mental health, and the parent-child relationship may reduce or exacerbate that risk, likely via mediating pathways. However, there is little research on how the refugee environment affects children via influences on their caregivers and how these pathways change over time, particularly in lower income contexts where the environmental risk may be higher and more changeable. In this chapter, I aimed to investigate the direct and indirect effects of the refugee environment, maternal mental health, and the mother-child relationship on child PTSD, depression, and externalising problems in the BIOPATH sample. Mediating pathways were tested using structural equation modelling at baseline with 1,446 child-mother dyads and again one year later with 872 of the original sample, with separate models for each child outcome. The refugee environment had indirect effects on child mental health, mediated by maternal mental health (e.g., baseline wider social environment to child depression via maternal mental health: $\beta_{w1} = -0.06$). In turn, maternal mental health had direct effects on all child outcomes, in addition to indirect effects on child PTSD ($\beta_{w1} = 0.03$, $\beta_{w2} = 0.04$) and depression ($\beta_{w1} = 0.02$, $\beta_{w2} = 0.03$) via maltreatment. The physical environment became more important at the follow-up assessment, indicating the importance of longitudinal perspectives on refugee adaptation. Overall, these results emphasise that work on refugee child mental health requires a holistic approach that considers the wider environment and family functioning. This chapter is based on the paper *The important role of mothers during displacement: Direct and indirect effects of the refugee context on Syrian refugee children's mental health* (Popham, McEwen, Karam, & Pluess) under review in *Child Development*.

5.1. Introduction

The post-migration environment can be crucial in the aftermath of war and displacement, and a considerable amount of work has been carried out in recent years to identify which key aspects of the environmental context affect refugee children's mental health (Arakelyan & Ager, 2021; Scharpf et al., 2021). Maternal mental health and parenting are consistently associated with child outcomes (Eltanamy et al., 2021), while aspects of the wider refugee environment (e.g., poverty, post-migration stressors) may also play a role (Zwi et al., 2018), although those findings are less consistent (Betancourt, Salhi, et al., 2012). However, these pathways are not necessarily direct; there is evidence that maternal mental health may primarily affect child mental health via changes in parenting (Sim, Bowes, et al., 2018). It has also been suggested that post-migration stressors might indirectly affect children by worsening caregiver distress (Sim, Bowes, et al., 2018), but there is as of yet no research in low and middle income countries (LMICs) on how specific aspects of the refugee environment affect children via impacts on their caregivers, and how that changes over time. In the previous two chapters, we found that a substantial proportion of a sample of Syrian refugee children in camps in Lebanon were at risk for clinical mental health problems, but that a not insignificant proportion demonstrated resilience. Caregiver mental health and the parent-child relationship seemed to play an important role in determining these outcomes, but the role of the wider refugee environment was less clear. In this chapter, we investigate more closely the pathways through which these potentially important factors affect children by examining the direct and indirect effects of the refugee and family environments on individual dimensions of child mental health.

5. The Role of Mothers and the Refugee Environment

5.1.1. The role of the family

One of the most consistent findings in refugee research to date is that the family environment, caregiver mental health, and the parent-child relationship are key to refugee children's mental health (Eltanamly et al., 2021; Eruyar et al., 2018; Sangalang et al., 2017). For example, poorer parental and maternal mental health have been linked with worse internalising and externalising problems in Syrian refugee children in multiple contexts, though they are less consistently associated with child post-traumatic stress disorder (PTSD; Eruyar et al., 2018; Sim, Bowes, et al., 2018). In terms of the caregiver-child relationship, harsh or rejecting parenting (Eltanamly et al., 2021; Eruyar et al., 2020), child abuse and neglect (Karam et al., 2019; Lee et al., 2020), and parent-child conflicts or disagreements (Choi et al., 2008; Sangalang et al., 2017; Ying & Han, 2007) have been associated with heightened child PTSD, depression, and behavioural problems in a range of refugee environments. The previous two chapters demonstrate these factors are also important in the current sample of Syrian refugee children living in informal tented settlements (ITSs) in Lebanon.

Conversely, the family environment can also have positive and protective influences on children. For example, Syrian adolescents in Lebanon highlight their mothers as a source of strength (Nagi et al., 2021), and warm parenting tends to be negatively associated with child symptoms of PTSD, internalising, and externalising problems (Eltanamly et al., 2021; Eruyar et al., 2020). In Chapter 4, we found that baseline maternal acceptance was predictive of lower symptoms on a composite of child PTSD, depression, and externalising problems one year later. Parental presence may also be important; quality time with parents is generally associated with greater wellbeing in children (Suldo & Fefer, 2013), and there is evidence in refugee children specifically that greater family cohesion is associated with reduced mental health problems (Aitcheson et al., 2017). Finally, parental monitoring, or the extent to which

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caregivers are aware of their child's activities, can play a protective role (Eltanamly et al., 2021). We did not find compelling evidence for the effects of parental presence or monitoring in the previous chapters, but this could be due to interactions with other aspects of the parent-child relationship (Ahmad et al., 2015).

5.1.2. The role of the refugee environment

Factors outside of the family may also have strong impacts on children, although findings are less consistent. Refugee reports highlight resource constraints, food access, and housing as key stressors (Bermudez et al., 2018; Sim, Fazel, et al., 2018). Indeed, economic status, hunger, and household assets are related to psychological distress in children and adolescents in refugee camps (Meyer, Steinhaus, et al., 2017; Panter-Brick et al., 2015; Zwi et al., 2018). However, some studies find no links between the physical environment and refugee child outcomes (Betancourt, Salhi, et al., 2012). Similarly, the wider social environment shows inconsistent associations with child outcomes; community support can play a protective role for children (Zwi et al., 2018) but some studies find no such association (Betancourt, Salhi, et al., 2012). This could be explained by differences in the contexts studied; more challenging environments are likely to have greater effects on mental health.

However, in the current sample of children living in the challenging context of informal settlements in a country in the midst of economic crisis, the association between the refugee environment and child mental health remains uncertain. Children who showed improvements over time had better baseline reported refugee environment in Chapter 4, but results from the cross-lagged panel models suggested that environmental quality was not directly predictive of child symptoms. Instead, there was evidence that child symptoms negatively affected environmental scores, perhaps because their symptoms, behaviours, or general stigma about mental health problems influence how the family is treated by the

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community (Midouhas et al., 2021; O’Driscoll et al., 2012). Nevertheless, there are multiple possible explanations for the observation that the refugee environment did not seem to affect child mental health in the current sample. For example, there may be insufficient variance in environmental quality to observe differences, specific aspects of the environment (e.g., physical or social) might have different effects and so need to be tested separately, or the effects of the refugee environment on child mental health could be indirect, and depend on mediating factors, as per Ecological Systems Theory (EST; Bronfenbrenner, 1979).

5.1.3. Interplay between systems

According to EST (Bronfenbrenner, 1979), children are embedded in multiple systems from the more proximal (e.g., family) to the more distal (e.g., national policy), and those distal systems impact a child via effects on the more proximal (Arakelyan & Ager, 2021). For example, Syrian mothers reported that feeling unable to provide for their children causes them distress, which subsequently causes their children distress (Rizkalla et al., 2020). There is also interplay between individual features within systems; for example, within the family system a caregiver’s own mental health problems could reduce their ability to provide supportive parenting or to monitor their child’s activities (Van Loon et al., 2014). In this way, lack of resources might affect children indirectly by impacts on maternal mental health or changes in mothering behaviour. Alternatively, caregivers may also represent important buffers to the effects of environmental stressors.

Several studies provide empirical evidence that caregiver mental health affects child mental health via parenting. In fact, some studies suggest that family functioning, including conflict and positive parenting, fully mediates the association between caregiver and child mental health (Sangalang et al., 2017), whilst others find that a direct effect remains alongside indirect effects (Bryant et al., 2018; Sim, Bowes, et al., 2018). In Chapter 3 we

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show that child maltreatment and maternal psychological control are correlated with caregiver depression, but all three retained independent effects on the composite of child symptoms when combined into a single model. This suggests that the effects of maternal mental health on children may not be fully mediated by harsh parenting.

However, the pathway from the wider environment to child outcomes via caregiver mental health and parenting is less studied. Bryant and colleagues (2018) identified that daily stressors reported by caregivers in their sample of refugees in Australia were related to child outcomes via a pathway of parental PTSD and harsh parenting. In terms of evidence specific to humanitarian settings, Sim and colleagues (Sim, Bowes, et al., 2018) report an association between maternal psychological distress and refugee environment stressors such as access to food, sanitation, and shelter in a sample of Syrian refugee mothers in Lebanon. In the same sample, perceived social support was associated with more maternal psychological resilience and less harsh parenting (Sim et al., 2019). These findings suggest that physical and social support in refugee settings impact the family environment, but do not tell us about the effects of this relationship on child mental health. More work is needed to better understand the pathways through which different aspects of the refugee environment and family systems affect child outcomes, particularly in refugees living in LMICs and humanitarian settings, for whom daily stressors are substantially different than those faced by refugees resettled in high income countries.

5.1.4. Changes over time

It is also important to consider that the processes influencing child mental health can change over time. We know that the process of adaption is highly dynamic, as evidenced by previous research in other refugee populations (Müller, Gossman, et al., 2019) and the results from Chapter 4. The environment is also often more changeable in refugee

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settlements, and time since displacement can influence outcomes, in a positive direction in high income contexts (Müller, Gossmann, et al., 2019) compared to a negative direction in some humanitarian contexts (Nasıroğlu et al., 2018). However, research on predictors of refugee child outcomes over time remains limited, and little is known regarding how the relations between different aspects of the environment and children's mental health might change in the years after displacement. For example, the relative importance of different predictors may change the longer a child has been living in the host country. This gap is particularly prominent in refugee settings in LMICs, in which there are more likely to be significant changes in the environment, including adverse experiences such as settlement raids (Human Rights Watch, 2018).

5.1.5. The current study

The overall objective of the current study was to address the gaps in the literature reviewed above to understand how specific features of the refugee and family environments impact refugee child mental health via direct and indirect effects at two separate timepoints one year apart, in a unique, large sample of Syrian refugee children living in informal refugee settlements in Lebanon. Our specific aims were to test two main hypotheses: (1) that maternal mental health mediates the effects of the refugee environment on children, and (2) that the parent-child relationship mediates the effects of maternal mental health on child outcomes. Due to research showing that predictors of child functioning can differ between outcomes (Erucar et al., 2018), and to augment our multi-dimensional resilience approach in the previous two chapters, we investigated these pathways separately for symptoms of child PTSD, depression, and externalising behaviour problems. We determined inclusion of hypothesised predictors in each outcome model using exploratory analysis (bivariate correlations), before structuring the models predicting child outcomes according to an

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ecological systems-based framework (Figure 5.1). Physical and social aspects of the refugee environment were included as separate factors in order to untangle their specific effects on outcomes in mothers and children. Finally, to address the lack of studies with refugees in LMICs that consider change over time (Scharpf et al., 2021), we investigated how the direct and indirect predictors of the current sample's mental health differed across time by testing separate models at baseline and again at follow-up one year later.

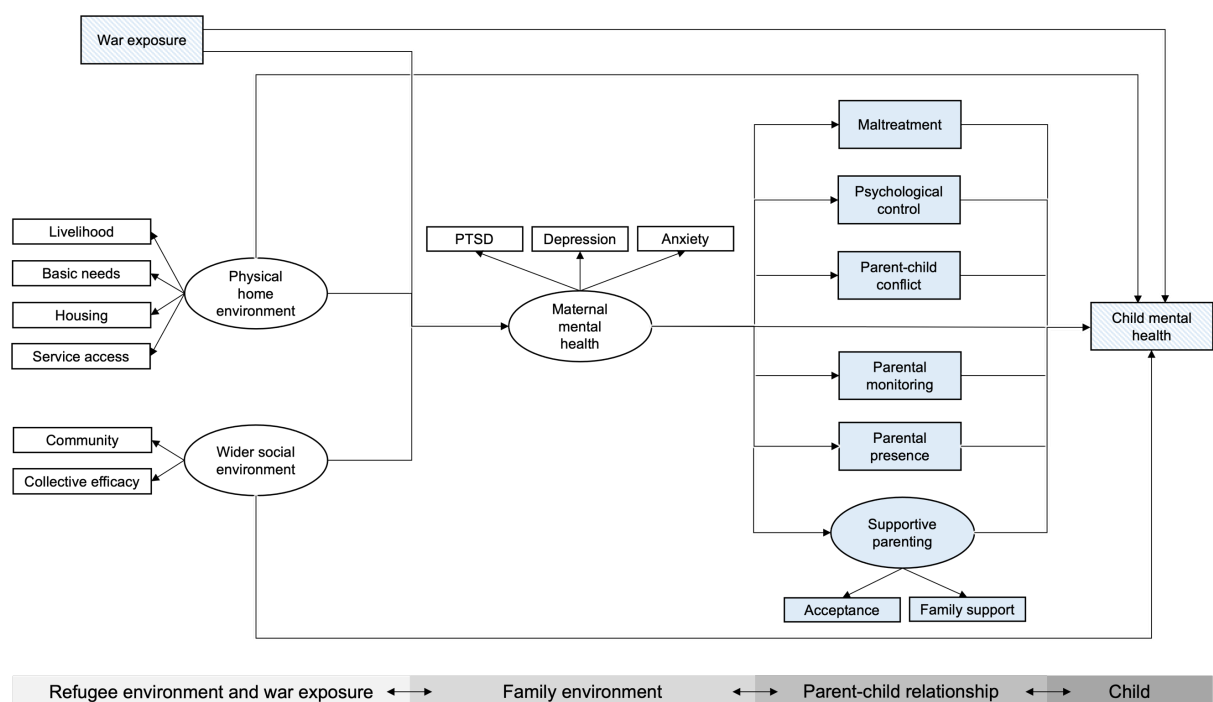


Figure 5.1. Theoretical pathway model. Child-report variables are shaded blue, mother-report variables are white. Combined child and mother report is shaded white and blue. Separate models were specified for each child outcome: PTSD, depression, and externalising.

5.2. Methods

5.2.1. Study design

We tested the associations between the wider and family environments and child mental health using structural equation modelling (SEM) with the baseline and follow-up data from the BIOPATH sample. After identifying predictors of refugee child mental health

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from the literature, we further narrowed the selection of variables by considering bivariate correlations in the current sample. We then tested direct predictors of and mediating pathways to child PTSD, depression, and externalising behaviour problems in separate models at baseline and follow-up.

5.2.2. Setting and participants

For the analyses presented in this chapter, we used the baseline ($N = 1,591$) and follow-up ($N = 1,000$) samples. As the majority of participating caregivers were female, we restricted the sample to those child-caregiver dyads in which the mother or another female caregiver (e.g., stepmother, grandmother) completed the caregiver questionnaire (94.7%), and was the subject of the child's report on the parent-child relationship (91.5%), in order to investigate the specific relation between maternal mental health and parenting. We additionally restricted the follow-up sample to those dyads with the same participating caregiver at both waves (92.2%), so all follow-up participants had baseline data to facilitate comparison across waves. Finally, we excluded families missing data on child age, child gender, time since leaving Syria, or child PTSD, depression, or externalising scale scores ($n = 12$ at baseline and $n = 5$ at follow-up).

5.2.3. Data collection

All participants completed the questionnaires via interviews in their homes in the settlements, conducted by trained, native Arabic-speaking interviewers. Different interviewers conducted the child and caregiver interviews simultaneously. Visual aids (Figure 2.2) for each scale were available where necessary to enhance understanding and privacy. All measures were repeated one year later with approximately two thirds of the original baseline sample. For detailed information on data collection, see Chapter 2, Section 2.1.3.4.

5. The Role of Mothers and the Refugee Environment

5.2.4. Measures

5.2.4.1. *Mental health outcomes*

We focused on PTSD, depression, and externalising behaviour problems as individual outcomes. PTSD was measured using the self-report Child PTSD Symptom Scale (CPSS; Table 2.4; Foa et al., 2001). Depression was measured using the abridged self-report Centre for Epidemiological Studies Depression Scale for Children (CES-DC; Table 2.5; Faulstich et al., 1986). Externalising behaviour problems were measured using parent report on the externalising subscale of the Strengths and Difficulties Questionnaire (SDQ; Goodman, 1997) and additional items related to conduct disorder (CD) and oppositional defiant disorder (ODD) administered separately (Table 2.6). The sum scores for each scale were used in analysis.

5.2.4.2. *Family environment*

We investigated two key aspects of the family environment: maternal mental health and the parent-child relationship (including parenting). Maternal mental health was measured using the PTSD Checklist for DSM-5 (Blevins et al., 2015), the anxiety subscale of the Depression Anxiety and Stress Scale (Henry & Crawford, 2005), and the Center for Epidemiologic Studies Short Depression Scale (Radloff, 1977).

Negative aspects of the parent-child relationship were captured with the ISPCAN Child Abuse Screening Tool (Runyan et al., 2009) as an index of child maltreatment, in addition to measures of psychological control (Barber et al., 2012), and parent-child conflict (Barber, 1999). Parental monitoring (Barber, 1996), parental presence (Table A2; McEwen, Popham, et al., 2022), the acceptance subscale of the Child Report of Parent Behavior Inventory (Schaefer, 1965), and perceived family social support as measured by the family subscale of the Multidimensional Scale of Perceived Social Support for Arab American

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Adolescents (Ramaswamy et al., 2009) were used to capture positive dimensions of the family environment.

5.2.4.3. Refugee environment

Measures of the wider refugee environment were not consistently related to child outcomes in the previous two chapters, but we hypothesised this could be due to confounding effects of other predictors, and that there may be differential effects of the physical and social environments. Therefore, we used the perceived refugee environment index (Table A5; McEwen, Popham, et al., 2022) and a measure of collective efficacy (Sampson et al., 1997) to evaluate the quality of the physical and social refugee environment separately. The physical environment was measured using PREI subscales assessing livelihood, basic needs, housing, and service access. The social environment was measured using PREI subscales assessing practical and emotional community support, combined with the collective efficacy scale, which measured the extent to which caregivers feel the neighbourhood is close knit and supportive. For detailed information on any predictor scales, including modifications to measures, see Table 2.7 in Chapter 2.

5.2.4.4. War exposure

War exposure was measured using the combined child and caregiver report version of the War Events Questionnaire (WEQ; Karam et al., 1999) at baseline, as described in Chapter 2. The WEQ consists of 25 yes/no items, such as “*Did you witness explosions close to you?*” (Figure 2.3). The combined measure was created such that if either the child or caregiver reported that the child experienced an event, the event was considered to have occurred. We used the total war exposure score as a measure of both the child and mother’s war exposure. As maternal war exposure is likely to have effects on maternal mental health and may interact

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with their experience of current stressors (Sim, Bowes, et al., 2018), we deemed it important to control for maternal war exposure as well as child war exposure in our models. However, as we do not have a measure of maternal war exposure, we used the combined child-mother reported child exposure measure as a proxy, examining its association with maternal in addition to child mental health. It is likely that the child war exposure measure relates closely to the mother's own exposure, as they would have been together for many of those experiences, particularly for children who were young at the age of exposure. Moreover, mothers would be more likely to report on children's experiences they were also present for.

5.2.5. Statistical methods

5.2.5.1. *Exploratory analysis: bivariate correlations*

All analyses were conducted in RStudio 2021.09.2+382. In order to determine which of the literature-derived variables to include in our final models, we ran bivariate correlations to investigate the association between each predictor and the three dimensions of child mental health (PTSD, depression, externalising), as well as the associations between predictors (refugee environment, maternal mental health, parent-child relationship) and determine which measures to include in the final models.

5.2.5.2. *Structural equation models*

As a first step towards the SEMs, we created latent factors for the physical environment, wider social environment, maternal mental health, and supportive parenting to reduce the number of variables in the models. We assessed fit of each factor at both waves, and if it was good (CFI > 0.95, RMSEA < 0.06, SRMR < 0.08; Hu & Bentler, 1999), combined it into the overall measurement model. A harsh parenting latent factor was assessed

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but showed poor fit, so negative aspects of the parent-child relationship were retained as independent measures.

We then created three independent SEMs to identify the effects of selected predictors of interest (identified from the bivariate correlations) on child PTSD, depression, and externalising behaviour problems. These were structured to reflect the different ecological system levels and test our hypotheses that maternal mental health mediates the effects of the refugee environment on children, and that the parent-child relationship mediates the effects of maternal mental health on child mental health (Figure 5.1). In all models we controlled for (1) the effects of child age and gender on child mental health and the parent-child relationship, (2) the effects of time since leaving Syria on child and caregiver mental health and the refugee environment, and (3) the effects of war exposure on child and caregiver mental health. We ran each model separately for the baseline and follow-up samples, to enable a comparison of pathway patterns across time. We decided not to combine the two waves into one single longitudinal model due to significant changes in environmental quality between waves (Table 5.1) as a result of additional events (e.g., settlement raids; Human Rights Watch, 2018), for which we did not have specific measures.

In terms of specific predictors, we only included those parent-child relationship measures in the SEM that showed significant bivariate correlations with the child mental health outcome of interest at both timepoints. Where a measure only correlated with the outcome at one timepoint, we compared the fit of models including and excluding the measure. Models at both waves in all three outcomes showed better fit excluding those inconsistently correlated measures (Table D1), so we excluded them in all models, to improve parsimony. Models were run with lavaan (Rosseel, 2012) using full information maximum likelihood (FIML) estimation to account for missing data. Mediation was tested using bootstrapping with 1,000 replications.

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5.2.5.3. *Missing data*

Four (0.3%) child-caregiver dyads from the baseline sample and seven (0.8%) from the follow-up sample were missing scale totals for at least one of the predictors of interest. Children missing data at follow-up had lower follow-up depression scores ($M = 2.57$, $SD = 2.70$) than those with no missing data ($M = 6.26$, $SD = 6.78$; $t(6.63) = 3.53$, $p = .010$, $d = 0.72$). However the group with missing data was small and unlikely to bias analysis, so we determined that FIML estimation was appropriate, to best utilise the available data.

5.3. Results

5.3.1. Descriptive data

The final sample included 1,446 children (52.1% female; *mean age* = 11.39, $SD = 2.41$) and their female caregiver (97.2% mother) at baseline, and 872 children (53.1% female; *mean age* = 12.17, $SD = 2.30$) and their female caregiver (98.6% mother) at follow-up. At baseline, 46.5% had left Syria in the past three years, and the remainder more than three years previously. The final selected baseline sample did not significantly differ from the original sample of 1,591 child-caregiver dyads described in Chapter 2 on any of the included measures. Children with follow-up data (the retained sample) were slightly younger at baseline ($M = 11.18$, $SD = 2.30$) than the baseline sample ($M = 11.39$, $SD = 2.41$; $t(1143) = 4.19$, $p < .001$, $d = 0.23$), and were more likely to have left Syria more than three years prior ($\chi^2(1) = 19.28$, $p < .001$, $d = 0.12$). The follow-up sample also had slightly higher baseline maternal PTSD compared to the baseline sample ($t(1186) = -2.41$, $p = .016$), but the effect size was small ($d = -0.13$) and there were no other differences between the samples (Table 5.1). For the sake of simplicity, we will refer to all caregivers included in the analyses as the child's mother throughout the rest of this chapter.

