Getting through: Children's effective coping and adaptation in the context of the Canterbury, New Zealand, Earthquakes of 2010-2012

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Abstract

Children may experience distress and can become vulnerable as the result of a disaster. However, recent research suggests that children experiencing such adversity can address adversity by employing their capacities to adapt. The present study investigates how children coped effectively with a disaster, the Canterbury, New Zealand earthquakes of 2010-2102, and identifies strategies, processes, and resources that promoted effective coping and adaptation. Semi-structured interviews took place with 38 children from three different age groups, with 31 parents, and with 11 teachers and principals from five Canterbury schools. Children were interviewed twenty months after the first earthquake, during an ongoing aftershock sequence, and six selected children were interviewed again sixteen months later. Thematic analysis of interview data identified multiple, inter-connected coping strategies and resources in the children that were fundamental to their post-disaster adaptation. Children coping effectively employed a repertoire of diverse coping strategies in a flexible and pertinent manner. Three key strategies employed by the children were emotional regulation, positive reframing, and problem-solving. Sixteen months later, the children had shifted their focus away from coping with earthquakes to coping with everyday problems. It is expected that findings from this study will contribute to future interventions for promoting effective coping and adaptation by children.

Keywords: *Children, effective coping, adaptation, earthquake, disaster, Canterbury*

Disasters affect millions of children each year and represent particularly complex experiences that can disturb or compromise children's future development. Earthquake disasters arrive with no warning, so that children experience these as sudden, shocking events (Margolin, Ramos & Guran, 2010). Often, aftershock sequences can last for several years. With each successive earthquake, children's routines are disrupted and multiple support systems in the children's context can be negatively and progressively impacted. In the terms of ecological systems theory (Bronfenbrenner, 1992), this includes their micro-system of families, and exo-systems of community neighbourhoods and schools.

The context of the present study is the Canterbury, New Zealand earthquakes of 2010-2012. Two major earthquakes, of Mw 7.1 in September 2010, and Mw 6.3 in February 2011, and over 10,000 aftershocks produced significant physical, social, and economic impacts on the region (Potter, Becker, Johnston & Rossiter, 2015), and particularly on the city of Christchurch. Psychosocial repercussions of such disasters can be of long duration (Ghuman, Brackbill, Stellman, Farfel & Cone, 2014; Goenjian et al., 2011). The long duration of these repercussions, coupled with a need to cope with the consequences of aftershocks as well as demands and challenges that change over time, makes understanding children's effective coping and adaptation particularly important. The need for such work can also be traced to a lack of existing research in this area.

Historically, most research on children's disaster experiences stems from investigation of children who have manifested trauma symptoms, so less is known about how and why some children respond effectively (Bonanno, Brewin, Kaniasty & La Greca, 2010).

However, children's reactions are diverse; not all children are traumatised or overwhelmed by their disaster experience (La Greca et al., 2013). Recent research on children's adaptation in disasters is comparable with work on adult populations and suggests that most children experience adaptive outcomes (Kronenberg et al., 2010) and that children will cope effectively with the experience, given support and time (Osofsky & Osofsky, 2013). That is, they can function at an age appropriate level (Masten & Obradovic, 2008).

When facing a disaster, children experience variable levels of distress and there is a need to react in some way by mobilising coping processes (Folkman & Moskowitz, 2004). Coping in these contexts has been generally defined to encompass a myriad of thoughts and behaviours individuals use to deal with stressful experiences (Skinner, Edge, Altman, & Sherwood, 2003). Coping strategies and the way children use their strategies appear to be core processes that underpin a pathway of adaptation (Compas, Connor-Smith, Saltzman, Thomen, & Wadsworth, 2001), although some strategies may hamper a child's recovery (Lack & Sullivan, 2008).

In contrast with their adult counterparts, where coping strategies may comprise a more established repertoire, coping in children is thought to change across different developmental phases (Zimmer-Gembeck & Skinner, 2011), and may evolve over the course of a disaster. However, an integrated picture of children's coping experience in disasters is still in progress (Pfefferbaum et al., 2013). Furthermore, the way that much research has focused on maladjustment rather than positive functioning means that certain processes for effective coping in the face of adversity may have been missed (Taylor & Stanton, 2007).