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Table 5.1. Sample characteristics: baseline and follow-up samples

Measure	Baseline sample	Follow-up sample	Follow-up sample	Baseline sample vs follow-up		Whole sample baseline vs follow-up scores ^a	
	baseline scores (<i>N</i> = 1446)	baseline scores (<i>N</i> = 872)	follow-up scores (<i>N</i> = 872)	sample baseline scores	sample baseline scores	(<i>follow-up sample baseline vs follow-up scores</i>)	(<i>follow-up sample baseline vs follow-up scores</i>)
	M (SD)	M (SD)	M (SD)	<i>t</i> / χ^2	Effect size	<i>t</i>	Effect size
Child age	11.39 (2.41)	11.18 (2.30)		4.19***	0.23		
Child gender, n (%) female	753 (52.1%)	463 (53.1%)		0.82	0.03 ^b		
Time since leaving Syria, n (%) ≤ 3 years	672 (46.5%)	364 (41.7%)		19.28***	0.12 ^b		
Child war exposure	9.57 (5.51)	9.55 (5.48)		0.24	0.01		
Child PTSD	15.70 (12.22)	15.44 (12.26)	10.72 (13.01)	1.01	0.05	9.90*** (8.55***)	0.40 (0.29)
Child depression	8.08 (6.99)	8.01 (7.04)	6.23 (6.76)	0.46	0.02	7.10*** (6.27***)	0.27 (0.21)
Child externalising	11.64 (6.32)	11.70 (6.25)	11.22 (6.60)	-0.44	-0.02	2.37* (2.19*)	0.06 (0.07)
Child maltreatment	11.79 (12.09)	11.80 (12.18)	8.45 (10.62)	-0.01	0.00	7.66*** (7.18***)	0.29 (0.24)
Psychological control	11.21 (2.58)	11.21 (2.58)	10.63 (2.16)	-0.11	-0.01	6.47*** (6.05***)	0.24 (0.20)
Parent-child conflict	6.05 (3.21)	5.95 (3.16)	7.26 (3.86)	1.36	0.07	-8.46*** (-8.25***)	-0.34 (-0.28)
Parental monitoring	13.98 (2.01)	14.03 (1.98)	14.07 (2.03)	-1.23	-0.07	-1.18 (-0.42)	-0.04 (-0.01)
Acceptance	27.22 (4.00)	27.24 (3.95)	27.48 (4.30)	-0.25	-0.01	-1.62 (-1.49)	-0.06 (-0.05)
Family support	6.01 (0.87)	6.04 (0.85)	6.13 (0.89)	-1.63	-0.09	-3.33** (-2.36*)	-0.14 (-0.08)
Parental presence	15.7 (3.83)	15.80 (3.80)	15.60 (3.86)	-0.78	-0.04	1.16 (1.15)	0.04 (0.04)
Maternal PTSD	33.54 (17.78)	34.46 (17.41)	24.45 (18.13)	-2.41*	-0.13	12.95*** (12.92***)	0.50 (0.44)
Maternal depression	15.32 (6.50)	15.40 (6.41)	13.95 (7.39)	-0.57	-0.03	5.20*** (5.18***)	0.20 (0.18)
Maternal anxiety	8.20 (5.35)	8.36 (5.28)	6.88 (5.28)	-1.35	-0.07	6.44*** (6.67***)	0.25 (0.23)
Livelihood	2.32 (1.04)	2.34 (1.02)	2.75 (1.02)	-0.82	-0.04	-10.24*** (-8.90***)	-0.41 (-0.30)

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Measure	Baseline sample	Follow-up sample	Follow-up sample	Baseline sample vs follow-up		Whole sample baseline vs follow-up scores ^a	
	baseline scores (<i>N</i> = 1446) M (SD)	baseline scores (<i>N</i> = 872) M (SD)	follow-up scores (<i>N</i> = 872) M (SD)	sample baseline scores <i>t</i> / χ^2	sample baseline scores Effect size	<i>(follow-up sample baseline vs follow-up scores)</i> <i>t</i>	<i>(follow-up sample baseline vs follow-up scores)</i> Effect size
Basic needs	3.33 (0.81)	3.33 (0.82)	3.59 (0.85)	-0.42	-0.02	-8.32*** (-7.03***)	-0.32 (-0.24)
Housing	3.72 (0.80)	3.75 (0.77)	3.84 (0.65)	-1.84	-0.10	-4.30*** (-2.76**)	-0.16 (-0.09)
Service access	2.95 (0.91)	2.97 (0.90)	3.07 (1.05)	-1.03	-0.06	-2.84** (-2.46*)	-0.13 (-0.08)
Community	3.81 (0.76)	3.84 (0.75)	3.85 (0.82)	-1.92	-0.10	-1.26 (-0.30)	-0.05 (-0.01)
Collective efficacy	31.97 (6.48)	32.02 (6.32)	31.58 (7.90)	-0.33	-0.02	1.39 (1.43)	0.05 (0.05)

^aPartially overlapping samples t-test with Welch's df to compare mean scores at baseline (*n* = 1446) and follow-up (*n* = 872) using whole sample at both timepoints (Derrick et al., 2017). ^bSomers' *d*, all other effect sizes shown are Cohen's *d*. *p* < .05*, *p* < .01**, *p* < .001***

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5.3.2. Measurement model

The measurement model combining the physical environment, wider social environment, maternal mental health, and supportive parenting latent factors showed good fit with the data at baseline ($\chi^2(38) = 222.524, p < .001$; CFI = .95; RMSEA = .06 (90% CI: .05-.07); SRMR = .04) and adequate fit at follow-up ($\chi^2(38) = 182.77, p < .001$; CFI = .93; RMSEA = .07 (90% CI: .06-.08); SRMR = .05). All factor loadings were statistically significant (Figure 5.2). The model demonstrated metric invariance across waves according to the criterion that change in CFI ≤ 0.01 (Cheung & Rensvold, 2009), allowing us to compare covariance between waves (Table 5.2).

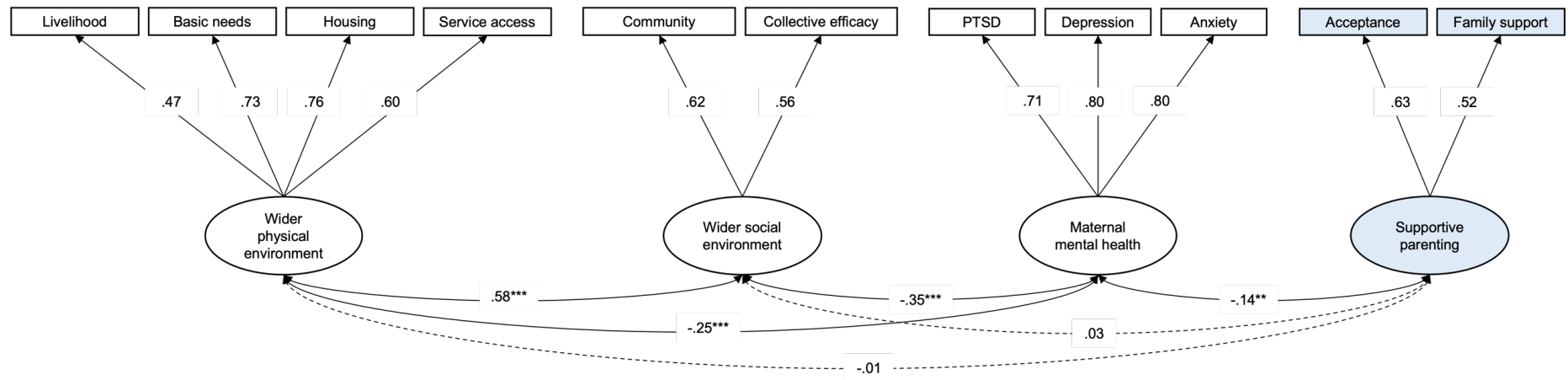
Table 5.2. Longitudinal invariance test

	$\chi^2 (p)$	CFI	RMSEA (90% CI)	SRMR	AIC	ΔCFI^a
Configural	479.54 (< .001)	.94	.04 (.04, .05)	.04	80783.39	
Metric	514.57 (< .001)	.93	.05 (.04, .05)	.04	80804.43	-0.006

^aChange in CFI between models; $\Delta\text{CFI} \leq 0.01$ shows metric invariance (Cheung & Rensvold, 2009)

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a. Baseline



b. Follow-up

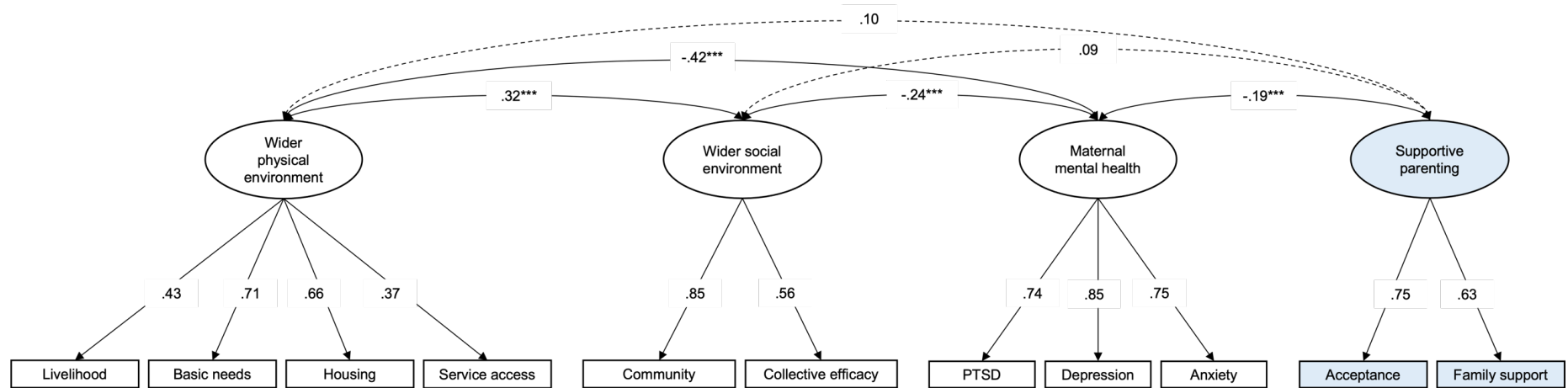


Figure 5.2. Measurement model. Child-report variables are shaded blue, mother-report variables are white. All latent factor loadings are significant.

$p < .05^*$, $p < .01^{**}$, $p < .001^{***}$

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Table 5.3. Bivariate correlations at baseline and follow-up

	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.	14.	15.	16.	17.	18.	19.
1. Child PTSD		.39***	.12***	.30***	.15***	.24***	-.06	-.07*	-.09**	-.01	.16***	.11**	.16***	-.13***	.01	-.01	-.10**	-.09**	-.01
2. Child depression	.40***		.09**	.28***	.26***	.16***	-.19***	-.28***	-.09*	-.12***	.22***	.18***	.25***	-.13***	-.14***	-.18***	.03	-.09**	-.02
3. Child externalising	.06*	.08**		.15***	.12***	.12***	-.15***	-.01	-.02	-.12***	.33***	.26***	.42***	-.15***	-.13***	-.06	-.21***	-.15***	-.15***
4. Child maltreatment	.35***	.26***	.16***		.37***	.34***	-.37***	-.23***	-.21***	-.14***	.15***	.10**	.16***	-.06	.03	.03	-.11***	-.05	-.03
5. Psychological control	.22***	.17***	.14***	.33***		.31***	-.43***	-.26***	-.09**	-.14***	.09**	.03	.12***	-.01	.01	-.01	.00	-.11**	-.07*
6. Parent-child conflict	.19***	.14***	.09***	.32***	.30***		-.31***	-.14***	-.04	-.14***	.07*	-.07*	.05	.04	.00	-.03	-.20***	-.02	-.07*
7. Acceptance	-.08**	-.19***	-.12***	-.20***	-.36***	-.20***		.47***	.20***	.22***	-.15***	-.04	-.13***	.06	.03	.04	.07	.07*	.05
8. Family support	-.05	-.19***	-.09**	-.12***	-.15***	-.11***	.33***		.22***	.14***	-.13***	-.04	-.11**	.05	.02	.11**	-.03	.03	.04
9. Parental presence	.05	-.06*	.03	-.12***	-.06*	-.11***	.21***	.10***		.19***	-.04	-.09**	.02	.06	-.10**	-.09**	-.02	-.08*	-.04
10. Parental monitoring	.01	-.08**	-.13***	-.09***	-.07*	-.06*	.18***	.18***	.22***		-.08*	-.04	-.11**	.05	.04	.04	.01	-.02	-.01
11. Maternal PTSD	.06*	.22***	.29***	.05	.07**	.01	-.12***	-.13***	.12***	-.01		.57***	.62***	-.25***	-.15***	-.23***	-.17***	-.12***	-.04
12. Maternal anxiety	.10***	.21***	.21***	.02	.00	.01	-.05*	-.04	.04	.01	.58***		.64***	-.25***	-.13***	-.19***	-.13***	-.08*	.02
13. Maternal depression	.17***	.21***	.26***	.15***	.06*	.03	-.06*	-.02	.04	.01	.56***	.64***		-.27***	-.22***	-.24***	-.17***	-.24***	-.16***
14. Livelihood	-.01	-.02	-.01	-.02	-.01	-.04	-.05	-.01	-.03	.08**	-.04	-.07*	-.18***		.34***	.19***	.22***	.09**	.00

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	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.	14.	15.	16.	17.	18.	19.
15. Basic needs	.05*	-.05	-.02	.05	.03	.07*	.02	.02	-.04	.02	-.14***	-.16***	-.19***	.37***		.50***	.21***	.18***	.16***
16. Housing	.01	-.07**	.01	.03	.04	.10***	.01	-.05	.02	.04	-.07**	-.13***	-.15***	.33***	.56***		.25***	.18***	.13***
17. Service access	-.05*	-.05	.04	-.01	.04	-.03	.00	.00	-.04	-.05	-.07**	-.08**	-.18***	.32***	.44***	.44***		.14***	.15***
18. Community	-.01	-.07**	-.09***	-.02	-.01	.03	.00	-.06*	.04	.01	-.07**	-.17***	-.20***	.08**	.21***	.34***	.27***		.48***
19. Collective efficacy	.02	-.08**	-.10***	.04	.01	.08**	.04	.06*	.01	.08**	-.16***	-.17***	-.19***	.15***	.18***	.28***	.17***	.35***	

Note. Pearson correlation coefficients. Lower half are correlations at baseline, upper half are correlations at follow-up. $p < .05^*$, $p < .01^{**}$, $p < .001^{***}$

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5.3.3. Post-traumatic stress disorder

According to bivariate correlation matrices (Table 5.3), child PTSD symptom scores showed significant positive correlations with maternal mental health, child maltreatment, psychological control, and parent-child conflict at both waves. Acceptance showed a small negative correlation with PTSD at baseline only while perceived family support and parental presence only showed small negative correlations with PTSD at follow-up. Finally, PTSD showed small negative correlations with basic needs and service access at baseline and larger negative correlations with livelihood, service access, and community at follow-up.

The final PTSD SEM (Figure 5.3a; Table 5.4; Table D1) retained the physical home environment, the wider social environment, and maternal mental health latent factors, along with maltreatment, psychological control, and parent-child conflict. The model showed adequate fit at baseline ($\chi^2(92) = 476.36, p < .001$; CFI = .92; RMSEA = .05 (90% CI: .05-.06); SRMR = .04) and follow-up ($\chi^2(92) = 347.81, p < .001$; CFI = .90; RMSEA = .06 (90% CI: .05-.06); SRMR = .05), explaining 20.3% of the variance in child PTSD at baseline and 15.5% at follow-up. War exposure ($\beta_{w1} = .22, p_{w1} < .001$; $\beta_{w2} = .12, p_{w2} = .001$), maternal mental health ($\beta_{w1} = .06, p_{w1} = .046$; $\beta_{w2} = .13, p_{w2} = .002$), maltreatment ($\beta_{w1} = .26, p_{w1} < .001$; $\beta_{w2} = .22, p_{w2} < .001$), and parent-child conflict ($\beta_{w1} = .06, p_{w1} = .045$; $\beta_{w2} = .14, p_{w2} < .001$) had direct effects on child PTSD symptoms at both waves. Maternal mental health also had an indirect effect on PTSD via child maltreatment at both waves ($\beta_{w1} = .03, p_{w1} = .001$; $\beta_{w2} = .04, p_{w2} < .001$). At follow-up, the physical environment had an indirect effect on PTSD via maternal mental health ($\beta_{w2} = -.05, p_{w2} = .008$). At baseline, the wider social environment had an indirect effect on PTSD via the pathway through maternal mental health and child maltreatment ($\beta_{w1} = -.01, p_{w1} = .011$), while at follow-up the wider physical environment had a similar effect on child PTSD via the same pathway ($\beta_{w2} = -.01, p_{w2} = .001$).

5.3.4. Depression

Depression showed significant positive bivariate correlations with maternal mental health, child maltreatment, psychological control, and parent-child conflict, and significant negative correlations with acceptance, perceived family support, parental monitoring, and parental presence at both waves. In terms of the refugee environment, depression was negatively correlated with housing and community at both waves, with collective efficacy at baseline, and with livelihood and basic needs at follow-up (Table 5.3).

The depression SEM (Figure 5.3b; Table 5.4; Table D1) retained all predictors and showed adequate fit at baseline ($\chi^2(140) = 638.80, p < .001$; CFI = .91; RMSEA = .05 (90% CI: .05-.05); SRMR = .04) and follow-up ($\chi^2(140) = 508.35, p < .001$; CFI = .89; RMSEA = .06 (90% CI: .05-.06); SRMR = .04), explaining 19.5% of the variance in child depression at baseline, and 25.1% at follow-up. War exposure ($\beta_{w1} = .09, p_{w1} = .001$; $\beta_{w2} = .11, p_{w2} = .002$), maternal mental health ($\beta_{w1} = .19, p_{w1} < .001$; $\beta_{w2} = .16, p_{w2} < .001$), and maltreatment ($\beta_{w1} = .16, p_{w1} < .001$; $\beta_{w2} = .19, p_{w2} < .001$) had direct effects on depression at both waves. Supportive parenting had a direct effect on depression at baseline only ($\beta_{w1} = -.19, p_{w1} = .004$), while the physical environment ($\beta_{w2} = -.14, p_{w2} = .005$) and psychological control ($\beta_{w2} = .13, p_{w2} = .004$) had direct effects on depression at follow-up. At both waves, maternal mental health had an indirect effect on depression via child maltreatment ($\beta_{w1} = .02, p_{w1} = .006$; $\beta_{w2} = .03, p_{w2} = .001$). Maternal mental health also had indirect effects on depression via supportive parenting at baseline ($\beta_{w1} = .02, p_{w1} = .034$) and via psychological control ($\beta_{w2} = .02, p_{w2} = .024$) at follow-up. The wider social environment had indirect effects on depression via maternal mental health ($\beta_{w1} = -.06, p_{w1} < .001$), and via the pathway through both maternal mental health and maltreatment ($\beta_{w1} = -.01, p_{w1} = .019$) at baseline. The physical environment had indirect effects on depression via maternal mental health ($\beta_{w2} = -.06, p_{w2} = .001$) and via the maternal mental health – maltreatment ($\beta_{w2} = -.01, p_{w2} = .003$)

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and the maternal mental health – psychological control ($\beta_{w2} = -.01, p_{w2} = .026$) pathways at follow-up.

5.3.5. Externalising behaviour problems

Externalising behaviour problems showed significant positive bivariate correlations with maternal mental health, child maltreatment, psychological control, and parent-child conflict, and significant negative correlations with acceptance and parental monitoring at both waves. Perceived family support negatively correlated with externalising at baseline only. In terms of the refugee environment, externalising correlated with community and collective efficacy at both waves and with livelihood, basic needs, and service access at follow-up (Table 5.3).

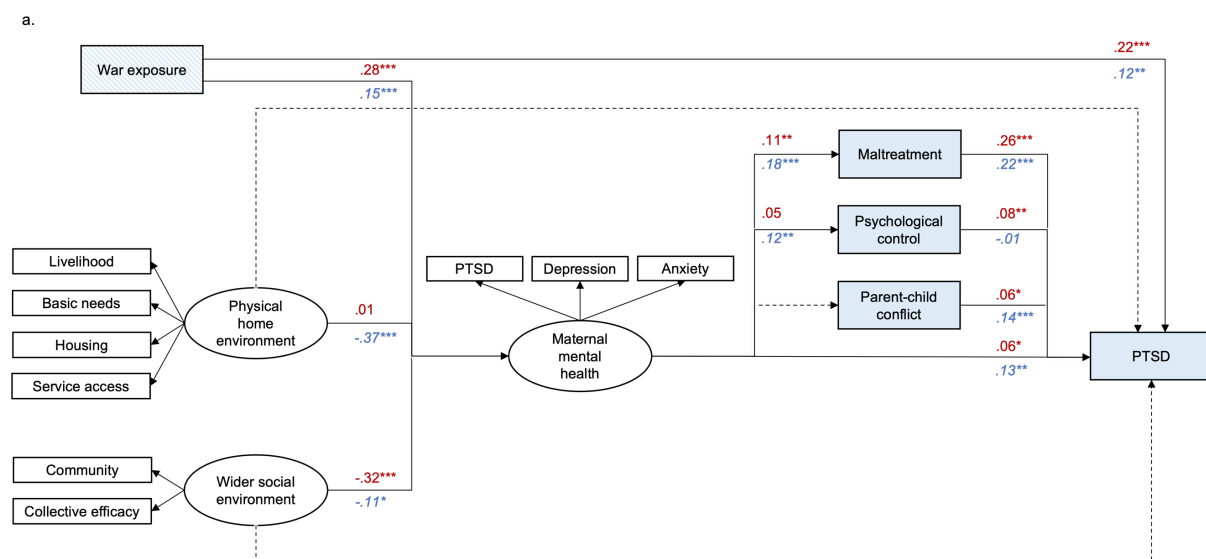
The final externalising SEM (Figure 5.3c; Table 5.4; Table D1) retained the physical and social environments, maternal mental health, maltreatment, psychological control, parent-child conflict, parental monitoring, and acceptance as an individual variable. None of the physical environment measures correlated with externalising at baseline and the association between the physical environment and externalising in the model was in the opposite direction to their bivariate correlations at follow-up, so the final model did not test the direct pathway from physical environment to externalising behaviour problems. The model showed adequate fit at baseline ($\chi^2(113) = 537.39, p < .001$; CFI = .91; RMSEA = .05 (90% CI: .05-.06); SRMR = .04) and follow-up ($\chi^2[113] = 388.11, p < .001$; CFI = .91; RMSEA = .05 (90% CI: .05-.06); SRMR = .04), explaining 18.7% of the variance in child externalising at baseline and 27.8% at follow-up. Maternal mental health had a direct effect on externalising at both waves ($\beta_{w1} = .29, p_{w1} < .001$; $\beta_{w2} = .39, p_{w2} < .001$). Maltreatment ($\beta_{w1} = .06, p_{w1} = .029$), psychological control ($\beta_{w1} = .08, p_{w1} = .005$), and parental monitoring ($\beta_{w1} = -.09, p_{w1} = .003$) had direct effects on externalising at baseline, and parent-child

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conflict ($\beta_{w1} = .11, p_{w1} = .003$) had a direct effect at follow-up. The wider social environment had an indirect effect on externalising via maternal mental health at both waves ($\beta_{w1} = -.10, p_{w1} < .001; \beta_{w2} = -.05, p_{w2} = .026$), while the physical environment had an indirect effect via maternal mental health at follow-up only ($\beta_{w2} = -.14, p_{w2} < .001$).

5.3.6. Additional pathways

In addition to the individual SEM results presented above, war exposure and the wider social environment had direct effects on maternal mental health in all models and at both waves. The physical environment became a significant predictor of maternal mental health at follow-up. Maternal mental health had direct effects on several aspects of the parent-child relationship, most consistently maltreatment and supportive parenting. Direct effect estimates are displayed in Figure 5.3 and indirect effect estimates in Table 5.4.



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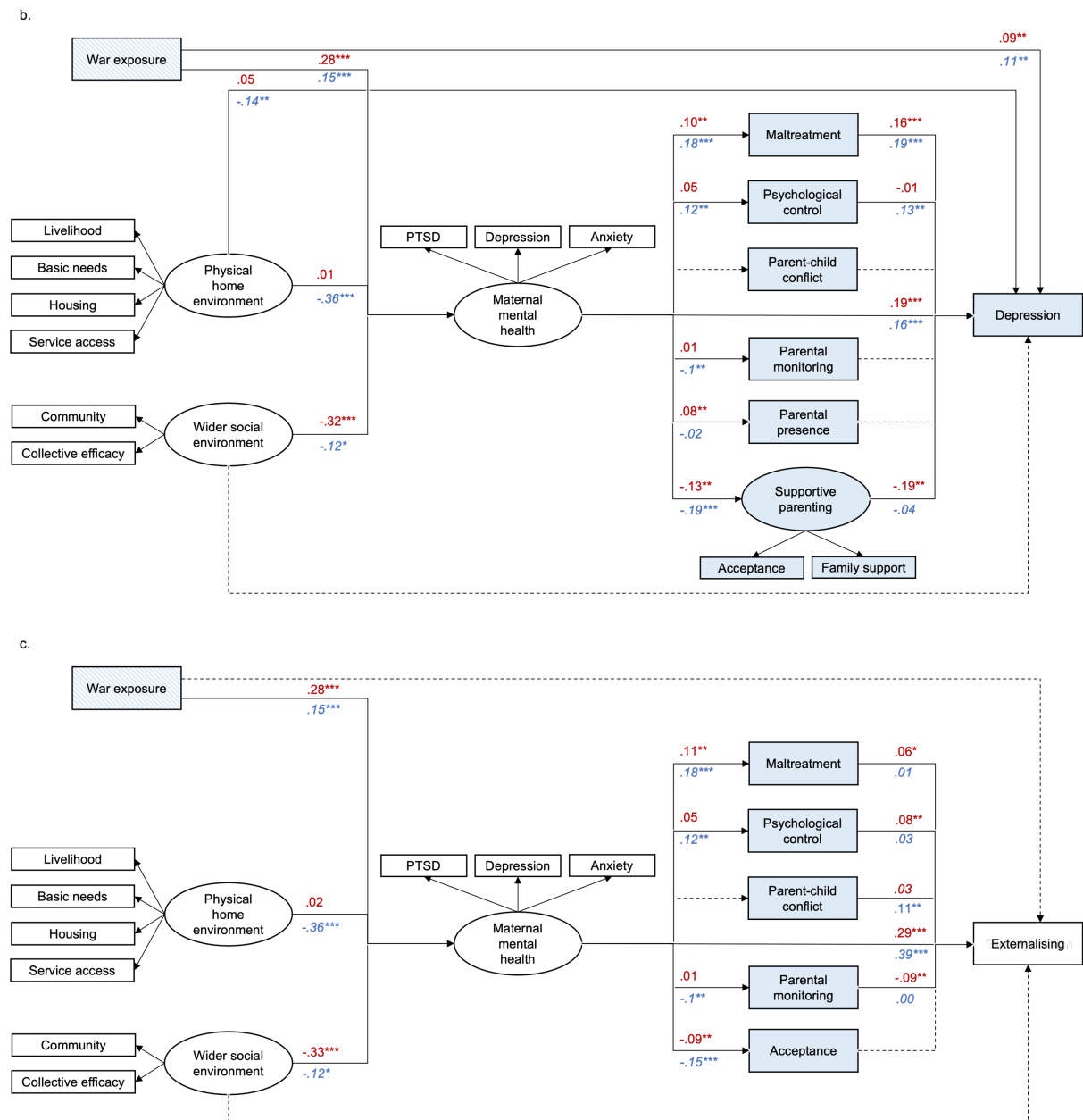


Figure 5.3. Structural models. Individual SEMs for a) PTSD, b) depression, and c) externalising behaviour problems. Dashed pathways depict those that were not significant at either wave. Effect estimates above the line in red are from baseline, estimates below the line in blue are from follow-up. Child-report variables are shaded blue, mother-report variables are white. Combined child and mother report of war exposure is shaded both white and blue. Factor loadings can be found in the measurement model (Figure 5.2). Additional pathways controlled for in the model but not shown here are the effects of child age and gender on child outcomes, maltreatment, psychological control, and parent child conflict, the effects of time since leaving Syria on child outcomes, maternal mental health, physical environment, and the social environment, and covariances between the environment latent factors and between the parent-child relationship variables.

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Table 5.4. Standardised indirect effects

Independent Variable	Mediator(s)	Dependent Variable	β W1	β W2
Physical environment →	Maternal mental health →	Child PTSD	.00	-.05**
Maternal mental health →	Child maltreatment →	Child PTSD	.03**	.04***
Wider social environment →	Maternal MH → Child maltreatment →	Child PTSD	-.01*	-.00
Physical environment →	Maternal MH → Child maltreatment →	Child PTSD	.00	-.01**
Wider social environment →	Maternal mental health →	Child depression	-.06***	-.02
Physical environment →	Maternal mental health →	Child depression	.00	-.06**
Maternal mental health →	Child maltreatment →	Child depression	.02**	.03***
Maternal mental health →	Psychological control →	Child depression	-.00	.02*
Maternal mental health →	Supportive parenting →	Child depression	.03*	.01
Wider social environment →	Maternal MH → Child maltreatment →	Child depression	-.01*	-.00
Wider social environment →	Maternal MH → Supportive parenting →	Child depression	-.01*	-.00
Physical environment →	Maternal MH → Child maltreatment →	Child depression	.00	-.01**
Physical environment →	Maternal MH → Psychological control →	Child depression	-.00	-.01*
Wider social environment →	Maternal mental health →	Child externalising	-.10***	-.05*
Physical environment →	Maternal mental health →	Child externalising	.00	-.14***

Note. Only significant effects are shown. All effects are standardised. $p < .05^*$, $p < .01^{**}$, $p < .001^{***}$

5.4. Discussion

The aim of this chapter was to explore the complex pathways from the refugee environment through maternal mental health and the parent-child relationship to refugee child mental health in order to improve our understanding of the processes involved in the mental health of refugee children living in humanitarian settings. We developed upon existing research by investigating direct and indirect effects across multiple ecological systems to child PTSD, depression, and externalising symptoms, replicating models one year apart in the same sample of child-mother dyads living in a highly risky camp context. Our key findings can be summarised in four points: (1) the refugee environment indirectly predicted child mental health via maternal mental health; (2) maternal mental health predicted child mental health directly as well as indirectly via child maltreatment; (3) certain pathways, such as the direct effect of maternal mental health on children, applied to all three outcomes, whilst others were disorder-specific; and (4) while key findings were consistent across time, there was some change between time points.

5.4.1. Indirect effects of the refugee environment

In support of our first hypothesis, we found that the wider social and physical environments were for the most part not directly related to child mental health, but predicted child mental health via a mediating pathway through maternal mental health. Better social environment, as measured by whether caregivers felt the community was close-knit and provided emotional and practical support, and felt neighbours would help discipline children, was predictive of better maternal mental health at both waves. Better physical environment, including access to necessities such as food and clean drinking water, adequate income and accommodation, and access to services such as healthcare or transportation, was predictive of better maternal mental health at follow-up. In turn, better maternal mental health was

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associated with fewer symptoms across all three child mental health outcomes. The specific significant indirect effects we observed were: from the social environment to child depression and externalising via maternal mental health at baseline, and from the physical environment to child depression, externalising, and PTSD via maternal mental health at follow-up.

These findings support our ecological systems-based hypotheses (Bronfenbrenner, 1979) and add to evidence that social support improves mothers' mental health and reduces harsh parenting (Sim et al., 2019), and that caregivers' daily stressors can affect children indirectly via parental PTSD and harsh parenting (Bryant et al., 2018). For the most part, our measures of the refugee environment had no direct effects on child mental health outcomes, supporting the hypothesis that they primarily impact children through effects cascading through more proximal systems. This may explain why findings from previous research, and from the previous two chapters, have been somewhat inconsistent in terms of whether the quality of the refugee environment predicts child outcomes (Arakelyan & Ager, 2021; Scharpf et al., 2021).

5.4.2. Direct and indirect effects of maternal mental health

Focusing on the family environment, we also found support for our second hypothesis: that the parent-child relationship mediates the effects of maternal mental health on child outcomes. In particular, worse maternal mental health was associated with increased child maltreatment, which in turn was associated with worse child PTSD and depression, in keeping with multiple previous refugee studies (Bryant et al., 2018; Sangalang et al., 2017; Sim, Bowes, et al., 2018). However, in contrast with some previous work (Sangalang et al., 2017), we found that maternal mental health also had a direct effect on child outcomes, meaning it affected children in other ways in addition to the mediated effects through harsh or supportive parenting, parent-child conflict, and parental monitoring. While there may be

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further indirect effects that we did not test, such as other relationships within the household, witnessing their mother's symptoms or distress could directly cause child distress (Rizkalla et al., 2020). It is possible that this has particularly strong effects on children in the current study sample compared to other populations due to their difficult living conditions. The families who participated in this study tend to live in cramped, informal shelters, and the majority of children were not in formal school; this level of confinement may make it difficult for mothers to mask their own symptoms, thereby exacerbating the effects of maternal mental health on child outcomes (Sim, Fazel, et al., 2018).

5.4.3. Outcome-specific effects

While several key findings applied to all three child outcomes (maternal mental health mediated the effects of the refugee environment on PTSD, depression, and externalising problems, and also had a direct effect on all three outcomes), we also observed some outcome-specific effects. Firstly, the indirect effect of maternal mental health via maltreatment only applied to child PTSD and depression but not externalising behaviour problems, in contrast to previous findings (Bryant et al., 2018), while the direct effect of maternal mental health on externalising was much larger compared to the other two child outcomes. This may be due in part to the different informants for the measures; child PTSD and depression were self-reported, as were the parent-child relationship measures, whereas child externalising and maternal mental health were reported by the mother. The externalising symptom score may therefore be less strongly associated with the child-reported parent-child relationship measures, and more strongly with maternal mental health, due to common method variance. However, externalising symptoms remained significantly associated with aspects of the parent-child relationship, and did not show consistently lower bivariate correlations with the parent-child relationship measures compared to PTSD and depression,

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suggesting the observed associations between the parent-child relationship and all three child outcomes are genuine.

Nevertheless, there were differences between the outcomes in terms of their association with different aspects of the family environment. The other key difference to note is that the child depression model showed additional mediating pathways from the refugee environment and maternal mental health through psychological control and supportive parenting to child depression. The mediating effect of supportive parenting in particular suggests that caregivers may be able to protect children from at least some of the negative impacts of the refugee environment or their own distress, through providing support and acceptance (Eltanamy et al., 2021). This emphasises the importance of supporting mothers by addressing their own mental health problems, reducing external stressors, and enabling an environment in which they have the resources to parent supportively. However, supportive parenting may not be sufficient to protect children from PTSD, which was not strongly or consistently associated with the positive dimensions of the mother-child relationship, in contrast to previous research (Eltanamy et al., 2021). Perhaps the PTSD response is primarily related to measures that could further exacerbate a child's trauma, such as war exposure, poor maternal mental health, or maltreatment. Overall, the different patterns we observed in the PTSD, depression, and externalising models indicate that while some aspects of the child's environment, such as maternal mental health, are crucial for child mental health more generally, others may have particular influence on specific outcome dimensions.

5.4.4. Differences across time

Finally, while several key findings emerged at both waves, our results also show considerable differences over time. The direct effect of maternal mental health on child mental health, the impact of maltreatment on child PTSD and depression, and the indirect

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effect of maternal mental health on PTSD and depression via maltreatment all replicate at both waves, providing confidence as to the importance and reliability of these pathways. However, there is also important information to be gained from the differences in models between baseline and follow-up.

The key difference is the increased importance of the physical environment over time. At follow-up, the physical environment became directly predictive of maternal mental health and child depression, and indirectly predictive of all three child outcomes. This could be due to the cumulative effects of the refugee environment on mothers, whereby the post-migration environment quality becomes more important the longer a family is in a camp (Khamis, 2019a), in comparison to pre-migration experiences such as war exposure, which showed diminishing associations with maternal mental health over time in the current sample. The divergence between the physical and social environments that we observed at follow-up could have strengthened this effect. The physical and social resources available to families in ITSs are often related; for example, a supportive community may increase the likelihood a family's basic needs are met if neighbours share with one another, or conversely high levels of deprivation could strain social relationships (Rizkalla et al., 2020). However, all aspects of the physical environment showed small but significant improvements from baseline to follow-up, whereas the social environment remained the same. These improvements may have had a particularly positive effect on maternal mental health.

Associations within the family environment also fluctuated between waves. A general pattern that emerged is that maternal mental health was more strongly associated with the parent-child relationship at follow-up. This may indicate a cycle whereby worse maternal mental health leads to a worsening of the parent-child relationship and child mental health, in turn further worsening maternal mental health (Hinton et al., 2009; Rizkalla et al., 2020). Alternatively, improvements in maternal mental health could improve the mother's capacity

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to parent supportively, creating a positive feedback loop. Therefore, in order to understand the processes affecting refugee child mental health, the dynamic nature of family relationships and how they relate to changing environments needs to be taken into consideration.

5.4.5. Implications

The results we have presented here have two key implications. Firstly, as has been emphasised in a majority of refugee research and in the previous chapter, the family environment and particularly caregiver mental health are crucial to how a child responds and adapts to the experiences of war and displacement. However, we additionally emphasise the importance of taking a more holistic view by also considering how the wider context impacts caregivers. Findings suggest that interventions aimed at improving child mental health should not only focus on the child or even the family, but also take the refugee environment into account. While parenting interventions could help caregivers to more effectively buffer the effects of environmental stressors, the external stress that caregivers experience must also be targeted. Strengthening the coordination between psychosocial and other humanitarian (e.g., housing-based) services may be the most effective way of reducing burden on families. Secondly, our results suggest that although different dimensions of child functioning are affected by different aspects of the environment, there are considerable commonalities between them. Hence, certain factors, such as the quality of the environment and maternal mental health, could universally help improve refugee children's mental health regardless of their specific pattern of symptoms.

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5.4.6. Strengths and limitations

The current study is characterised by several significant strengths including an ecological systems approach to mental health using two waves of data in a large, challenging to reach sample of Syrian refugees in Lebanon. While we cannot infer directionality from our results, two waves of data enabled us to identify which associations were stable over time, and infer that there is interplay between the environment, mother, parent-child relationship, and child.

Despite these strengths, the results should be interpreted with the following limitations in mind. Firstly, we did not have a direct measure of maternal war exposure. However, as described in the Methods section, it is likely that child and mother's war experiences were highly correlated. The strong association that we observe between war exposure and maternal mental health supports our theory that it can be considered a proxy measure, and emphasises the importance of attempting to control for the effects of maternal war exposure when looking at the impacts of other environmental stressors. Nevertheless, as it is a proxy, we only use that pathway as a control, and have not made any particular conclusions as to the association between war exposure and maternal mental health.

Secondly, our measure of maltreatment included maltreatment perpetrated by any adults in the home, not just the mother. Therefore, it could be the case that, for example, the father (or another adult) was responsible for violence in the home, which negatively impacted both mother and child. Though we attempted to develop upon the refugee mental health literature which typically features cross-sectional designs, more fully longitudinal designs are needed to test the directionality of the associations we identified, investigate potentially spurious associations, and better understand the change in associations over time. We did not repeat the approach to testing directionality from Chapter 4 due to being limited to two waves of data, the significant change in all predictors between those two waves, and the relatively

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small effect sizes of the pathways from baseline to follow-up in Chapter 4. Given these conditions, we did not expect to be able to observe indirect effects across time using the cross-lagged pathway approach. Repeating data collection at multiple waves closer together would allow us to test indirect paths over time with fewer concerns about confounding effects of the changing environment.

Thirdly, the models did not account for very large amounts of the variance in outcomes. This could in part be due to the exclusion of factors, such as self-esteem, that we have seen to be important in the previous chapters, but there may also be other important factors not measured in the BIOPATH study. For example, other aspects of the refugee environment or a child's genetic predisposition could play significant roles in determining mental health outcomes.

Finally, the BIOPATH sample had some inherent limitations. As noted in previous chapters, a selection bias in recruitment at baseline and retention at follow-up cannot be excluded due to restricted access to certain settlements, reliance on presence of families during recruitment, and the high mobility of the sample. However, differences between the baseline and follow-up samples were small (Chapter 2, Table 2.2), meaning any substantial retention bias is unlikely. Secondly, we used self-report for child PTSD and depression and caregiver-report for child externalising behaviour problems. Our use of multiple informants (i.e., mother and child) means that associations between measures differ in the degree to which they are confounded by common method variance. This creates some difficulty in interpreting the results of this chapter, as discussed above in regards to externalising behaviour problems. However, our choice to use caregiver-reported externalising and child-reported depression and PTSD measures was based on careful piloting which showed they were the most reliable and valid measures of these domains. We can also see that our results are not entirely explained by common method variance, as caregiver-reported maternal

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mental health was strongly related to child-reported parent-child relationship, PTSD, and depression scores.

5.5. Conclusion

Using reports from a large sample of Syrian mothers and children living in ITSs in Lebanon at two timepoints one year apart, we identified a range of direct and indirect pathways from the refugee and family environments to children's symptoms of PTSD, depression, and externalising behaviour problems. All three outcomes were directly associated with maternal mental health and aspects of the parent-child relationship, and were indirectly associated with characteristics of the refugee environment, the effects of which were mediated through maternal mental health. The effects of maternal mental health on child PTSD and depression were in turn mediated by aspects of the parent-child relationship, particularly child maltreatment, indicating a possible cascading of effects from environmental stressors through the family system. However, some pathways differed between timepoints, and scores on most measures changed substantially when measured 12 months later, demonstrating the highly dynamic nature of refugee settings in LMICs. Longitudinal research, particularly in less stable humanitarian settings, continues to be a key priority to understand the reality of refugees' situations, as well as the main factors affecting outcomes.

Chapter 6: Summary and General Conclusions

6. Overview

There are currently an estimated 2.7 million Syrian refugee children worldwide (UNHCR, 2022b). At minimum, half a million of these children have settled in Lebanon, a country that hosts the highest proportion of refugees relative to its population and is in the midst of economic crisis. In 2017, when the baseline data collection for the work in this thesis was conducted, 17% of Syrian refugees in Lebanon were living in non-permanent shelter, primarily within informal settlements (UNHCR, 2018). This proportion has steadily increased over the last several years (UNHCR et al., 2021). Children living in such settlements often face inadequate living facilities, economic and food insecurity, are at risk of child labour, and often have no access to education (UNHCR, 2018). As a consequence of these factors and their experiences of war, this group of children is at high risk for the development of mental health problems (Ataç et al., 2018; Gormez et al., 2018; Özer et al., 2016; Uysal et al., 2022; Vossoughi et al., 2018), but a notable proportion demonstrate psychological resilience (Çeri et al., 2018; Müller, Gossmann, et al., 2019; Purgato et al., 2020; Scherer et al., 2020).

However, relatively few studies have tested resilience. The majority of work focuses on single dimensions of functioning (e.g., post-traumatic stress disorder/PTSD) and does not account for the effects of specific war experiences. Moreover, despite their high vulnerability, refugee children living in camps in low and middle income countries (LMICs) remain understudied (Scharpf et al., 2021; Vossoughi et al., 2018). Of the research that has been conducted in these settings, most is cross-sectional, which precludes any conclusions regarding directionality of effects, in addition to neglecting the dynamic nature of mental health and the environment. Another consequence of this limitation is the lack of research into the effects that refugee children can exert on their environment and relationships.

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Finally, the role that the wider environment plays in influencing the family and refugee children remains uncertain, particularly in camp settings. The overall objective of this thesis was therefore to address these limitations by exploring risk and resilience in a sample of Syrian refugee children living in informal tented settlements (ITSs) in Lebanon, with a view to understanding how best to support them. In this chapter, I review the aims and key findings of the work that has been presented, interpret results across the different chapters, and discuss possible implications for practice and future research.

6.1. Overall aims and key findings

The current thesis had five key aims: (1) estimate the proportion of children who could be described as resilient, (2) identify predictors of risk and resilience, (3) investigate how mental health and resilience change over time, (4) investigate reciprocal relationships between children and their environment, and finally (5) investigate the mediating pathways through which environmental factors impact the child. We addressed these aims using data from the BIOPATH sample of Syrian refugee children. Children and their primary caregiver had completed questionnaires at baseline and again at follow-up one year later.