Very little is known about the underlying processes used by children who experience adversity and yet demonstrate positive adaptive outcomes (Cicchetti, 2013; Masten & Narayan, 2012). Questions remain about *how* children cope effectively with disaster and disaster consequences (Jensen, Ellestad & Dyb, 2013). As opposed to assessing scores on established measures of coping, there are gaps in our understanding of how children perceive their own experiences, their vulnerabilities and capacities (Peek, 2008). One answer to understanding how children experience a disaster is with the children themselves. Talking to children about their experiences of a disaster is a valid investigative approach and prior research suggests that children are accurate reporters of their own experiences (Balaban, 2006). Being able to use children's knowledge to understand coping and adaptation is especially important in the context of complex, prolonged disaster recovery settings and, ultimately, for the design of future interventions to promote effective coping.

To understand children's experiences and the consequences for their well-being, the question then shifts to consider how to investigate children's coping. Considering the paucity of research into just how disasters are understood and experienced by children (Gibbs, Mutch, Connor & Macdougall, 2013), there is a large scope to contribute to research by gathering rich, contextual data about effective coping strategies by talking to the children themselves.

Method

Aim

The present study aims to investigate children's effective coping experience from the children's own perspective. Note that children within this study are defined, according to the United Nations Convention on the Rights of the Child (UNCRC), as persons aged 18 and younger.

Theoretical perspective

A descriptive phenomenological framework is a pertinent approach for investigating children's own experience of coping. This approach enables exploration of the way complex meaning is built out of simple units of subjective experience (Merriam, 2002), and allows a phenomenon to be understood in depth (Camic, Rhodes & Yardley, 2003). Phenomenological methodology enables investigation of children's multiple perspectives and contexts that exist in their experience of living in a particular social context (Kvale & Brinkman, 2009).

Participants and procedure

Following ethics approval by the Massey University Human Ethics Committee, 12 schools in Christchurch were initially sent information sheets and invited to participate in the study. The 12 schools were purposively sampled in various geographical areas of Christchurch that would provide an overview of the impact of the earthquakes on children across the city. Ultimately, principals of five schools consented to their school taking part in the study. These schools comprised three primary and two secondary schools covering north,

south, west and east locations. Invitations to participate, information sheets and consent forms were then sent to teachers nominated by their principal on the basis that these teachers were particularly articulate and willing to participate in the study. Consenting teachers then sent information sheets. Consent forms were sent home to all parents of the teachers' students.

Five children were randomly selected for interviewing from the lists of consenting parents and children. Table 1 shows a detailed list of all participants. The random selection of consenting children was carried out to include students with a variety of experiences (O'Reilly & Parker, 2012; Patton, 2002). In total, 32 children were interviewed to obtain adequate in-depth data on coping, and to investigate a wide range of children's perspectives. The study was conducted with 5, 9 and 15 year-old age groups, to understand how coping might differ across age.

Five principals and six teachers were also interviewed regarding their perceptions of how the children were coping following the earthquakes, and thirty-one parents were interviewed regarding their perceptions of how their children were coping. Parents, principals and teachers were interviewed so data could be obtained from multiple sources about the children's coping and to help understand the school and community environment in which the children were situated. The interviews of children, parents, principals and teachers were conducted 20 months after the first earthquake (Time 1) at a time of ongoing aftershocks.

For a preliminary investigation of change in coping over time, six children were purposively selected to be interviewed for a second time (Time 2), sixteen months after the Time 1 interviews and 36 months after the first earthquake, when aftershocks were more-widely spaced. In order to maximise rich data collection, the six children were selected from all age groups in the study. The six children had been articulate in describing their experience within Time 1 data collection and they had demonstrated a range of coping skills. For example, at Time 1, some had reported effective coping, whereas others were still exhibiting post-earthquake distress symptoms such as hair loss and avoidance of public places such as malls and cinemas. Principals, teachers and parents were not interviewed again at Time 2.

Table 1
Participants

Age Group	**Time 1:** July 2012	**Time 2:** November 2013
Year 0: 5years-olds 1 class	7 children (4 boys, 3 girls) 6 parents 1 teacher	1 child
Year Five: 9/10 year-olds 3 classes	15 children (9 boys, 6 girls) 15 parents 3 teachers 3 principals	3 children
Year Eleven: 15/16 year-olds 2 classes	10 children (3 boys, 7 girls) 10 parents 2 teachers 2 principals	2 children
Totals	32 children 31 parents 6 teachers 5 principals	6 children

Interview protocol and procedure

Before the study began, an interview protocol was developed for each age group before being reviewed by an experienced family therapist and an early childhood educator. The protocol was then tested in a small pilot study, following which slight changes were made to clarify wording.

Semi-structured interviews took place in the children's homes, for the five year-olds and some of the nine year-olds, or in their school context. The five and nine year-old children were given the option of drawing and the interview often started from a discussion about the drawings produced.