Questionnaires included measures of child war exposure, child mental health, and a range of hypothesised predictors of child outcomes, including individual factors such as self-esteem and coping strategies, social factors such as the child's relationship with peers and family, and aspects of the refugee environment, such as housing quality.

In the first results chapter (Chapter 3), we addressed the first and second aims by grouping children according to their symptoms of PTSD, depression, and externalising behaviour problems, and matching children reporting low symptoms across all three outcomes (i.e., children demonstrating manifested resilience) with high symptom children who experienced similar war events. We then ran logistic regressions to identify which

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hypothesised predictors were associated with group membership. A primary focus of this chapter was addressing the challenge of how best to operationalise resilience and account for war exposure. In Chapter 4 we developed on these findings by examining how the proportion of low and high symptom children changed from baseline to follow-up and testing the directionality of associations between apparent predictors and child mental health using cross-lagged panel models (CLPMs). Given the importance of caregivers in the results from the previous two chapters, in Chapter 5 we further explored the pathways through the family environment to examine the direct and indirect effects of the refugee environment, maternal mental health, and the mother-child relationship on child outcomes, using structural equation models (SEMs). We explored child PTSD, depression, and externalising problems separately to test whether certain effects applied to specific dimensions of child mental health, and repeated models at baseline and follow-up to explore change over time.

In response to our five aims, our findings can be summarised in five main points. Firstly, the mental health of the children in the current sample was worse and a smaller proportion appeared resilient than expected, given other estimates from comparable populations (Çeri et al., 2018; Müller, Gossmann, et al., 2019; Scherer et al., 2020). However, mental health changed over time, and the sample showed overall improvement from baseline to follow-up. A range of different factors from the individual, social, and refugee environment systems were associated with individual differences in mental health, but the social environment and specifically children's caregivers seemed to be particularly important. In turn, child mental health was influential, and showed evidence of impacting caregivers and other aspects of the social environment. Finally, we found evidence for mediating pathways: the wider refugee environment seemed to affect children via effects on their mothers, while maternal mental health showed both direct and indirect effects on child

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mental health. Below, I discuss how these results advance our knowledge of risk and resilience in refugee children.

6.2. Risk and resilience in Syrian refugee children in camps in Lebanon

Previous research has shown that refugee children tend to be at significantly increased risk for mental health problems, but that a proportion appear to demonstrate resilience (Çeri et al., 2018; Müller, Gossmann, et al., 2019; Purgato et al., 2020; Scherer et al., 2020). The concept of resilience in refugee populations is powerful for the emphasis it places not only on surviving, but also on adapting and growing (Ellis et al., 2017; Masten & Narayan, 2012). However, work on resilience in refugee children is limited by inconsistent and unclear definitions and methods of measurement (Cosco et al., 2017; Karadzhov, 2015; Windle et al., 2011). Moreover, work on the prevalence of psychological disorders in general is limited by a lack of research across multiple timepoints and in LMICs (Scharpf et al., 2021). In this thesis, I addressed these issues by outlining a clear method of operationalising manifested psychological resilience that takes multiple dimensions of functioning into account and applying it across two waves of data. I operationalised resilience as the observable manifestation of *the process of adapting to function better than expected in the context of adversity*. Given the extreme adversity faced by the BIOPATH sample, in practice this meant showing no or low symptoms of PTSD, depression, and externalising behaviour problems despite the experience of war (Aitcheson et al., 2017; Yule et al., 2019). Children who had clinical levels of symptoms at baseline but no or low symptoms at follow-up (i.e., improving/recovering children) were also classed as resilient (Masten & Narayan, 2012).

Using these criteria, we observed that a lower proportion of children (19.3%) met the low symptom (i.e., resilient) criteria at baseline than expected (Çeri et al., 2018; Scherer et al., 2020). In comparison to studies focusing on single outcomes (Khamis, 2019a), this result

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emphasises the importance of taking multiple dimensions of functioning into account. However, our estimate of the proportion of resilient children still remains lower than some studies that have accounted for multiple psychological outcomes (Çeri et al., 2018; Scherer et al., 2020). One possible explanation for the variety in prevalence rates across studies is the temporal distance from war exposure and displacement. As discussed previously, refugee children's mental health generally improves over time since displacement (Hermosilla et al., 2021; Müller, Gossmann, et al., 2019; Purgato et al., 2020), meaning that data collected closer to the time of displacement may provide worse estimates of mental health. In keeping with these reports, we also found an overall improvement from baseline to follow-up, meaning more children showed evidence of resilience at follow-up. This result is encouraging, as it demonstrates that children may be able to 'bounce back' even in a camp context where resources are scarce and a substantial number have no access to education or psychological intervention.

However, despite this improvement, some children showed meaningful deterioration over time, and the proportion of children who showed high symptoms at both timepoints was higher than expected (Müller, Gossmann, et al., 2019). Our inclusion of externalising symptoms, which few studies explicitly measure (Scherer et al., 2020), may contribute to these results, but the rate of externalising behaviour problems remained high across both timepoints even in comparison to estimates from previous studies (Blackmore et al., 2020; Çeri et al., 2018; Özer et al., 2016). The number of children scoring above the cut-offs for PTSD and depression was also high, particularly in comparison to estimates from high income countries (HICs; Henkelmann et al., 2020; Kien et al., 2019). While the possibility of false positives must be considered (McEwen et al., 2020), there is clearly an increased psychological burden in the current sample, most likely due to the extremely challenging context.

6.3. Predictors of risk and resilience

Given these results, identifying which factors are important for refugee children's mental health, particularly in more at-risk groups, is crucial, in order to understand why some are doing better or worse than others and to inform interventions to promote resilience. As discussed previously, many predictors of refugee children's mental health have been identified thus far, but there are four main gaps in the literature. Firstly, the majority of work has been conducted in HICs and community (i.e., non-camp) settings (Scharpf et al., 2021). This poses a problem as the experiences of refugees living in formal accommodation in higher income contexts differ considerably from the experiences of those living in tents and lower income contexts (Habib et al., 2019; Nickerson et al., 2022). Accordingly, prevalence estimates from HIC compared to LMIC-based studies indicate the psychological burden is also different (Blackmore et al., 2020; Kien et al., 2019; Özer et al., 2016; Uysal et al., 2022). Secondly, studies often focus on single dimensions of mental health, and there is a lack of work on predictors of resilience across multiple dimensions of functioning (Aitcheson et al., 2017; Klasen et al., 2010). Given the high comorbidity of mental health problems often seen in refugee populations (Kandemir et al., 2018; McEwen, Biazoli, et al., 2022), combined with the inverse observation that children can function well in one area whilst struggling in another (Scherer et al., 2020), it is crucial to identify what predictors are important across multiple dimensions of mental health, in order to inform interventions that can help overall functioning. Thirdly, most work is cross-sectional (Scharpf et al., 2021), and therefore cannot account for the dynamic nature of refugee children's mental health or that of their surroundings. Moreover, cross-sectional data limits the inferences that can be made about the direction of effects. An additional consequence of this is that there is a lack of work looking at what role children play in influencing their environment. In order to understand the processes determining child outcomes, it is crucial to investigate not only how children's

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mental health is affected by factors such as parenting, but also how these effects might be reciprocal (Hinton et al., 2009; Rizkalla et al., 2020). Finally, there are inconsistent findings as to the importance of the refugee environment for children's mental health. One possible explanation for this is that the wider environment only affects children indirectly, via their caregivers (Bryant et al., 2018), but thus far no one has investigated the possible mediating pathways from specific aspects of the refugee environment through the family environment to child mental health in LMICs.

We addressed these gaps in the extant research by investigating a comprehensive list of potential predictors from the individual, social, and wider ecological systems flagged in the literature (Scharpf et al., 2021), using the two waves of data from the BIOPATH sample. Here, we provide a brief overview of the key predictors identified when synthesising the results from across the three results chapters.

Starting at the individual level, self-esteem was consistently predictive of child outcomes (Marley & Mauki, 2019). Within the family system, psychological control and child maltreatment were key predictors of child outcomes throughout the chapters (Eruiyar et al., 2020; Karam et al., 2019; Lau et al., 2018; Lee et al., 2020). Though some previous work has suggested that harsh parenting may not be sufficiently challenging to affect child PTSD (Eruiyar et al., 2020), we found evidence that they are related in the current sample, perhaps because harsh parenting exacerbates the already challenging environment. The pattern between supportive parenting and child mental health was less consistent; results from the CLPMs suggested that maternal acceptance was important, but it was not associated with low symptom group membership in Chapter 3. This could be explained by the results from Chapter 5; in contrast to previous work (Eltanamy et al., 2021; Eruiyar et al., 2020), maternal acceptance was only predictive of child depression in the SEMs, but not PTSD or externalising. In fact, we observed that child PTSD was less strongly associated with positive

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factors in general. It may be the case that warm and supportive parenting is promotive of better mood and fewer depressive symptoms but is not protective against more severe traumatic responses. This is in contrast to evidence reviewed in Chapter 1, that warm parenting is associated with reduced child PTSD (Eltanamly et al., 2021). However, according to the meta-analysis conducted by Eltanamly and colleagues, the effect of warm parenting on PTSD was smaller than the effect on depression and anxiety. Perhaps the extent to which positive parenting serves a resilience function is limited depending on the outcome or the wider context (Elklit et al., 2012).

In contrast, caregiver depression was the factor most consistently associated with resilience and all aspects of child mental health, in line with previous findings regarding the importance of maternal mental health for refugee children (Eruyar et al., 2018; Javanbakht et al., 2018; Panter-Brick et al., 2014; Sim, Bowes, et al., 2018). In Chapter 5, we observed that caregiver mental health had direct effects on all three child outcomes, as well as indirect effects via parenting (Bryant et al., 2018; Sim, Bowes, et al., 2018). Clearly the family environment is of crucial importance for refugee children. However, factors outside of the family were also implicated in child mental health. In particular, bullying was consistently associated with child outcomes (Çeri et al., 2021; Damra et al., 2022; Samara et al., 2020). We also found evidence for an indirect effect of the wider social and physical refugee environment on children, which was mediated by maternal mental health, though the physical environment only appeared to be important at follow-up. This change over time and the mediating effect of maternal mental health may provide an explanation for why its role in refugee children's mental health has not been consistent in research thus far (Betancourt, Salhi, et al., 2012; Zwi et al., 2018). Wider aspects of the environment such as access to basic needs or community support appear to primarily impact children in the current sample via the toll they take on caregiver mental health. Chapter 5 included discussion of some theories as

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to why effects of the physical environment emerge at follow-up only. While we cannot provide a definite answer, one possible explanation is that practical aspects of the environment become more important the more time a family spends in a camp (Khamis, 2019a). The improvements we observed in the reported physical environment from baseline to follow-up may have been particularly meaningful to caregivers who were struggling to provide basic necessities for their children.

Crucially, while the factors reviewed above were all predictive of child outcomes, many of these relationships are likely bidirectional. The CLPMs showed that child symptoms at baseline were predictive of various factors at follow-up including self-esteem, various aspects of the parent-child relationship, caregiver mental health, bullying, and the perceived quality of the refugee environment. Meanwhile, according to the SEMs in Chapter 5, the association between maternal mental health and the parent-child relationship grew stronger from baseline to follow-up. In combination, these results may indicate a vicious cycle whereby negative social factors exacerbate a child's symptoms, which in turn worsens their relationships with others, leading to more negative social experiences (Midouhas et al., 2021; O'Driscoll et al., 2012; Rizkalla et al., 2020). For example, harsh parenting might negatively impact children, who in response display challenging behaviours, which could lead to increases in parent-child conflict and in turn negatively impact the caregiver's mental health and increase the likelihood they use more harsh parenting strategies (Hinton et al., 2009; Obradović & Hipwell, 2010; Rizkalla et al., 2020). On the other hand, they could also represent more positive feedback loops. For example, self-esteem may be affected by other aspects of individual functioning or by socio-ecological factors (e.g., social support), but can also represent a valuable target for improving other dimensions of psychological health (Johnson et al., 2016). One notable exception is maternal acceptance, which was predictive of but did not seem to be influenced by child symptoms. Acceptance was also one of the only

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predictors that did not change on average from baseline to follow-up. Perhaps it could be an important asset for children, robust to the effects of their psychological status.

6.4. Limitations and future directions

The work in this thesis represents a careful combination of person- and variable-centred approaches to determining the resilience and mental health status of at-risk Syrian refugee children and the most relevant post-migration factors affecting those outcomes. This study is characterised by two waves of data in a unique, large, and challenging to reach sample of Syrian refugees in Lebanon. As the majority of refugees globally reside in LMICs (UNHCR, 2022b), our findings may also be generalisable to many other groups of refugees. Despite these strengths, there remain several questions to be answered with future work. Below, I will detail overall limitations and outstanding questions, and provide suggestions as to how future research could tackle these issues.

6.4.1. War exposure

Firstly, the measurement of war exposure presents a significant challenge to any work in the field of refugee research. Individual war experiences are usually measured retrospectively, and the combination of retrospective report with the potentially traumatic nature of war means reports are likely to be somewhat unreliable (Oransky et al., 2013; Panter-Brick et al., 2015). This is even more true in the case of children (Goldin et al., 2003). The number of war events that children report tends to decrease over time - a pattern we observed in our own data - and even the events that children identify to be their most distressing experience are not consistent (Panter-Brick et al., 2015). Despite this, it is crucial to account for war exposure when investigating risk, resilience, and predictors of mental health in refugee populations (Kliewer et al., 2021). Throughout the thesis we used a

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combined child and caregiver report of war exposure to improve reliability (Goldin et al., 2003; Oh et al., 2018), and in Chapter 3 we implemented a novel matching approach to investigate which predictors differentiated children with high and low symptoms when their reported war exposure was the same. The similarity in results between the matching approach and the sensitivity analysis in which war exposure was controlled for as a total score suggests that, when war exposure is not a principal part of the research question, a total score may be sufficient. However, Chapters 3 and 4 had slightly different results in terms of which predictors significantly differed between groups. While this could be a result of the slight differences between samples, it may be that controlling more carefully for war exposure in Chapter 3 allowed effects to emerge that are associated with the type of events experienced. For example, problem-focused coping was predictive of high symptom group membership in Chapter 3 but did not differ between groups in Chapter 4. This may be because different coping strategies have different functions depending on the context (Duraković-Belko et al., 2003; Elklit et al., 2012; Wolpin et al., 2018). Regardless, research into resilience must take adversity into account, and a more accurate measurement of war exposure would prove valuable. Perhaps modelling war exposure as a latent factor using the observed total scores of child- and caregiver-report as indicators would have better accounted for measurement error, but this does not address the core issue of retrospective report.

Further information as to the characteristics of war exposure would also help to understand the effect these experiences have on children. In addition to the number of different types of events experienced, the frequency and timing may influence a child's responses. For example, repeated, chronic exposure to violence is likely to have a greater effect than witnessing a single violent act, and early onset trauma often has greater effects than late onset (Agorastos et al., 2014; Wamser-Nanney & Chesher, 2018). Perhaps a move beyond self-report could provide this information without the problem of recall. For example,

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information as to a family's whereabouts at different points in a conflict can be linked with location-based mapping of the conflict (Raleigh et al., 2010). However, these methods cannot tell us about individual experiences. A greater understanding of what affects the accuracy and reliability of reported war exposure may be the best approach, to determine how best to maximise reliability or account for unreliability in analysis (e.g., by combining child and caregiver report). In fact, there is an argument in the area of research into adverse childhood experiences that subjective experiences of adversity might be more relevant to mental health outcomes than objective exposure (Danese & Widom, 2021). How a child remembers and interprets their war experiences remains crucial, and requires further investigation.

6.4.2. Mental health and resilience

The measurement of mental health in a way that is both clinically and contextually meaningful presents an equal challenge. To address this, we used cut-off scores that had been validated against clinical judgement in a subsample of the BIOPATH cohort (McEwen et al., 2020) to ensure our operationalisation of resilience had clinical relevance. However, as discussed in previous chapters, it was not possible to find cut-off scores that were simultaneously highly sensitive in identifying all cases and highly specific in only identifying true cases. Therefore, while sensitivity was high, meaning we can be confident that children scoring below cut-offs do not have clinical levels of symptoms, lower specificity means that not all children above the cut-offs necessarily have clinical symptoms, and the rate of clinical mental health problems in the current sample may be a slight overestimation. More children might be resilient than reported. Nevertheless, the overall conclusion that children are in need of support stands. Point prevalence estimates based solely on structured clinical interviews combined with clinical judgement in the subsample of the BIOPATH cohort were 39.6% for PTSD, 20.1% for depression, and 26.9% for conduct or oppositional defiant disorder

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(McEwen, Biazoli, et al., 2022). 57.5% of this subsample met criteria for any common mental disorder. These prevalence rates remain substantially higher than previous estimates based on clinical diagnosis (Blackmore et al., 2020).

The high number of children scoring above at least one cut-off, according to both clinical interviews (McEwen, Biazoli, et al., 2022) and the symptom scales used in this thesis, demonstrates the importance of a multi-dimensional perspective, in order to gain a complete picture of refugees' psychological state as well as determining which factors represent valuable targets for intervention. However, we limited our outcomes of interest to three dimensions of mental health problems and used these to capture resilience. While we found that children meeting the resilience criteria also scored higher on self-reported wellbeing, our resilience measure did not explicitly include positive outcomes or competences (Bonanno, 2012; Miller-Graff, 2020; Ungar, 2015). According to some perspectives, this limits us in what we can conclude about resilience, as a distinct construct that represents more than the absence of mental health problems (Bonanno, 2012). However, as I argued in Chapter 1, the absence of mental health problems, at baseline or follow-up, demonstrates at least some form of resilience given the context of extreme adversity.

For future work, possible alternatives to our approach could include the measurement of mental health problems using latent modelling. For example, the three outcome dimensions (PTSD, depression, and externalising) could be treated as indicators of a single latent construct, such as in the use of a 'p' factor to represent overall susceptibility to psychopathology (Caspi et al., 2014). For the creation of mental health groups as in Chapters 3 and 4, a latent class or latent transitions approach may also provide an alternative to clinical cut-offs that better allows for nuance in the data, such as the existence of children scoring marginally above or below cut-offs. We did not use this method due to the number of possible latent classes present in the data at baseline; using validated clinical cut-offs

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introduced fewer researcher degrees of freedom than deciding what number of latent classes was most appropriate. However, using latent transitions from baseline to follow-up in Chapter 4 would have enabled a more data-focused approach without the somewhat arbitrary threshold of a change in symptoms of at least 20% that we utilised to define change over time.

Regardless of the strengths or limitations of this approach to resilience, the results from Chapter 3 and the subsequent chapters provide valuable information as to why some children appear to do better than expected, despite extreme adversity. Most notably, the consistent importance of the social environment across models, and the impact of the refugee environment on children via their mothers, support a systems-based perspective of resilience (i.e., generative resilience). In other words, resilience is not just related to individual traits, but also depends on the resources that are available (Masten, 2012; Miller-Graff, 2020; Ungar, 2018). However, certain resources can play either a risk or resilience function, depending on the context. For example, active coping strategies have resilience functions in some settings, but may have a risk function in others, as we see in Chapter 3 (Elklit et al., 2012; Woltin et al., 2018). The generative or systems-based resilience approach, which often relies on resilience scales, therefore faces the not insignificant challenge of taking the context into account (Panter-Brick et al., 2017; Ungar & Liebenberg, 2011). Clearly, the topic of resilience is not straightforward, and the current, still fragmented, state of the field means that resilience is not a single clearly defined concept. However, the work towards understanding why and how some children appear to adapt well to adversity remains valuable. Transparency in exactly how this is tested in each case is paramount.

Future work would benefit from investigating refugee children's functioning on more dimensions, such as positive psychological outcomes, somatic symptoms, and external measures of competence such as social skills or academic success (Bonanno, 2012; Cicchetti

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& Rogosch, 2007; Grych et al., 2015; Miller-Graff, 2020). Here, the question of contextual validity again comes into play. In addition to validating cut-offs in the cohort, we piloted our measures in the population of interest and, where possible, modified scales accordingly, in order to ensure the items reflected psychological difficulties rather than cultural differences (Kyrillos et al., 2022). However, future work needs to take this further, and determine which measures of functioning are most important to include by consulting the population of interest (Schwarz, 2018).

6.4.3. Causal inference

A third limitation of the work in this thesis is the lack of fully longitudinal data. Cross-sectional data represents the majority of research in refugees, particularly those living in camp contexts, due to the high mobility of these populations (Scharpf et al., 2021). Using two waves of data, we were able to investigate changes in mental health from baseline to follow-up. This allowed us to identify children who appeared to be struggling at baseline but demonstrated resilience by recovering at follow-up, and identify that some children who initially appeared to be resilient began to struggle. We were also able, in Chapter 4, to see that the group who improved over time tended to show greater improvements in environmental factors such as bullying compared to the other groups, whereas the children who deteriorated showed increases in those factors. We then further investigated this by testing the directionality of associations between predictors and outcomes.

However, it has been argued that two waves of data are not sufficient to make conclusions regarding causality (Hamaker et al., 2015). Moreover, the instability of the camp context means that all factors can change substantially over the course of a year, as was the case in the current sample. This may have reduced the extent to which we could observe associations over time, and likely explains why the cross-lagged pathways in Chapter 4 had

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relatively small effects. It also prevented us from testing the directionality of the effects identified in the SEMs, as we would not expect to be able to see mediating pathways across the extended 12-month period between waves, particularly given the substantial change in that time and the small effects when looking only at direct pathways in Chapter 4's CLPMs. One solution to this problem, as mentioned in Chapter 5, is to repeat data collection at multiple points closer together in time. Multiple waves of data would allow for a more nuanced picture of the process of children's adaptation and the reciprocal relationships between different predictors and child mental health. Measuring any important events (e.g., floods, raids) that occur between waves and accounting for these in analysis would also help this process.

6.4.4. Unexplained outcome variance

Fourth and finally, we investigated an extensive range of potential psychological and socio-ecological predictors of child outcomes from across the ecological systems (Bronfenbrenner, 1979). However, a substantial portion of the variance in outcomes was not explained by the presented models, suggesting perhaps that there are other important factors not accounted for, such as other individual (e.g., specific competences; Beiser et al., 2015) or socio-ecological (e.g., parent-child attachment relationship; Eruyar et al., 2020) factors. In fact, some socio-ecological factors that we would expect to affect children, such as the father-child relationship and the school environment (Eruyar et al., 2020; Khamis, 2019b), were included in the BIOPATH study, but not in the analyses presented in this thesis due to a lack of responses. Many children were not living with a paternal figure at the time of data collection, and many did not attend school, leading to substantial amounts of missing data. In order to focus on the sample as a whole, and avoid excluding the most vulnerable families,

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we chose to focus on the data provided by the majority of the sample. However, the impacts of these factors remain a question for future work.

Variance in outcomes could additionally be explained by factors at different levels of functioning, such as genetic or neurobiological processes (e.g., hypothalamic-pituitary-adrenal axis reactivity; Ioannidis et al., 2020). These factors may interact in complex ways across systems to affect children's responses to adversity. The next step in research on risk and resilience in refugees may therefore be taking a more multi-level approach (Masten, 2016) in order to understand who may be at more risk for psychological difficulties, and to inform intervention. Genetic, epigenetic, and hair hormone data were collected as part of the BIOPATH study, but did not fit within the scope of this thesis. Future work could determine how they relate to the predictors identified here.

In fact, there is much remaining to be done to understand the interplay between the predictors that we did include in analysis, as well as between predictors and child mental health. For example, environmental sensitivity (Pluess, 2015), which we found to be associated with high symptom group membership when controlling for war exposure, might moderate the effects of adversity and other environmental factors on children (Karam et al., 2019). Additionally, although we focused on the family environment in Chapter 5 due to its importance in the previous two chapters, in Chapters 3 and 4 we also identified measures of social relationships outside of the family (e.g., bullying) that seemed to impact child mental health. Caregivers may be able to protect their children from external factors to an extent (Akesson & Sousa, 2019; Kliwer et al., 2021), but more research is needed to understand the interplay between wider social environments and the family in order to determine where may be the most useful target for intervention. Finally, the influence of more practical aspects of the environment remains in question. We identified that the physical environment has indirect effects on children via caregiver mental health, but more work is needed to understand the

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role it plays and how it interacts with other factors. Perhaps more comparative studies, that investigate pathways from the wider environment to child mental health in different settings (e.g., camp vs. community), are needed to understand the effect the wider context has on children (Beni Yonis et al., 2020; Khamis, 2019a; Nickerson et al., 2022).

Finally, this future work could utilise more complex modelling approaches, including structural equation modelling and mixed modelling, in order to obtain more accurate estimates of effect. As mentioned previously, more extensive use of latent factors and structural equation modelling could allow us to better control for measurement error and latent class approaches could group children in ways that more accurately reflect the data, whilst mixed modelling could allow us to better separate within and between person differences by clustering participants across time.

6.5. Practical implications

Despite the limitations and outstanding questions detailed above, the results presented in this thesis provide an important step to understanding resilience in a highly vulnerable child population with considerable barriers to research access, and have several practical implications for work in refugee settings. Firstly, it is clear that many Syrian refugee children residing in ITSs in Lebanon are presenting elevated mental health symptoms and require psychological support. We observed that, when considering symptoms of PTSD, depression, and externalising problems, the current sample had a higher mental health need than expected (Çeri et al., 2018). Moreover, while it is often the case that refugee children show improvements in their mental health in the time since displacement (Hermosilla et al., 2021; Müller, Gossmann, et al., 2019; Purgato et al., 2020), we found that a large proportion did not spontaneously recover, remaining at high risk for clinical levels of PTSD, depression, or externalising problems, and a proportion deteriorated from baseline to follow-up.

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Hence, the key question remains what type of support or intervention is most likely to be effective. Recent reviews have identified some treatments that may be effective at addressing PTSD or depression, but there is as yet no gold standard, and the available evidence is often limited by study design (Genç, 2022; Rafieifar & Macgowan, 2021). Additionally, there remains a lack of work on preventative measures, and interventions that address overall mental health or resilience (Fazel & Betancourt, 2018). In answer to this, our results indicate several factors that may be important across the dimensions of PTSD, depression, and externalising problems. The importance of caregiver mental health and parenting in our models indicates that caregiver-targeted interventions may be particularly effective in indirectly boosting child mental health. In line with our finding that maternal mental health was predictive of parenting, caregiver support has been shown to improve parental warmth and reduce harsh parenting, in addition to ameliorating caregiver distress (Miller et al., 2020). Interventions promoting positive parenting may also in turn improve caregiver mental health (Sim et al., 2021). However, trials of parenting skills interventions thus far find inconsistent effects regarding what impacts they have on child outcomes (Gillespie et al., 2022). This may be because, though important, the family environment is not the only factor that affects child mental health. Bullying and peer victimisation, which caregivers are likely unable to guard against, and which refugee children may be at increased risk of (Samara et al., 2020), was an important predictor of child mental health in the current sample. Community- or school-based interventions aimed at reducing prejudice towards refugees might therefore be effective at reducing bullying and improving refugee child mental health (Smith & Minescu, 2021), but to address the root of this issue a change in attitudes towards refugees nationally and globally may be necessary.

However, while these aspects of the social environment seem to be important for children's mental health, it is important to remember the role that the child plays. Given our

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finding that child mental health was predictive of caregiver mental health, the parent-child relationship, and other social factors including bullying, directly treating child symptoms could also improve a child's social relationships and make it easier for caregivers to parent supportively. For example, Erdemir (2020) reported that a preschool-based intervention for children also influenced parental practice. There is some evidence for the efficacy of techniques that target trauma specifically (Genç, 2022), but the reciprocal relationship we observed between child mental health and self-esteem suggests that positive assets such as self-esteem could also be valuable targets (Foka et al., 2020). Interventions that promote positive cycles within the family in concurrence with work to disrupt negative cycles may be most effective in promoting positive outcomes. However, the practical aspects of living as a refugee in an ITS, such as working conditions and poor access to transport, not only negatively impact caregivers and children, but also present barriers to accessing mental health treatment (Byrow et al., 2020). If the refugee environment is not improved, families will remain under high stress, and any treatments they are able to access may not be as effective.

Altogether, our results indicating the effects of the wider environment on caregivers, parenting, and children, and the effects of children on their environment, point towards a holistic approach. Practical support in combination with psychosocial interventions both from the top-down (i.e., community, caregivers) and bottom-up (i.e., children) would provide families with the stability to create a positive environment and adapt together (Bürgin et al., 2022). It should be acknowledged that what steps are possible and practicable depends highly on the context, and that the current situation in Lebanon is severely limiting. In light of this, community-based psychosocial interventions might provide a resource-efficient method of supporting families and empowering them to support one another. However, the responsibility for children's wellbeing cannot rest solely with the community.

6.6. Concluding remarks

As increasing numbers of people are forcibly displaced around the world, the psychological effects of war and displacement on children become ever more relevant. This thesis contributes a careful exploration of risk and resilience in a vulnerable yet understudied sample of Syrian refugee children living in informal camps in Lebanon. Some children showed evidence of manifested resilience in the form of resistance to or recovery from the negative impacts of war, and mental health showed overall improvements from baseline to follow-up one year later, but a substantial number of children appeared to have PTSD, depression, or externalising problems. The family environment likely plays a key role in determining these outcomes, but the results presented here develop on previous research by demonstrating evidence of the effect the wider refugee environment has on the family unit, and the effect the child has on their environment. Taken together, these results provide support for holistic interventions that combine both practical and psychosocial support in order to enable caregivers and children to adapt together.

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Appendix A: Supplemental Information for Chapter 2

Table A1. Future aspirations and plans

Subscale	Items
Future aspirations	Do you know what job you want to have in the future? If you know what job you want to have, what is it?
Future expectations	How sure are you that your plans for the future will definitely come true? (e.g., getting married, having children, having the job you want, etc)
Future planning and motivation	I am determined to make my plans about my future come true I have thought about things that I need to do to make my plans come true (e.g., what grades or subjects I need at school, how to get the job I want) I am willing to give up my immediate happiness or wellbeing in order to make my plans come true in the future (e.g., work hard at school/doing homework instead of playing, move away from my family if I need to) I think about how things might be in the future and try to make those things happen with my day-to-day behavior

Note. Future aspirations and plans scale developed for the study (McEwen, Popham, et al., 2022). The first item had four response options: “Yes, I know exactly what I want to do”, “I have some idea what I want to do”, “I’m not sure yet what I want to do”, “I don’t think I’ll have a job in the future”. The second item was a free text field and the third item had four response options ranging from “Very sure” to “My plans definitely won’t come true”. The remaining items used a four-point Likert scale “Not true for me” to “Very true for me”.

Table A2. Parental presence

Items
My parents are present during lunch/dinner time
My parents are present with me during play time
My parents are present with me during bed time
My parents are present with me during homework

Note. Positive home experiences scale developed for the study (McEwen, Popham, et al., 2022). Five-point Likert scale, “Never” to “Always”, or “N/A” for item 4 if child does not have homework.

Table A3. Bullying of refugee children

Items
<i>How often have other children or teenagers done these things to you in the past year?</i>
Said they would harm you or do bad things to you
Called you bad names or made cruel jokes about you
Said they didn’t want you around
Pushed, shoved, tripped, or picked fights with you
Threw stones or other objects at you

Appendix A

Items
Threatened or attacked you with a knife or other weapon
Robbed you
Sometimes groups of kids or gangs attack people. In the last year, did a gang hit, jump, or attack you?

Note. Bullying scale developed for the study (McEwen, Popham, et al., 2022). Five-point Likert scale “*Often*” to “*Never in my life*”.

Table A4. Loneliness and social isolation

Scale	Items
New items	I have no really close friends to play with or hang out with
	I feel lonely because some family members are not here with me
Loneliness and social dissatisfaction scale	I have nobody who I can trust to talk to
	I feel alone

Note. Two items on loneliness in refugee children scale developed for the study (McEwen, Popham, et al., 2022) combined with two items from the Loneliness and Social Dissatisfaction Scale (Asher et al., 1984). Four-point Likert scale “*Strongly disagree*” to “*Strongly agree*”.

Table A5. Perceived refugee environment

Subscale	Items
Livelihood	Does your family have enough income or resources to pay for basic needs like food, clothing, housing?
Basic needs	Does your family have enough food so that none of you has to be hungry?
	Does your family have access to clean drinking water whenever you need it?
	Does your family have enough clothing to stay warm and clean?
Housing	Does your family have access to cooking facilities whenever you need to cook?
	Does your family have access to adequate toilet facilities whenever you need to use the toilet?
	Does your family have access to adequate washing facilities whenever you need to wash?
	Does your family have access to electricity when you need it?
	Are you able to heat your current accommodation during cold seasons so you are warm?
	Is your current accommodation large enough to house all people that are living there?
	Does your current accommodation provide protection from the weather in summer and winter (e.g., rain, sun, wind) so that you are comfortable?
Family environment	Are most of your immediate family members living in the same area (e.g., husband, wife, children, parents)?
	Are there many conflicts between the people you are living with?

Appendix A

Subscale	Items
Access to services	Do you get the emotional support that you need from the people you are living with?
	Do you get the practical help that you need from the people you are living with?
	Are you able to get access to health care (e.g., treatment, medicine) for your family when you need it?
	Are you able to get access to transportation in order to move easily between places when you have to?
Community social environment	Are you able to get access to important information when you need it?
	Do you have access to communication (phone/internet) whenever you need it?
	Do you feel safe from crime where you are living?
	Do you feel that the local host community around you accepts your presence?
Work	Do you have quarrels with other people in the immediate community?
	Do people get emotional support from others in your community when they need it?
	Do people get practical help from others in your community when they need it?
	Do you or someone in your family have regular paid employment (part or full time)?
Learning environment for children	Do you feel your employer is exploiting you, or the person in your family who is working (for example, by having you work too many hours or not paying you enough)?
	Do you, or the person in your family who is working, have to travel a very long distance to your work?
	Do you have time to spend talking and listening to your children whenever they need you?
	Do your children have toys to play with?
	Do your children have access to books and other learning materials?
	Do your children have a safe space to play outside?
	Are you able to get access to basic education for your children?
	If yes, how many hours a day? (Enter the number in English)
	If yes, how many days a week? (Enter the number in English)
	If yes, how many months a year? (Enter the number in English)
If no, when was your child last in education?	
- Within the last month	
- 1-6 months ago	
- 7-12 months ago	
- Over a year	
- Never been to school	

Note. Perceived refugee environment index developed for the study (McEwen, Popham, et al., 2022). Five-point Likert scale “*Not at all*” to “*Yes*”.

Appendix B: Supplemental Information for Chapter 3

Table B1. Binary logistic regressions predicting low symptom group membership in individual and combined models

	PTSD Exp(B) (95% CI)		Depression Exp(B) (95% CI)		Externalising Exp(B) (95% CI)		Low/High Symptom Group Exp(B) (95% CI)	
	Individual	Combined	Individual	Combined	Individual	Combined	Individual	Combined
<i>Individual traits and health</i>								
Optimism	1.06 (1.00, 1.12)		1.16 (1.08, 1.24)***	1.14 (1.05, 1.24)**	1.07 (1.00, 1.13)*	1.05 (0.97, 1.13)	1.07 (1.01, 1.13)*	1.07 (1.01, 1.13)*
Self-efficacy	1.01 (0.97, 1.06)		1.04 (0.99, 1.10)		1.01 (0.96, 1.06)		1.00 (0.96, 1.05)	
Self-esteem	1.70 (1.41, 2.05)***	1.53 (1.22, 1.92)***	1.85 (1.52, 2.25)***	1.54 (1.21, 1.95)***	1.35 (1.11, 1.63)**	1.08 (0.85, 1.36)	1.51 (1.25, 1.81)***	1.38 (1.17, 1.62)***
Child religiosity	0.98 (0.96, 1.01)		1.00 (0.97, 1.02)		1.02 (1.00, 1.05)		1.01 (0.98, 1.03)	
Future aspirations	1.09 (0.95, 1.26)		0.94 (0.80, 1.10)		0.90 (0.77, 1.05)		1.05 (0.91, 1.21)	
Future expectations	0.98 (0.83, 1.15)		1.05 (0.88, 1.26)		1.03 (0.87, 1.23)		1.06 (0.91, 1.24)	
Future planning and motivation	0.97 (0.80, 1.16)		1.09 (0.90, 1.33)		0.90 (0.74, 1.10)		1.07 (0.90, 1.28)	
Environmental sensitivity	0.60 (0.50, 0.71)***	0.77 (0.63, 0.94)*	0.69 (0.57, 0.83)***	0.70 (0.56, 0.89)**	0.76 (0.63, 0.91)**	0.80 (0.65, 0.98)*	0.69 (0.59, 0.82)***	0.83 (0.72, 0.95)**
Problem-focused coping	0.84 (0.79, 0.90)***	0.89 (0.81, 0.99)*	0.94 (0.87, 1.01)		0.97 (0.90, 1.03)		0.91 (0.85, 0.97)**	0.92 (0.86, 0.99)*

Appendix B

	PTSD Exp(B) (95% CI)		Depression Exp(B) (95% CI)		Externalising Exp(B) (95% CI)		Low/High Symptom Group Exp(B) (95% CI)	
	Individual	Combined	Individual	Combined	Individual	Combined	Individual	Combined
Cognitive restructuring coping	0.95 (0.89, 1.01)		1.03 (0.96, 1.11)		1.02 (0.95, 1.09)		0.99 (0.93, 1.05)	
Distraction coping	0.96 (0.89, 1.03)		0.97 (0.89, 1.05)		0.93 (0.86, 1.00)		0.96 (0.90, 1.03)	
Avoidance coping	0.82 (0.77, 0.87)***	0.90 (0.82, 0.98)*	0.92 (0.86, 0.99)*	0.94 (0.85, 1.03)	0.94 (0.88, 1.01)		0.90 (0.85, 0.96)**	0.96 (0.90, 1.03)
Support-seeking coping	0.89 (0.84, 0.94)***	1.00 (0.92, 1.08)	0.94 (0.88, 1.00)	1.00 (0.92, 1.09)	0.95 (0.90, 1.01)		0.93 (0.88, 0.99)*	0.98 (0.92, 1.03)
Child general health	0.66 (0.53, 0.82)***	0.73 (0.57, 0.95)*	0.66 (0.52, 0.83)***	0.79 (0.59, 1.07)	0.75 (0.61, 0.93)**	0.82 (0.64, 1.05)	0.71 (0.58, 0.87)**	0.85 (0.70, 1.03)
<i>Parent-child relationship</i>								
Maternal acceptance	1.05 (1.01, 1.10)*	1.05 (0.99, 1.12)	1.10 (1.05, 1.16)***	1.04 (0.97, 1.10)	1.07 (1.01, 1.12)*	1.00 (0.94, 1.07)	1.05 (1.00, 1.10)	
Parental presence	0.96 (0.92, 1.00)*	0.96 (0.91, 1.01)	1.00 (0.96, 1.05)		0.99 (0.95, 1.03)		0.97 (0.93, 1.01)	
Parental monitoring	1.01 (0.93, 1.10)		1.09 (0.99, 1.20)		1.08 (0.99, 1.18)		1.01 (0.92, 1.10)	
Maternal psychological control	0.85 (0.78, 0.91)***	0.95 (0.87, 1.05)	0.87 (0.80, 0.94)**	0.99 (0.89, 1.11)	0.86 (0.80, 0.93)***	0.93 (0.84, 1.02)	0.86 (0.80, 0.93)***	0.95 (0.88, 1.01)

Appendix B

	PTSD Exp(B) (95% CI)		Depression Exp(B) (95% CI)		Externalising Exp(B) (95% CI)		Low/High Symptom Group Exp(B) (95% CI)	
	Individual	Combined	Individual	Combined	Individual	Combined	Individual	Combined
Parent-child conflict	0.94 (0.89, 1.00)*	1.04 (0.97, 1.11)	0.93 (0.88, 0.99)*	0.98 (0.91, 1.05)	0.93 (0.88, 0.99)*	0.98 (0.92, 1.05)	0.95 (0.90, 1.00)	
Child maltreatment	0.94 (0.92, 0.96)***	0.96 (0.94, 0.98)***	0.95 (0.93, 0.97)***	0.97 (0.95, 1.00)*	0.95 (0.93, 0.97)***	0.97 (0.95, 1.00)*	0.96 (0.94, 0.97)***	0.97 (0.96, 0.99)**
<i>Social environment</i>								
Perceived social support	1.12 (0.93, 1.34)		1.37 (1.12, 1.67)**	0.94 (0.73, 1.22)	1.16 (0.96, 1.40)		1.23 (1.02, 1.49)*	0.98 (0.82, 1.16)
Bullying	0.95 (0.92, 0.98)**	1.00 (0.96, 1.03)	0.95 (0.92, 0.99)**	0.99 (0.95, 1.04)	0.96 (0.93, 0.98)**	0.98 (0.94, 1.02)	0.96 (0.93, 0.98)**	0.98 (0.96, 1.01)
Loneliness/social isolation	0.82 (0.77, 0.88)***	0.85 (0.79, 0.92)***	0.78 (0.73, 0.84)***	0.86 (0.79, 0.93)***	0.83 (0.78, 0.89)***	0.89 (0.83, 0.96)**	0.85 (0.80, 0.90)***	0.90 (0.86, 0.95)***
Caregiver depression	0.95 (0.92, 0.97)***	0.97 (0.93, 1.01)	0.93 (0.90, 0.95)***	0.98 (0.93, 1.03)	0.92 (0.89, 0.94)***	0.96 (0.92, 1.00)*	0.94 (0.92, 0.97)***	0.96 (0.93, 0.99)**
Caregiver PTSD	0.99 (0.98, 1.00)*	1.01 (1.00, 1.03)	0.97 (0.96, 0.98)***	0.99 (0.97, 1.00)	0.97 (0.95, 0.98)***	0.98 (0.96, 0.99)**	0.98 (0.97, 0.99)***	0.99 (0.98, 1.00)**
Caregiver anxiety	0.96 (0.93, 0.99)**	0.99 (0.94, 1.04)	0.93 (0.89, 0.96)***	0.99 (0.93, 1.04)	0.93 (0.90, 0.96)***	1.02 (0.97, 1.07)	0.94 (0.91, 0.97)***	1.00 (0.96, 1.04)
Caregiver general health	0.82 (0.69, 0.97)*	0.96 (0.78, 1.20)	0.78 (0.64, 0.94)**	0.97 (0.76, 1.24)	0.76 (0.64, 0.91)**	0.93 (0.75, 1.16)	0.81 (0.68, 0.95)*	0.93 (0.79, 1.08)
<i>Wider environment</i>								
Human insecurity	1.09 (0.74, 1.59)		0.57 (0.36, 0.90)*	1.06 (0.59, 1.90)	0.90 (0.58, 1.41)		0.96 (0.66, 1.41)	
Perceived	0.87 (0.64, 1.19)		0.86 (0.60, 1.24)		0.88 (0.64, 1.22)		0.88 (0.65, 1.20)	

Appendix B

	PTSD Exp(B) (95% CI)		Depression Exp(B) (95% CI)		Externalising Exp(B) (95% CI)		Low/High Symptom Group Exp(B) (95% CI)	
	Individual	Combined	Individual	Combined	Individual	Combined	Individual	Combined
refugee environment								
Collective efficacy	1.00 (0.98, 1.03)		1.03 (1.00, 1.06)		1.02 (0.99, 1.05)		1.01 (0.99, 1.04)	
Access to education	1.04 (0.86, 1.25)		1.13 (0.92, 1.38)		0.83 (0.68, 1.01)		0.97 (0.80, 1.16)	
Parent abroad	0.80 (0.50, 1.29)		0.52 (0.32, 0.85)*	0.63 (0.35, 1.12)	0.86 (0.50, 1.47)		0.77 (0.48, 1.24)	
Child responsibilities	0.96 (0.91, 1.01)		0.97 (0.92, 1.03)		0.96 (0.90, 1.01)		0.96 (0.91, 1.01)	
Parent deceased	0.88 (0.49, 1.56)		0.63 (0.34, 1.15)		0.86 (0.46, 1.58)		1.00 (0.55, 1.81)	
Household size	1.00 (0.93, 1.06)		1.01 (0.94, 1.08)		0.96 (0.90, 1.03)		0.99 (0.92, 1.05)	
Family income	1.02 (0.87, 1.19)		0.96 (0.81, 1.14)		0.91 (0.77, 1.07)		0.88 (0.76, 1.03)	
Caregiver working	1.00 (0.61, 1.65)		0.90 (0.53, 1.52)		0.83 (0.49, 1.42)		0.91 (0.56, 1.49)	
Household adult literacy	1.03 (0.89, 1.18)		1.10 (0.95, 1.28)		0.95 (0.82, 1.10)		1.03 (0.89, 1.18)	

Note. The PTSD, depression, externalising, and Low/High Symptom group columns represent four different samples, each based on matching the Low Symptom group to children above the PTSD, depression, externalising, or any single cut-off, respectively. Combined PTSD model: n = 588 (294 low/high symptom pairs), Nagelkerke $R^2 = 0.33$. Combined depression model: n = 492 (246 low/high symptom pairs), Nagelkerke $R^2 = 0.35$. Combined externalising model: n = 526 (263 low/high symptom pairs), Nagelkerke $R^2 = 0.23$. Combined Low/High Symptom group model: n = 590 (295 low/high symptom pairs), Nagelkerke $R^2 = 0.21$. Exp(B) = Odds Ratio, CI = Confidence Interval. Individual columns are results from models including only the main predictor and the covariates age, gender, and time since leaving Syria. Combined columns are results from the combined models including all individually significant predictors simultaneously. Numbers in bold are those that survived Benjamini-Hochberg correction for multiple testing. * $p < .05$ ** $p < .01$ *** $p < .001$

Table B2. Binary logistic regressions predicting low symptom group membership in individual and combined models: complete case data

	Low/High Symptom Group Exp(B) (95% CI)	
	Individual	Combined
<i>Individual traits and health</i>		
Optimism	1.07 (1.01, 1.14)*	1.08 (1.00, 1.17)
Self-efficacy	1.00 (0.96, 1.05)	
Self-esteem	1.50 (1.24, 1.82)***	1.19 (0.95, 1.48)
Child religiosity	1.00 (0.98, 1.03)	
Future aspirations	1.09 (0.94, 1.27)	
Future expectations	1.12 (0.95, 1.32)	
Future planning and motivation	1.14 (0.94, 1.37)	
Environmental sensitivity	0.73 (0.61, 0.87)***	0.84 (0.69, 1.03)
Problem-focused coping	0.92 (0.86, 0.98)*	0.93 (0.84, 1.03)
Cognitive restructuring coping	0.99 (0.93, 1.06)	
Distraction coping	0.97 (0.90, 1.04)	
Avoidance coping	0.91 (0.85, 0.97)**	0.96 (0.88, 1.05)
Support-seeking coping	0.95 (0.89, 1.00)	
Child general health	0.72 (0.58, 0.90)**	0.84 (0.66, 1.07)
<i>Parent-child relationship</i>		
Maternal acceptance	1.06 (1.01, 1.11)*	1.03 (0.97, 1.09)
Parental presence	0.97 (0.92, 1.01)	
Parental monitoring	1.03 (0.93, 1.13)	
Maternal psychological control	0.84 (0.77, 0.92)***	0.89 (0.80, 0.98)*
Parent-child conflict	0.96 (0.91, 1.02)	
Child maltreatment	0.96 (0.94, 0.98)***	0.98 (0.96, 1.00)
<i>Social environment</i>		
Perceived social support	1.23 (1.01, 1.50)*	0.99 (0.78, 1.25)
Bullying	0.96 (0.93, 0.99)**	0.99 (0.96, 1.03)
Loneliness/social isolation	0.83 (0.78, 0.89)***	0.88 (0.82, 0.95)***
Caregiver depression	0.94 (0.92, 0.97)***	0.99 (0.95, 1.03)
Caregiver PTSD	0.98 (0.97, 0.99)***	0.99 (0.98, 1.01)
Caregiver anxiety	0.94 (0.91, 0.97)***	0.98 (0.93, 1.03)
Caregiver general health	0.81 (0.68, 0.97)*	0.97 (0.78, 1.19)
<i>Wider environment</i>		
Human insecurity	0.94 (0.64, 1.39)	
Perceived refugee environment	0.91 (0.67, 1.25)	
Collective efficacy	1.01 (0.98, 1.03)	
Access to education	0.98 (0.81, 1.19)	
Parent abroad	0.72 (0.44, 1.20)	

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	Low/High Symptom Group Exp(B) (95% CI)	
	Individual	Combined
Child responsibilities	0.96 (0.91, 1.01)	
Parent deceased	1.00 (0.54, 1.85)	
Household size	0.98 (0.92, 1.05)	
Family income	0.91 (0.78, 1.06)	
Caregiver working	0.86 (0.51, 1.47)	
Household adult literacy	1.03 (0.89, 1.19)	

Note. N = 542 (271 low/high symptom pairs). Nagelkerke $R^2 = 0.20$. We only include the complete case results for our main analysis as a demonstration that imputation did not bias our findings; complete case results for all other analyses would add redundant information. Exp(B) = Odds Ratio, CI = Confidence Interval. Individual columns are results from models including only the main predictor and the covariates age, gender, and time since leaving Syria. Combined columns are results from the combined models including all individually significant predictors simultaneously. Numbers in bold are those that survived the Benjamini-Hochberg correction for multiple testing. * $p < .05$ ** $p < .01$ *** $p < .001$

Appendix B

Table B3. Multiple regression main effects in individual and combined regression models

	PTSD B (95% CI)		Depression B (95% CI)		Externalising B (95% CI)		Mental Health Composite B (95% CI)	
	Individual	Combined	Individual	Combined	Individual	Combined	Individual	Combined
<i>Individual traits and health</i>								
Optimism	-0.39 (-0.59, -0.20)***	-0.37 (-0.56, -0.18)***	-0.70 (-0.81, -0.59)***	-0.42 (-0.53, -0.31)***	-0.12 (-0.23, -0.02)*	0.09 (-0.03, 0.20)	-0.01 (-0.01, -0.01)***	-0.01 (-0.01, -0.00)***
Self-efficacy	0.15 (-0.02, 0.32)		-0.28 (-0.38, -0.19)***	-0.01 (-0.10, 0.09)	-0.13 (-0.22, -0.04)**	0.02 (-0.08, 0.11)	0.00 (-0.01, 0.00)**	0.00 (0.00, 0.00)
Self-esteem	-2.40 (-2.92, -1.88)***	-1.17 (-1.66, -0.68)***	-2.28 (-2.57, -1.99)***	-1.35 (-1.64, -1.06)***	-0.03 (-0.31, 0.25)		-0.04 (-0.05, -0.04)***	-0.02 (-0.03, -0.02)***
Child religiosity	0.24 (0.15, 0.33)***	0.14 (0.06, 0.22)**	-0.01 (-0.07, 0.04)		-0.09 (-0.14, -0.04)***	-0.06 (-0.11, -0.02)**	0.00 (0.00, 0.00)	
Future aspirations	0.22 (-0.31, 0.74)		0.03 (-0.27, 0.34)		0.07 (-0.20, 0.35)		0.00 (0.00, 0.01)	
Future expectations	0.11 (-0.48, 0.69)		-0.63 (-0.97, -0.29)***	-0.20 (-0.50, 0.10)	-0.07 (-0.38, 0.24)		-0.01 (-0.01, 0.00)*	
Future planning and motivation	1.31 (0.64, 1.98)***	0.47 (-0.14, 1.08)	-0.23 (-0.62, 0.17)		-0.14 (-0.50, 0.21)		0.01 (0.00, 0.01)	
Environmental sensitivity	2.50 (1.94, 3.07)***	1.36 (0.84, 1.89)***	1.08 (0.75, 1.41)***	1.04 (0.74, 1.35)***	0.01 (-0.29, 0.31)		0.03 (0.02, 0.03)***	0.02 (0.02, 0.03)***
Problem-focused coping	1.17 (0.95, 1.38)***	0.78 (0.51, 1.05)***	-0.11 (-0.24, 0.02)		-0.18 (-0.29, -0.06)**	0.02 (-0.12, 0.17)	0.01 (0.00, 0.01)***	0.00 (0.00, 0.01)**

Appendix B

	PTSD B (95% CI)		Depression B (95% CI)		Externalising B (95% CI)		Mental Health Composite B (95% CI)	
	Individual	Combined	Individual	Combined	Individual	Combined	Individual	Combined
Cognitive restructuring coping	0.28 (0.07, 0.50)*	-0.51 (-0.76, -0.27)***	-0.21 (-0.33, -0.08)**	0.07 (-0.05, 0.20)	-0.19 (-0.30, -0.08)**	-0.17 (-0.31, -0.03)*	0.00 (0.00, 0.00)	0.00 (-0.01, 0.00)**
Distraction coping	-0.07 (-0.33, 0.18)		-0.18 (-0.33, -0.03)*	-0.07 (-0.20, 0.07)	-0.01 (-0.15, 0.12)		0.00 (-0.01, 0.00)	
Avoidance coping	1.12 (0.91, 1.33)***	0.58 (0.32, 0.83)***	-0.06 (-0.19, 0.06)		-0.17 (-0.28, -0.05)**	-0.08 (-0.23, 0.06)	0.01 (0.00, 0.01)***	0.00 (0.00, 0.01)*
Support-seeking coping	0.72 (0.54, 0.91)***	0.17 (-0.03, 0.37)	0.01 (-0.10, 0.13)		-0.08 (-0.18, 0.02)		0.00 (0.00, 0.01)***	0.00 (0.00, 0.00)*
Child general health	1.39 (0.68, 2.10)***	0.86 (0.22, 1.49)**	1.21 (0.80, 1.63)***	0.71 (0.34, 1.08)***	0.64 (0.27, 1.01)**	0.23 (-0.13, 0.60)	0.03 (0.02, 0.04)***	0.02 (0.01, 0.02)***
<i>Parent-child relationship</i>								
Maternal acceptance	-0.19 (-0.34, -0.04)*	0.02 (-0.12, 0.16)	-0.31 (-0.39, -0.22)***	-0.02 (-0.10, 0.06)	-0.21 (-0.28, -0.13)***	-0.04 (-0.12, 0.04)	-0.01 (-0.01, 0.00)***	0.00 (0.00, 0.00)
Parental presence	0.09 (-0.06, 0.24)		-0.15 (-0.24, -0.06)**	-0.09 (-0.17, -0.01)*	0.03 (-0.05, 0.11)		0.00 (0.00, 0.00)	
Parental monitoring	0.03 (-0.27, 0.33)		-0.27 (-0.44, -0.09)**	-0.14 (-0.30, 0.01)	-0.31 (-0.46, -0.15)***	-0.18 (-0.33, -0.03)*	-0.01 (-0.01, 0.00)**	0.00 (-0.01, 0.00)**
Maternal psychological control	0.92 (0.70, 1.14)***	0.26 (0.03, 0.48)*	0.43 (0.29, 0.56)***	0.01 (-0.12, 0.14)	0.33 (0.21, 0.45)***	0.21 (0.08, 0.34)**	0.01 (0.01, 0.02)***	0.00 (0.00, 0.01)**

Appendix B

	PTSD B (95% CI)		Depression B (95% CI)		Externalising B (95% CI)		Mental Health Composite B (95% CI)	
	Individual	Combined	Individual	Combined	Individual	Combined	Individual	Combined
Parent-child conflict	0.67 (0.49, 0.85)***	0.17 (0.00, 0.34)*	0.29 (0.18, 0.40)***	0.03 (-0.06, 0.13)	0.20 (0.10, 0.30)***	0.08 (-0.02, 0.18)	0.01 (0.01, 0.01)***	0.00 (0.00, 0.00)*
Child maltreatment	0.31 (0.27, 0.36)***	0.17 (0.12, 0.22)***	0.14 (0.11, 0.17)***	0.07 (0.04, 0.10)***	0.07 (0.04, 0.09)***	0.03 (0.01, 0.06)*	0.00 (0.00, 0.00)***	0.00 (0.00, 0.00)***
<i>Social environment</i>								
Perceived social support	-0.29 (-0.93, 0.34)		-1.68 (-2.04, -1.32)***	-0.19 (-0.53, 0.15)	-0.45 (-0.78, -0.12)**	0.03 (-0.30, 0.37)	-0.02 (-0.03, -0.01)***	0.00 (-0.01, 0.01)
Bullying	0.42 (0.33, 0.51)***	0.11 (0.02, 0.20)*	0.19 (0.13, 0.24)***	0.03 (-0.02, 0.08)	0.00 (-0.05, 0.05)		0.00 (0.00, 0.01)***	0.00 (0.00, 0.00)
Loneliness/social isolation	0.80 (0.60, 0.99)***	0.40 (0.22, 0.59)***	0.77 (0.66, 0.89)***	0.40 (0.29, 0.51)***	0.19 (0.09, 0.30)***	0.03 (-0.08, 0.13)	0.02 (0.01, 0.02)***	0.01 (0.01, 0.01)***
Caregiver depression	0.20 (0.10, 0.29)***	0.10 (0.02, 0.18)*	0.18 (0.12, 0.23)***	-0.02 (-0.09, 0.04)	0.23 (0.18, 0.27)***	0.12 (0.06, 0.18)***	0.00 (0.00, 0.01)***	0.00 (0.00, 0.00)**
Caregiver PTSD	-0.02 (-0.05, 0.02)		0.07 (0.05, 0.09)***	0.04 (0.02, 0.06)**	0.10 (0.08, 0.11)***	0.06 (0.04, 0.08)***	0.00 (0.00, 0.00)***	0.00 (0.00, 0.00)**
Caregiver anxiety	0.07 (-0.04, 0.18)		0.22 (0.15, 0.28)***	0.06 (-0.02, 0.14)	0.22 (0.16, 0.27)***	0.01 (-0.06, 0.09)	0.00 (0.00, 0.01)***	0.00 (0.00, 0.00)
Caregiver general health	0.54 (-0.08, 1.17)		0.27 (-0.10, 0.63)		0.50 (0.17, 0.82)**	-0.05 (-0.38, 0.29)	0.01 (0.00, 0.02)**	0.00 (-0.01, 0.00)
<i>Wider environment</i>								
Human insecurity	0.27 (-1.18, 1.72)		1.63 (0.79, 2.47)***	0.62 (-0.16, 1.40)	0.47 (-0.29, 1.23)		0.02 (0.01, 0.04)**	0.00 (-0.02, 0.01)

Appendix B

	PTSD B (95% CI)		Depression B (95% CI)		Externalising B (95% CI)		Mental Health Composite B (95% CI)	
	Individual	Combined	Individual	Combined	Individual	Combined	Individual	Combined
Perceived refugee environment	0.20 (-1.03, 1.42)		-0.59 (-1.30, 0.12)		-0.49 (-1.13, 0.15)		-0.01 (-0.02, 0.01)	
Collective efficacy	0.04 (-0.05, 0.14)		-0.08 (-0.13, -0.03)**	-0.01 (-0.06, 0.03)	-0.07 (-0.11, -0.02)**	-0.03 (-0.07, 0.02)	0.00 (0.00, 0.00)	
Access to education	0.38 (-0.33, 1.09)		-0.55 (-0.96, -0.13)**	-0.45 (-0.81, -0.09)*	0.72 (0.35, 1.08)***	0.74 (0.38, 1.09)***	0.00 (-0.01, 0.01)	
Parent abroad	0.87 (-0.75, 2.50)		1.88 (0.94, 2.82)***	0.68 (-0.13, 1.49)	-0.37 (-1.22, 0.48)		0.02 (0.01, 0.04)*	0.01 (-0.01, 0.02)
Child responsibilities	0.16 (-0.02, 0.34)		0.03 (-0.07, 0.14)		0.05 (-0.05, 0.14)		0.00 (0.00, 0.00)	
Parent deceased	1.72 (-0.31, 3.75)		0.99 (-0.20, 2.17)		0.04 (-1.04, 1.11)		0.02 (0.00, 0.05)	
Household size	-0.06 (-0.29, 0.17)		-0.03 (-0.16, 0.10)		0.06 (-0.06, 0.18)		0.00 (0.00, 0.00)	
Family income	-0.75 (-1.30, -0.21)**	-0.60 (-1.07, -0.13)*	0.23 (-0.08, 0.55)		0.42 (0.13, 0.71)**	0.31 (0.03, 0.59)*	0.00 (-0.01, 0.01)	
Caregiver working	1.08 (-0.65, 2.80)		0.77 (-0.23, 1.78)		-0.01 (-0.91, 0.89)		0.02 (0.00, 0.04)	
Household adult literacy	-0.33 (-0.82, 0.16)		-0.34 (-0.62, -0.05)*	0.02 (-0.23, 0.28)	0.25 (-0.01, 0.50)		0.00 (-0.01, 0.00)	

Note. All models n = 1,528. Combined PTSD model: *adjusted R*² = 0.35. Combined depression model: *adjusted R*² = 0.35. Combined externalising model: *adjusted R*² = 0.19.

Combined mental health composite model: *adjusted R*² = 0.4. B = Unstandardised Coefficient, CI = Confidence Interval. Individual columns are results from models including only the main predictor and the covariates age, gender, and time since leaving Syria. Combined columns are results from the combined models including all individually significant predictors simultaneously. Numbers in bold are those that survived the Benjamini-Hochberg correction for multiple testing. * *p* < .05 ** *p* < .01 *** *p* < .001

Appendix C: Supplemental Information for Chapter 4

Table C1. Analyses of covariance: main results

Factor		Mental health group M(SD)				F	Adj. R Square	Post-hoc comparisons
		Stable High Symptom (SHS)	Deteriorating (D)	Improving (I)	Stable Low Symptom (SLS)			
Optimism	Baseline	8.82 (3.14)	9.65 (2.51)	9.5 (2.73)	9.87 (2.43)	9.71***	0.42	SHS < D / I / SLS
	Change	0.45 (4.21)	0.2 (3.93)	0.71 (3.66)	0.67 (3.27)	6.03**	0.40	SHS < I / SLS
Self-efficacy	Baseline	11.12 (3.46)	11.5 (3.45)	11.5 (3.58)	11.33 (3.44)	0.65		
	Change	0.91 (4.64)	0.52 (4.95)	0.51 (4.46)	1.3 (4.06)	1.20		
Self-esteem	Baseline	3.88 (1.27)	4.41 (0.64)	4.13 (1.04)	4.44 (0.69)	10.76***	0.47	SHS < D / I / SLS
	Change	0.1 (1.41)	-0.3 (1.04)	0.21 (1.15)	-0.07 (0.99)	5.86**	0.41	SHS / D < I / SLS
Environmental sensitivity	Baseline	5.1 (1.01)	4.76 (0.98)	5.07 (1.05)	4.87 (0.93)	6.78***	0.52	I / SLS < SHS
	Change	-0.23 (1.34)	0.16 (1.31)	-0.56 (1.24)	-0.26 (1.21)	10.97***	0.50	I / SLS < SHS / D
Religiosity	Baseline	31.45 (6.37)	32.17 (6.6)	32.25 (6.7)	31.29 (5.98)	1.49		
	Change	2.28 (8.15)	2.11 (8.12)	1.86 (7.91)	2.81 (7.29)	0.17		
Future aspirations	Baseline	3.28 (1.08)	3.36 (0.99)	3.23 (1.09)	3.23 (1.14)	1.60		
	Change	0.09 (1.35)	0.02 (1.26)	-0.08 (1.44)	0.01 (1.38)	2.07		
Future expectations	Baseline	2.98 (1.04)	2.98 (0.98)	3.07 (0.97)	2.94 (0.99)	1.01		
	Change	0.16 (1.33)	0.01 (1.17)	-0.12 (1.32)	0.1 (1.15)	2.87		
Future planning	Baseline	3.03 (0.9)	3.05 (0.78)	3.01 (0.88)	2.94 (0.95)	2.01		
	Change	0.05 (1.19)	-0.08 (1.11)	-0.22 (1.22)	0.03 (1.19)	4.95**	0.40	I < SHS
Problem-focused coping	Baseline	7.91 (2.75)	7.31 (2.6)	8.08 (2.72)	6.97 (2.58)	1.73		
	Change	0.83 (3.71)	1.52 (3.79)	0.19 (3.69)	1.04 (3.46)	2.26		

Appendix C

Factor		Mental health group M(SD)				F	Adj. R Square	Post-hoc comparisons
		Stable High Symptom (SHS)	Deteriorating (D)	Improving (I)	Stable Low Symptom (SLS)			
Avoidant coping	Baseline	7.91 (2.75)	7.31 (2.6)	8.08 (2.72)	6.97 (2.58)	1.48		
	Change	0.27 (3.72)	1 (4.01)	-0.16 (3.86)	1.08 (3.42)	1.00		
Support seeking	Baseline	6.48 (3.06)	5.73 (2.71)	6.25 (2.94)	5.78 (2.89)	1.10		
	Change	0.42 (4.35)	1.13 (3.97)	0.56 (3.89)	1.17 (4.14)	0.06		
Distraction coping	Baseline	6.45 (2.3)	6.45 (2.19)	6.45 (2.29)	6.38 (1.88)	2.78		
	Change	-0.71 (3.16)	-1.16 (2.71)	-0.26 (3.11)	-0.06 (2.59)	6.20**	0.42	SHS / D < I / SLS
Positive cognitive restructuring	Baseline	8.18 (2.7)	8.36 (2.66)	8.51 (2.68)	7.9 (2.65)	2.92		
	Change	0.16 (3.93)	-0.23 (3.66)	0.39 (3.48)	0.59 (3.67)	2.32		
Child general health	Baseline	2.37 (0.82)	2.13 (0.91)	2.28 (0.79)	2.12 (0.73)	7.00***	0.47	I / SLS < SHS
	Change	-0.31 (1.01)	-0.08 (1.19)	-0.48 (0.94)	-0.35 (0.92)	7.45***	0.46	I / SLS < SHS / D
Maternal acceptance	Baseline	26.79 (4.4)	27.82 (3.18)	27.41 (3.66)	28.28 (2.61)	7.90***	0.34	SHS < D / I / SLS
	Change	0.24 (5.39)	-0.04 (4.09)	0.63 (4.54)	0.52 (3.54)	3.69*	0.32	SHS < I / SLS
Parental presence	Baseline	15.88 (3.83)	15.11 (3.89)	16.04 (3.93)	15.53 (3.72)	0.21		
	Change	-0.5 (5.36)	1.23 (5.5)	-0.6 (5.3)	0.56 (4.78)	1.78		
Parental monitoring	Baseline	13.88 (2.14)	14.23 (1.26)	14.1 (1.95)	14.21 (2.04)	3.02		
	Change	-0.01 (2.87)	0.05 (1.75)	0.27 (2.18)	0.01 (2.06)	2.52		
Maternal psychological control	Baseline	11.61 (2.86)	10.52 (1.5)	10.86 (2.05)	10.3 (1.65)	14.96***	0.49	D / I / SLS < SHS
	Change	-0.66 (3.29)	-0.31 (1.98)	-0.6 (2.21)	-0.13 (2.23)	4.68**	0.47	SHS < D / I / SLS
Parent-child conflict	Baseline	6.12 (3.25)	5.74 (2.97)	5.93 (3.29)	5.06 (2.33)	8.23***	0.37	SLS / I < SHS
	Change	1.72 (4.97)	1.34 (4.53)	0.53 (4.52)	1.09 (3.8)	9.10***	0.38	SLS < D I / SLS < SHS

Appendix C

Factor		Mental health group M(SD)				F	Adj. R Square	Post-hoc comparisons
		Stable High Symptom (SHS)	Deteriorating (D)	Improving (I)	Stable Low Symptom (SLS)			
Child maltreatment	Baseline	13.82 (13.52)	7.46 (8.27)	11.08 (11.81)	7.23 (8.21)	20.30***	0.50	I < SHS SLS < D < SHS
	Change	-3.09 (15.1)	1.41 (10.84)	-5.99 (13.63)	-3.3 (10.11)	17.13***	0.48	I / SLS < SHS / D
Perceived social support	Baseline	5.5 (0.97)	5.68 (0.8)	5.61 (0.81)	5.72 (0.76)	3.27*	0.37	SHS < D / I / SLS
	Change	0.13 (1.31)	0.22 (1.2)	0.19 (1.05)	0.13 (1.03)	2.40		
Bullying	Baseline	5.7 (6.83)	3.18 (5.31)	3.98 (5.79)	2.78 (4.54)	12.52***	0.50	D / I / SLS < SHS
	Change	-1.23 (7.93)	0.58 (6.68)	-1.94 (7.09)	-0.82 (5.55)	8.03***	0.45	I < SHS / D SLS < SHS
Loneliness and social isolation	Baseline	8.72 (3.02)	7.02 (2.37)	8.23 (2.69)	7.01 (2.49)	23.77***	0.50	D < SHS SLS < I < SHS
	Change	-0.96 (4.12)	-0.19 (4.05)	-1.61 (3.78)	-0.88 (3.39)	12.65***	0.47	I < SHS SLS < D < SHS
Caregiver depression	Baseline	16.19 (6.35)	12.44 (6.33)	15.2 (6.33)	13.12 (6.43)	24.10***	0.36	SLS < I / D < SHS
	Change	-0.31 (7.87)	1.46 (7.71)	-4.52 (8.64)	-3.79 (8.26)	37.93***	0.36	I / SLS < SHS / D
Caregiver PTSD	Baseline	35.95 (17.33)	27.64 (14.62)	34.93 (17.9)	29.01 (18.25)	14.12***	0.47	SLS < D < SHS I < SHS
	Change	-8.08 (22.39)	-2.42 (20.7)	-17.75 (25.19)	-13.04 (21.22)	23.82***	0.45	I / SLS < SHS / D
Caregiver anxiety	Baseline	8.69 (5.39)	6.25 (4.83)	8.36 (5.34)	7.28 (5.36)	9.35***	0.43	D / I / SLS < SHS
	Change	-0.88 (6.58)	0.13 (5.72)	-3.08 (6.56)	-2.34 (6.89)	14.30***	0.41	I / SLS < SHS / D

Appendix C

Factor		Mental health group M(SD)				F	Adj. R Square	Post-hoc comparisons
		Stable High Symptom (SHS)	Deteriorating (D)	Improving (I)	Stable Low Symptom (SLS)			
Caregiver general health	Baseline	3.04 (0.9)	2.84 (0.97)	2.97 (0.92)	2.8 (0.93)	4.12*	0.37	I / SLS < SHS
	Change	-0.18 (1.06)	-0.07 (1.07)	-0.41 (1.06)	-0.09 (1.13)	6.00**	0.37	I < SHS / D SLS < I
Human insecurity	Baseline	3.7 (0.37)	3.64 (0.41)	3.67 (0.43)	3.7 (0.42)	5.08**	0.51	I < SHS
	Change	0.08 (0.47)	0.15 (0.51)	-0.02 (0.61)	-0.03 (0.6)	7.71***	0.51	I / SLS < SHS / D
Perceived refugee environment	Baseline	3.21 (0.51)	3.27 (0.53)	3.28 (0.5)	3.14 (0.51)	9.39***	0.46	SHS / D / SLS < I
	Change	0.03 (0.6)	0.04 (0.61)	0.21 (0.61)	0.29 (0.63)	15.64***	0.42	SHS / D < I / SLS
Collective efficacy	Baseline	31.9 (6.09)	33.04 (6.25)	32.63 (6.49)	32.72 (6.72)	2.07		
	Change	-0.78 (9.19)	-0.8 (10.22)	-0.13 (9.44)	-1.12 (10.58)	1.29		
Household size	Baseline	7.56 (2.51)	7.5 (2.33)	7.82 (2.42)	7.81 (2.46)	1.04		
	Change	-0.02 (2.06)	0.16 (1.97)	0.14 (2.22)	-0.02 (1.95)	0.81		
School attendance	Baseline	1.1 (0.85)	1.04 (0.89)	1.02 (0.88)	0.86 (0.86)	3.09		
	Change	-0.35 (0.85)	-0.29 (0.91)	-0.4 (0.84)	-0.2 (0.91)	1.34		
Parent abroad	Baseline	0.15 (0.36)	0.06 (0.24)	0.15 (0.36)	0.09 (0.29)	1.35		
	Change	-0.03 (0.37)	0.02 (0.32)	-0.01 (0.39)	0.01 (0.28)	0.14		
Child responsibilities	Baseline	4.41 (3.49)	3.62 (2.81)	4.22 (3.28)	4.18 (2.75)	1.97		
	Change	1.08 (4.09)	1.76 (3.91)	0.47 (4.11)	1.2 (4.06)	4.48**	0.36	I < SHS / D
Parent deceased	Baseline	0.08 (0.27)	0.09 (0.29)	0.08 (0.27)	0.04 (0.21)	0.29		
	Change	0.01 (0.21)	-0.02 (0.24)	0 (0.15)	0.01 (0.11)	0.38		
Caregiver employed	Baseline	1.88 (0.32)	1.89 (0.31)	1.88 (0.33)	1.92 (0.27)	0.90		
	Change	-0.08 (0.45)	-0.07 (0.41)	-0.02 (0.44)	-0.06 (0.46)	1.37		

Appendix C

Factor		Mental health group M(SD)				F	Adj. R Square	Post-hoc comparisons
		Stable High Symptom (SHS)	Deteriorating (D)	Improving (I)	Stable Low Symptom (SLS)			
Family income	Baseline	1.86 (1.08)	1.95 (1.05)	1.93 (1.11)	1.79 (1.04)	0.18		
	Change	0.12 (1.53)	0.06 (1.25)	0.05 (1.57)	0.25 (1.26)	0.14		
Adult literacy	Baseline	2.6 (1.17)	2.59 (1.15)	2.53 (1.16)	2.48 (1.17)	0.93		
	Change	0.14 (1.49)	-0.18 (1.35)	0.05 (1.3)	0.07 (1.55)	2.24		

Note. Table representing descriptive statistics and analyses of covariance (ANCOVAs) from all predictors using imputed data (N = 982). Child age, gender, time since leaving Syria, and war exposure were entered as covariates into all ANCOVAs. Baseline models controlled for change scores, and change models controlled for baseline scores. F statistic is based on test against null model including only covariates. Adjusted R Square is based on full model. Post-hoc comparisons are based on Tukey’s test. Means and SDs are unadjusted estimates, all other statistics are based on adjusted means according to the ANCOVA models. Higher scores on child and caregiver general health indicate worse health. P-values based on Benjamini-Hochberg correction for multiple testing (Benjamini & Hochberg, 1995). * p < .05, ** p < .01, *** p < .001

Table C2. Analyses of covariance: complete case results

Factor		Mental health group M(SD)				F	Adj. R Squared	Post-hoc comparisons
		Stable High Symptom (SHS)	Deteriorating (D)	Improving (I)	Stable Low Symptom (SLS)			
Optimism	Baseline	8.93 (2.97)	9.72 (2.51)	9.51 (2.76)	10.06 (2.18)	8.71***	0.41	SHS < I / SLS
	Change	0.37 (4.09)	0.04 (4.03)	0.79 (3.64)	0.46 (2.99)	6.07**	0.40	SHS < I / SLS
Self-efficacy	Baseline	11.13 (3.45)	11.61 (3.19)	11.53 (3.58)	11.22 (3.45)	0.41		
	Change	0.80 (4.54)	0.25 (4.98)	0.41 (4.47)	1.21 (4.22)	0.85		
Self-esteem	Baseline	3.87 (1.26)	4.42 (0.64)	4.08 (1.06)	4.44 (0.70)	9.24***	0.46	SHS < I / SLS

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Factor		Mental health group M(SD)				F	Adj. R Squared	Post-hoc comparisons
		Stable High Symptom (SHS)	Deteriorating (D)	Improving (I)	Stable Low Symptom (SLS)			
	Change	0.12 (1.40)	-0.33 (1.06)	0.26 (1.15)	-0.07 (1.00)	5.78**	0.41	SHS / D < I
Environmental sensitivity	Baseline	5.14 (1.01)	4.80 (0.95)	5.10 (1.04)	4.94 (0.86)	6.35**	0.50	I / SLS < SHS
	Change	-0.25 (1.30)	0.14 (1.25)	-0.57 (1.24)	-0.30 (1.09)	10.68***	0.49	I / SLS < D I < SHS
Religiosity	Baseline	31.59 (6.36)	32.24 (6.51)	32.07 (6.79)	31.62 (5.77)	0.87		
	Change	2.35 (8.17)	2.27 (8.05)	2.08 (7.93)	2.44 (7.22)	0.17		
Future aspirations	Baseline	3.32 (1.07)	3.47 (0.94)	3.25 (1.08)	3.28 (1.11)	1.58		
	Change	0.04 (1.35)	-0.07 (1.26)	-0.11 (1.44)	-0.04 (1.40)	1.60		
Future expectations	Baseline	2.99 (1.02)	3.06 (0.95)	3.07 (0.97)	2.96 (0.99)	0.60		
	Change	0.11 (1.32)	-0.06 (1.09)	-0.14 (1.33)	0.09 (1.16)	2.40		
Future planning	Baseline	3.06 (0.86)	3.10 (0.73)	3.03 (0.88)	2.97 (0.92)	2.82		
	Change	0.04 (1.13)	-0.10 (1.11)	-0.26 (1.24)	0.00 (1.16)	6.35**	0.39	I < SHS
Problem-focused coping	Baseline	7.71 (2.62)	7.15 (2.46)	7.85 (2.79)	7.07 (2.51)	1.21		
	Change	0.72 (3.59)	1.36 (3.67)	0.13 (3.74)	0.90 (3.37)	1.63		
Avoidant coping	Baseline	8.05 (2.69)	7.47 (2.48)	8.13 (2.70)	7.11 (2.48)	0.99		
	Change	0.08 (3.63)	0.82 (3.72)	-0.19 (3.88)	1.00 (3.33)	0.73		
Support seeking	Baseline	6.60 (3.08)	5.89 (2.79)	6.23 (2.96)	5.94 (2.90)	1.02		
	Change	0.36 (4.40)	1.18 (4.03)	0.44 (3.91)	1.24 (4.31)	0.64		
Distraction coping	Baseline	6.58 (2.28)	6.56 (2.14)	6.46 (2.29)	6.50 (1.69)	1.96		
	Change	-0.88 (3.11)	-1.25 (2.53)	-0.35 (3.15)	-0.09 (2.45)	5.48**	0.39	SHS / D < SLS D < I

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Factor		Mental health group M(SD)				F	Adj. R Squared	Post-hoc comparisons
		Stable High Symptom (SHS)	Deteriorating (D)	Improving (I)	Stable Low Symptom (SLS)			
Positive cognitive restructuring	Baseline	8.32 (2.61)	8.47 (2.55)	8.65 (2.65)	7.96 (2.49)	3.27*	0.40	SHS < I
	Change	-0.11 (3.80)	-0.36 (3.49)	0.26 (3.42)	0.72 (3.65)	3.29*	0.40	SHS < I
Child general health	Baseline	2.37 (0.83)	2.16 (0.92)	2.26 (0.78)	2.11 (0.75)	7.80***	0.47	I / SLS < SHS
	Change	-0.30 (1.04)	-0.09 (1.17)	-0.48 (0.90)	-0.33 (0.94)	7.95***	0.47	I / SLS < SHS I < D
Maternal acceptance	Baseline	26.96 (4.25)	27.96 (3.07)	27.58 (3.47)	28.33 (2.58)	6.91***	0.30	SHS < I / SLS
	Change	-0.02 (5.24)	-0.13 (4.29)	0.53 (4.35)	0.37 (3.56)	3.35*	0.29	SHS < I
Parental presence	Baseline	15.76 (3.93)	15.02 (3.89)	15.99 (4.02)	15.88 (3.49)	0.35		
	Change	-0.34 (5.42)	1.33 (5.30)	-0.52 (5.30)	0.12 (4.51)	1.19		
Parental monitoring	Baseline	14.02 (1.98)	14.29 (1.20)	14.13 (1.91)	14.28 (1.86)	1.85		
	Change	-0.06 (2.69)	-0.04 (1.71)	0.29 (2.13)	0.11 (1.84)	2.24		
Maternal psychological control	Baseline	11.62 (2.81)	10.53 (1.55)	10.92 (2.11)	10.26 (1.48)	12.91***	0.47	D / I / SLS < SHS
	Change	-0.69 (3.14)	-0.26 (2.01)	-0.67 (2.25)	-0.11 (2.16)	3.56*	0.45	I < SHS
Parent-child conflict	Baseline	6.14 (3.24)	5.87 (3.10)	5.93 (3.27)	5.13 (2.42)	8.32***	0.35	I / SLS < SHS SLS < D
	Change	1.84 (4.93)	1.33 (4.72)	0.58 (4.47)	0.74 (3.69)	9.83***	0.37	I / SLS < SHS
Child maltreatment	Baseline	13.65 (12.89)	7.45 (7.51)	11.16 (12.01)	7.47 (8.37)	20.74***	0.49	D / I / SLS < SHS
	Change	-2.55 (14.78)	1.92 (10.33)	-6.57 (12.27)	-3.24 (10.48)	21.10***	0.48	I / SLS < D / SHS
Perceived social support	Baseline	5.53 (0.93)	5.70 (0.74)	5.58 (0.80)	5.73 (0.72)	2.32		
	Change	0.08 (1.29)	0.20 (1.16)	0.18 (1.04)	0.08 (1.03)	2.25		
Bullying	Baseline	5.81 (6.91)	3.03 (4.99)	4.16 (5.80)	3.02 (4.68)	10.46***	0.50	D / I / SLS < SHS

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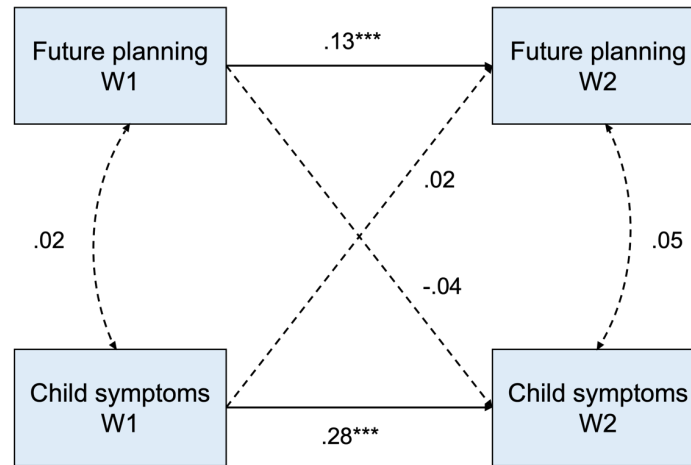
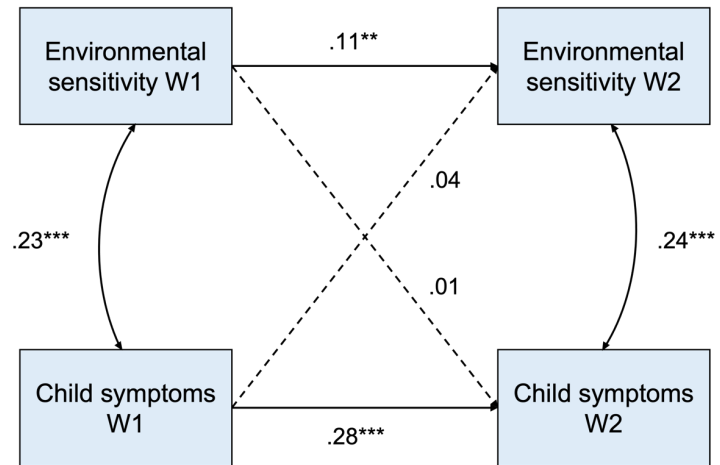
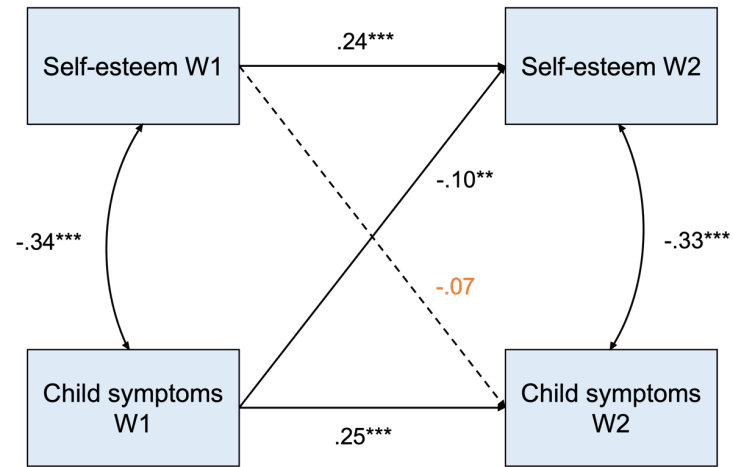
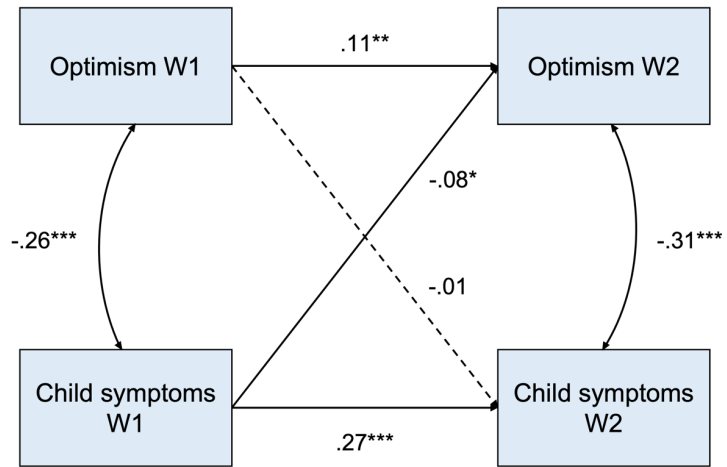
Factor		Mental health group M(SD)				F	Adj. R Squared	Post-hoc comparisons
		Stable High Symptom (SHS)	Deteriorating (D)	Improving (I)	Stable Low Symptom (SLS)			
	Change	-1.39 (7.88)	0.76 (6.72)	-2.15 (6.78)	-0.89 (5.81)	7.12***	0.45	I < D / SHS
Loneliness and social isolation	Baseline	8.74 (3.00)	7.06 (2.10)	8.29 (2.70)	6.71 (2.21)	24.29***	0.49	SLS < I < SHS D < SHS
	Change	-0.90 (4.10)	-0.20 (3.85)	-1.74 (3.82)	-0.50 (3.06)	12.32***	0.45	I / SLS < SHS
Caregiver depression	Baseline	15.96 (6.42)	12.60 (6.38)	14.90 (6.13)	12.89 (6.34)	21.24***	0.34	D / I / SLS < SHS
	Change	-0.09 (7.81)	1.31 (7.75)	-4.14 (8.39)	-3.89 (8.13)	33.33***	0.34	I / SLS < D / SHS
Caregiver PTSD	Baseline	35.40 (17.20)	28.12 (14.22)	33.56 (17.33)	28.25 (18.18)	14.58***	0.46	I / SLS < SHS
	Change	-7.56 (22.42)	-2.65 (20.47)	-16.60 (24.88)	-12.61 (21.47)	21.81***	0.44	I / SLS < D / SHS
Caregiver anxiety	Baseline	8.60 (5.36)	6.18 (4.84)	8.14 (5.30)	6.90 (5.23)	10.29***	0.43	D / I / SLS < SHS
	Change	-0.67 (6.59)	0.29 (5.52)	-2.88 (6.41)	-2.00 (6.97)	14.05***	0.41	I / SLS < SHS I < D
Caregiver general health	Baseline	3.04 (0.90)	2.88 (0.99)	2.97 (0.93)	2.74 (0.94)	4.21*	0.38	I < SHS
	Change	-0.18 (1.06)	-0.08 (1.06)	-0.43 (1.08)	-0.06 (1.14)	5.72**	0.39	I < SHS
Human insecurity	Baseline	3.70 (0.37)	3.64 (0.41)	3.66 (0.44)	3.70 (0.43)	5.40**	0.51	I < SHS
	Change	0.07 (0.47)	0.16 (0.53)	-0.02 (0.63)	-0.06 (0.61)	7.82***	0.51	I / SLS < D / SHS
Perceived refugee environment	Baseline	3.22 (0.52)	3.26 (0.53)	3.29 (0.50)	3.13 (0.51)	9.22***	0.47	SHS / D < I
	Change	0.01 (0.60)	0.06 (0.59)	0.20 (0.61)	0.31 (0.63)	15.14***	0.43	SHS / D < I SHS < SLS
Collective efficacy	Baseline	32.03 (6.12)	32.43 (5.92)	32.55 (6.38)	32.59 (6.92)	0.94		
	Change	-0.90 (9.17)	-0.30 (10.19)	-0.11 (9.38)	-0.91 (10.98)	1.00		
Household size	Baseline	7.51 (2.45)	7.58 (2.38)	7.88 (2.45)	7.76 (2.53)	1.47		

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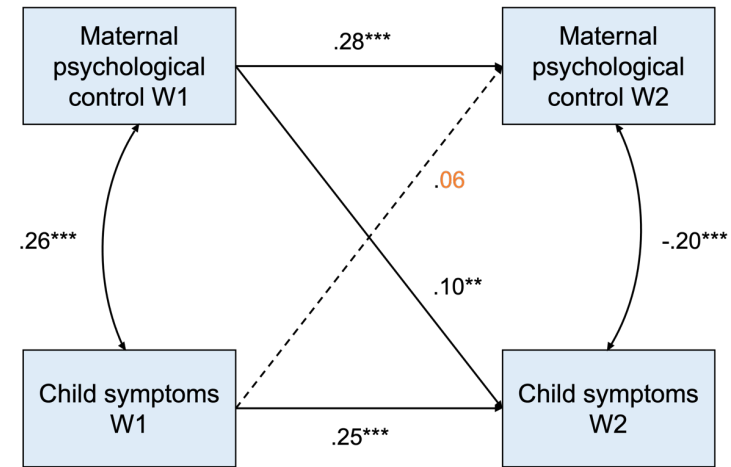
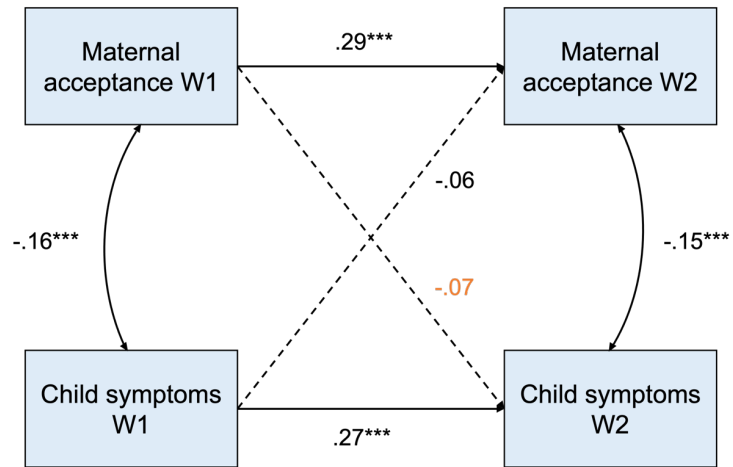
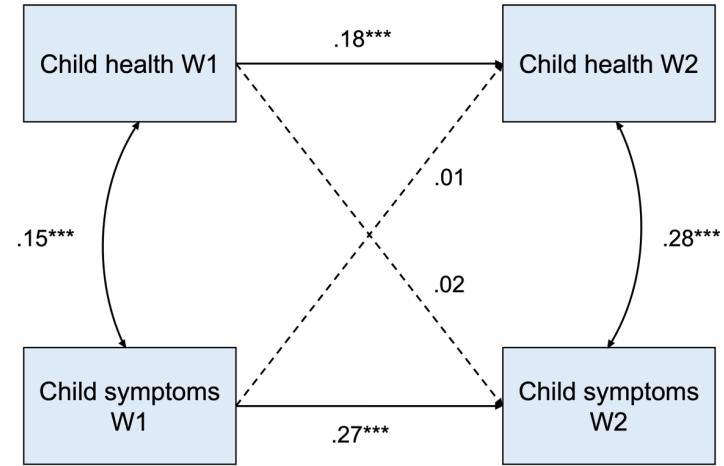
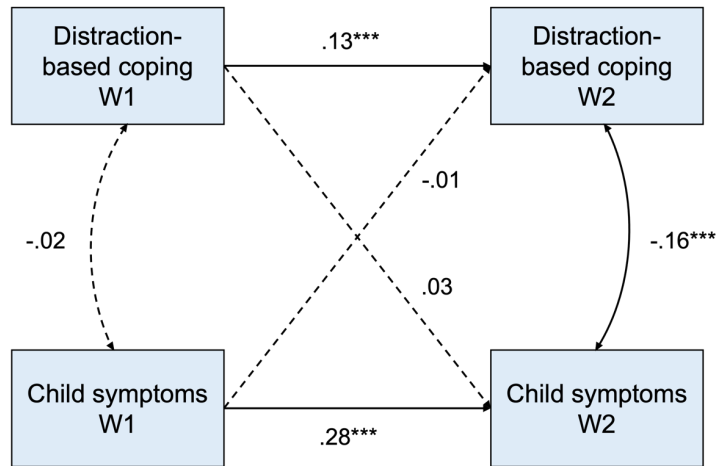
Factor		Mental health group M(SD)				F	Adj. R Squared	Post-hoc comparisons
		Stable High Symptom (SHS)	Deteriorating (D)	Improving (I)	Stable Low Symptom (SLS)			
	Change	-0.03 (2.07)	0.13 (1.99)	0.12 (2.29)	0.00 (2.03)	0.84		
School attendance	Baseline	1.12 (0.85)	1.04 (0.90)	1.04 (0.88)	0.87 (0.86)	3.38*	0.40	
	Change	-0.35 (0.86)	-0.29 (0.91)	-0.44 (0.83)	-0.18 (0.94)	2.20		
Parent abroad	Baseline	0.14 (0.35)	0.06 (0.23)	0.15 (0.35)	0.09 (0.28)	1.13		
	Change	-0.03 (0.36)	0.03 (0.32)	-0.01 (0.39)	0.00 (0.27)	0.41		
Child responsibilities	Baseline	4.41 (3.45)	3.60 (2.82)	4.26 (3.28)	4.18 (2.70)	1.83		
	Change	1.15 (4.06)	1.73 (3.83)	0.43 (3.93)	1.22 (3.95)	4.58**	0.35	I < D / SHS
Parent deceased	Baseline	0.09 (0.28)	0.07 (0.25)	0.08 (0.26)	0.05 (0.22)	0.24		
	Change	0.01 (0.21)	-0.01 (0.18)	0.00 (0.14)	0.01 (0.11)	0.37		
Caregiver employed	Baseline	1.88 (0.33)	1.89 (0.32)	1.88 (0.33)	1.93 (0.26)	0.77		
	Change	-0.08 (0.45)	-0.06 (0.41)	-0.03 (0.45)	-0.07 (0.47)	1.10		
Family income	Baseline	1.87 (1.07)	1.94 (1.07)	1.92 (1.09)	1.84 (1.07)	0.09		
	Change	0.09 (1.50)	0.09 (1.25)	0.06 (1.57)	0.21 (1.27)	0.13		
Adult literacy	Baseline	2.62 (1.17)	2.60 (1.16)	2.52 (1.15)	2.48 (1.19)	0.82		
	Change	0.05 (1.40)	-0.22 (1.36)	0.03 (1.31)	0.02 (1.53)	1.57		

Note. Table representing analyses of covariance from all predictors using complete case data (N = 861). Child age, gender, time since leaving Syria, and war exposure were entered as covariates into all ANCOVAs. Baseline models controlled for change scores, and change models controlled for baseline scores. F statistic is based on test against null model including only covariates. Adjusted R Square is based on full model. Post-hoc comparisons are based on Tukey’s test. Means and SDs are unadjusted estimates, all other statistics are based on adjusted means according to the ANCOVA models. Higher scores on child and caregiver general health indicate worse health. Post-hoc comparisons for the change scores depict relationships based on the actual change score (differentiating change in negative and positive directions), not relative amount of change. P-values based on Benjamini-Hochberg correction for multiple testing (Benjamini & Hochberg, 1995) * p < .05, ** p < .01, *** p < .00

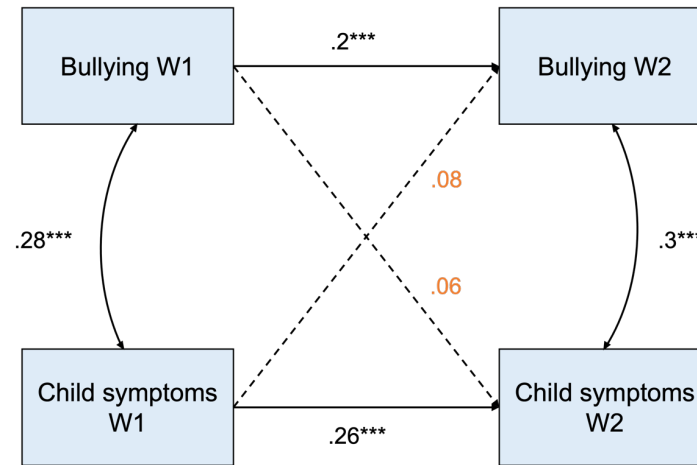
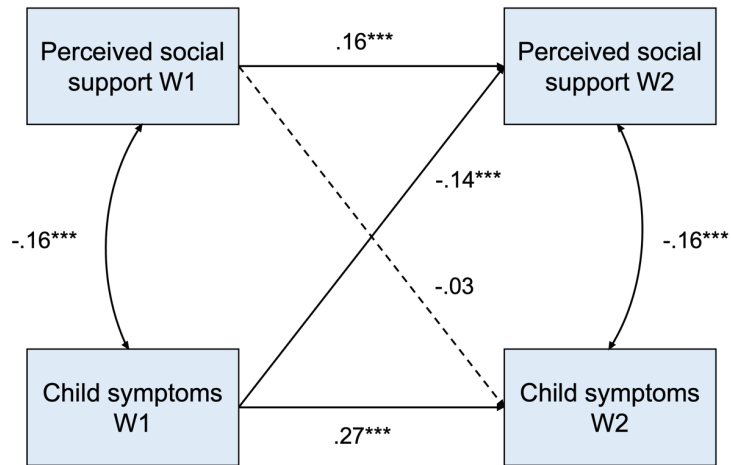
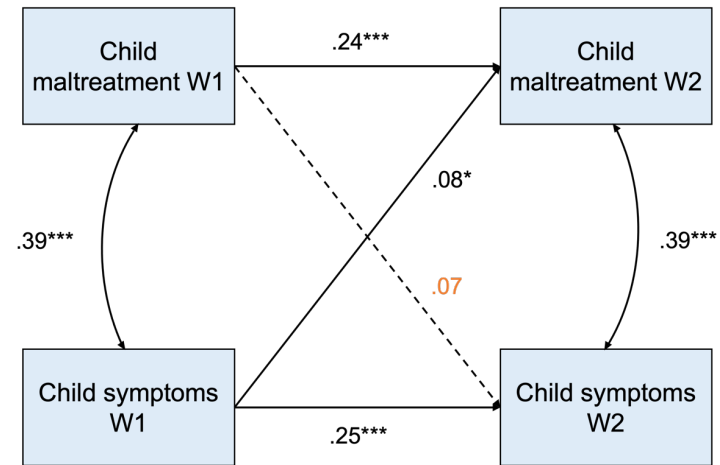
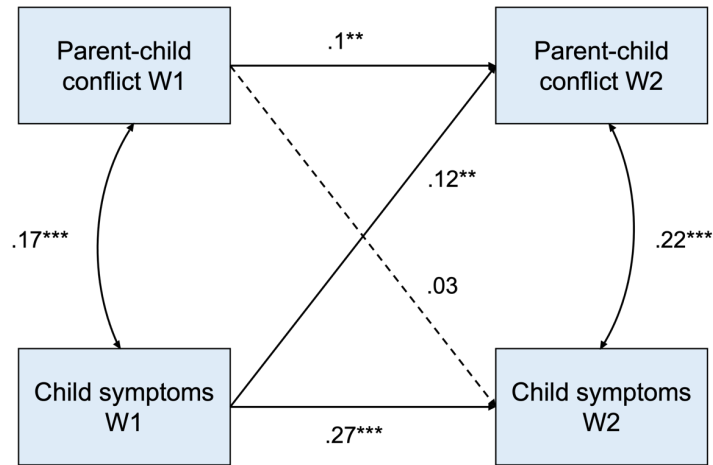
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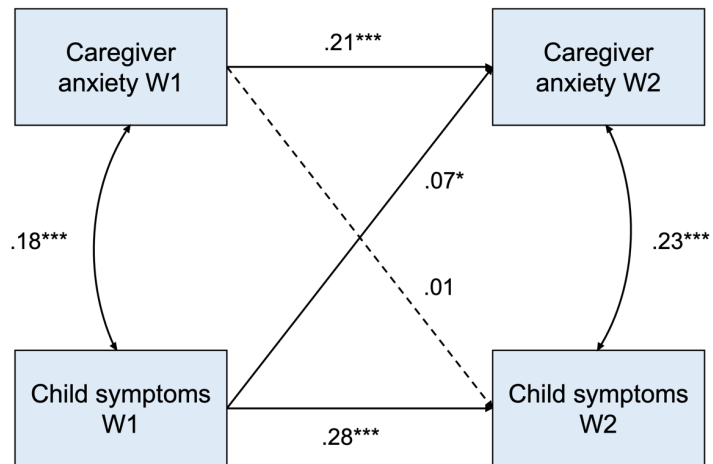
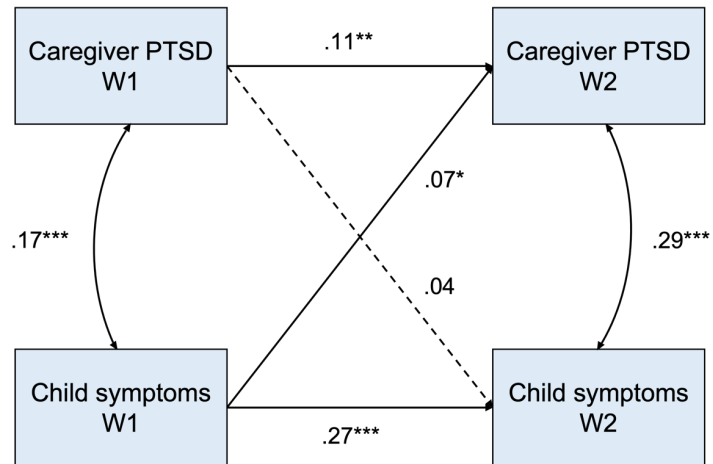
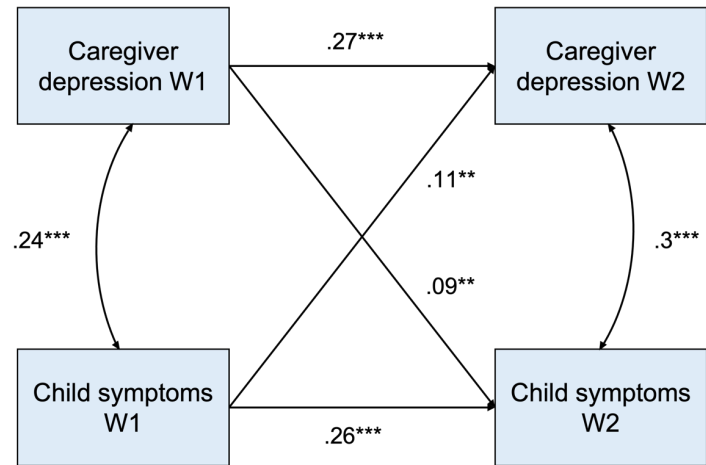
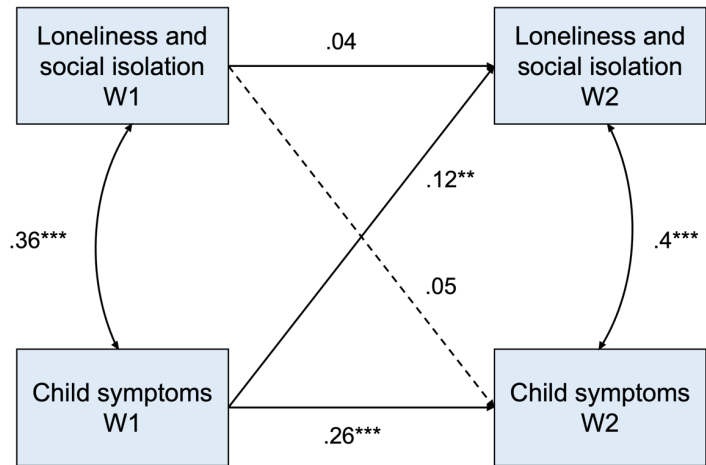
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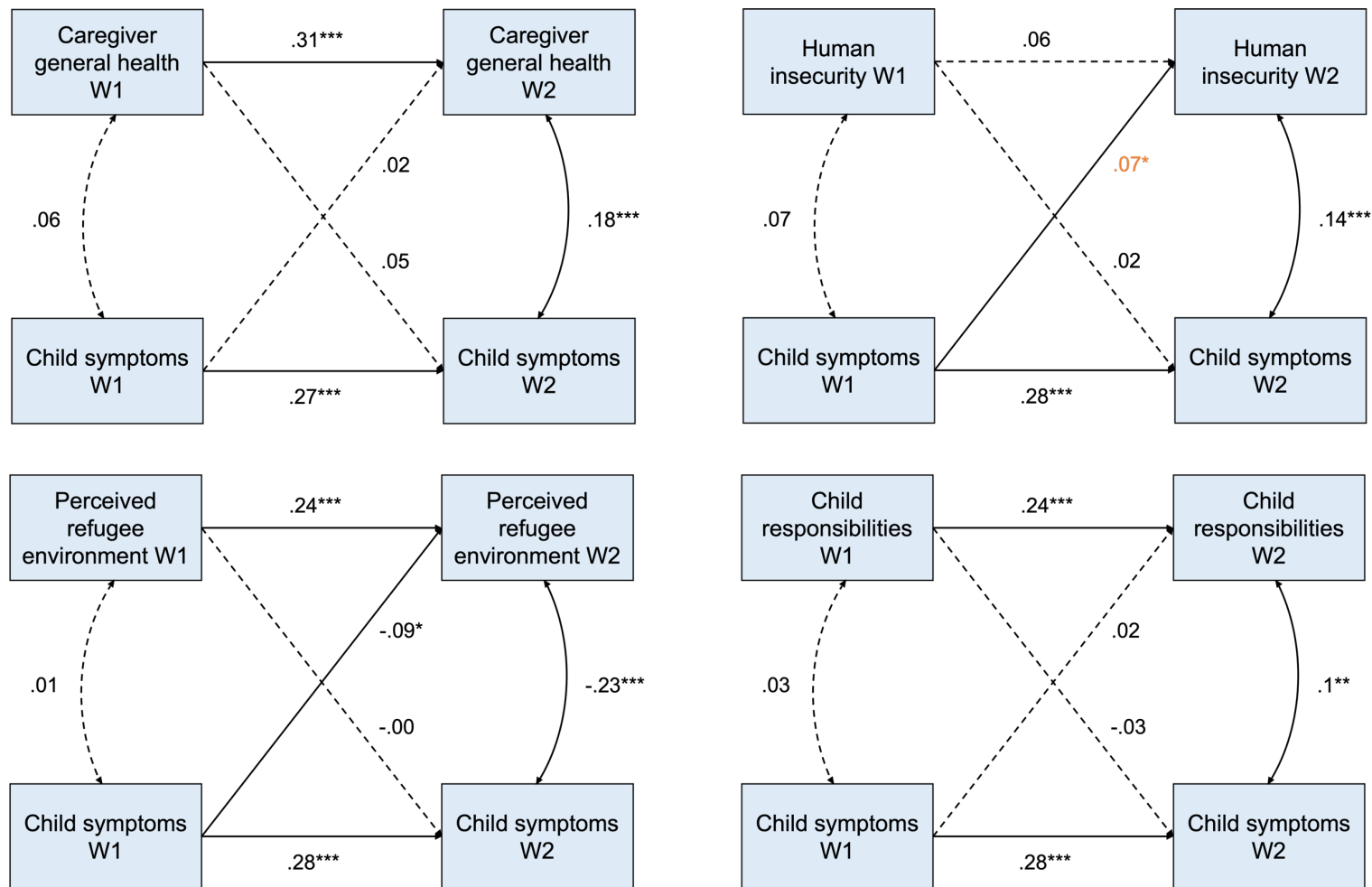


Figure C1. Cross-lagged panel models: complete case data. Pathways depict coefficients from cross-lagged panel models. Not shown are pathways controlling for the effects of child age, gender, time since leaving Syria, and war exposure, which were included as predictors for both predictor and child composite symptom score (depression, PTSD, and externalising) at both waves. Dashed pathways are non-significant. Coefficients in orange are pathways that were significant in the imputed data but not in this complete case analysis, or vice versa. * $p < .05$, ** $p < .01$, *** $p < .001$

Appendix D: Supplemental Information for Chapter 5

Table D1. Model fit progression

Models	Baseline					Follow-up					Notes
	$\chi^2 (p)$	CFI	RMSEA (90% CI)	SRMR	AIC	$\chi^2 (p)$	CFI	RMSEA (90% CI)	SRMR	AIC	
PTSD											
1. Parent-child relationship predictors included: maltreatment, psychological control, parent-child conflict, parental presence, supportive parenting	615.34 ($<.001$)	.91	.05 (.05, .06)	.04	110790.73	466.24 ($<.001$)	.89	.06 (.05, .06)	.05	67913.4	Association between PTSD and parental presence opposite direction to bivariate correlation at follow-up; parental presence and PTSD not correlated at baseline
2. Parental presence removed	559.29 ($<.001$)	.91	.05 (.05, .06)	.04	102909.53	419.76 ($<.001$)	.90	.05 (.05, .06)	.05	63162.83	Association between PTSD and supportive parenting opposite direction to bivariate correlation
3. Supportive parenting separated into acceptance and family support	540.63 ($<.001$)	.92	.05 (.05, .06)	.04	102902.87	390.52 ($<.001$)	.91	.05 (.05, .06)	.04	63145.60	Association between PTSD and acceptance opposite direction to baseline bivariate correlation; acceptance not correlated with PTSD at follow-up
4. Acceptance removed	520.20 ($<.001$)	.91	.05 (.05, .06)	.04	95134.99	374.23 ($<.001$)	.9	.06 (.05, .06)	.05	58505.3	Family support not correlated with PTSD at baseline
5. Family support removed	476.36 ($<.001$)	.92	.05 (.05, .06)	.04	91507.11	347.81 ($<.001$)	.9	.06 (.05, .06)	.05	56333.59	Final model

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Models	Baseline					Follow-up					Notes
	χ^2 (<i>p</i>)	CFI	RMSEA (90% CI)	SRMR	AIC	χ^2 (<i>p</i>)	CFI	RMSEA (90% CI)	SRMR	AIC	
Depression											
1. All parent-child relationship predictors included	638.80 (<i><.001</i>)	.91	.05 (.05, .05)	.04	115227.3	508.35 (<i><.001</i>)	.89	.06 (.05, .06)	.04	70317.09	Final model
Externalising											
1. Parent-child relationship predictors included: child maltreatment, psychological control, parent-child conflict, parental monitoring, supportive parenting	592.73 (<i><.001</i>)	.91	.05 (.05, .05)	.04	107076.70	453.45 (<i><.001</i>)	.90	.05 (.05, .06)	.04	65222.71	Association between physical environment and externalising opposite direction to bivariate correlation at follow-up; physical environment not correlated with externalising at baseline
2. Direct pathway from physical environment to externalising removed	599.52 (<i><.001</i>)	.91	.05 (.05, .05)	.04	107081.49	448.72 (<i><.001</i>)	.90	.05 (.05, .06)	.04	65512.64	Family support not correlated with externalising at follow-up
3. Family support removed	537.39 (<i><.001</i>)	.91	.05 (.05, .06)	.04	103573.81	388.11 (<i><.001</i>)	.91	.05 (.05, .06)	.04	63461.53	Final model

Note. All models also included physical and social environment and maternal mental health, in addition to war exposure, child age, child gender, and time since leaving Syria.