After briefly explaining to the children that the researcher was interested in hearing about their experiences over the last months, a broad question of "How has it been for you?" was followed by the questions, "What has been the most difficult/tricky thing you've had to deal with?" and, "What seemed to work best that allowed you to deal with that?" These questions were followed by potential prompts such as, "What would you say to a group of people your age that would help them if they had a difficult situation to deal with or manage?" Although earthquakes were not specifically mentioned, the children knew the interviewer was interested in their experiences during a period of multiple earthquakes. All children, except one dealing with major illness in the family, referred to earthquakes as their most difficult recent experience.

Parents were asked: "When your child/adolescent has to deal with some difficulty, how does he/she cope?"; "What works best for them?"; "What doesn't seem to help?"; "How do you deal with a situation?".

Teachers and principals responded to these broad questions: "How is the class faring?"; "For children coping the best, what have you noticed that makes you think that about them?"; "For children coping less well, what have you noticed that makes you think that about them?"; "How has the situation been for you?".

Time 2 interviews, involving children only, provided data on how coping may change as children progressively negotiate the challenges and demands of a prolonged disaster recovery. Time 2 interviews opened with the question: "How are you getting on this last year?" followed by "What was difficult?" and "How did you deal with it?".

All interviews were conducted by the same researcher. Conversations were led by the interviewees, with the researcher guiding with key questions as required. Although parents had consented to their children participating in the study, additional verbal consent was obtained from each child at the time of their interview. For confidentiality, transcripts included pseudonyms for all child participants.

Analysis

The approach to data analysis in the present study was taken from phenomenological methodology developed by Giorgi (2000b; 2012) and Giorgi and Giorgi (2003), and from Braun and Clarke's (2006; 2014) approach to thematic analysis.

Interviews were recorded and verbatim transcripts were loaded into ATLAS.ti (Version 7.0.89, 2013), which Friese (2012) describes as data analysis software for computer-assisted qualitative analysis. The children's data were coded before parent, principal and teacher data so that the voices of the children were considered first. Systematic thematic analysis was conducted to identify initial categories related to the children's coping. At this stage of analysis, the focus was on understanding effective coping examples. However, ineffective coping examples were also identified because these were representative of some of the children's experiences and could help to understand how effective coping strategies operated.

Consistencies or inconsistencies between different participant data were also examined. For example, parents' interview data were cross referenced with the children's data. Cross-referencing of data can be "understood as a strategy that adds rigor, breadth, complexity, richness and depth to the inquiry" (Denzin and Lincoln, 2000, p. 5). Time 1 analysis was completed before Time 2 analysis was started so that temporal factors could be separated. Analyses were also subject to credibility checks by academic colleagues to obtain consensus and substantiate findings, as recommended by Braun & Clarke (2014).

After immersion in the whole data set, the initial coding was organised into meaningful clusters. From the clusters, a structural description was built up to identify and describe six major themes identified in the children's effective coping. Findings and discussion are presented under these six themes.

Findings and Discussion

For children, a disaster is a challenging context, yet the analysis identified that children are not always overwhelmed and are far from passive. Many of the children who reported coping effectively demonstrated awareness of the complexity of coping in such a context.

Six major coping themes were identified in children who appeared to cope effectively. With reference to the children's own words, these themes were:

- "Don't get worked up about it"
- "Working out what to do"
- "Everything's gonna be alright"
- "Are you ok?"
- "Go to someone"
- "Getting on", which in T2 evolved to, "Moving on".

"Don't get worked up about it": Emotional regulation

One of the major coping strategies that enabled the children to stay functional and use their capacities to respond, was to regulate or manage emotions engendered by the multiple earthquakes, for example:

> *And um, don't get worked up about it cause then it's just more scary.* (Lucas, 10 years)

Not all children reported coping with their emotions however. A minority of children continued to feel overwhelmed, like Ann:

> *We haven't had one in a long time… on Friday there was a [Mw] 5 I think. I was at school. I was just about to leave but then and it started shaking and some people were fine with it, didn't even feel it, and I was, I—I was just screaming out for Mum. I didn't know what to do.* (Ann, 9 years)

Ann continued to have only one strategy – to "scream", and was not able to function like the children who were now "fine with it". However, children coping effectively focused actively on strategies for keeping calm, for example:

> *Well, I've tried to keep calm… I don't really know how to explain it…Well, I take deep breaths.* (Alec, 10 years)

Bi-directional influences from the children's multiple relationships and contexts appeared to affect their capacities for emotional regulation, for example:

> *They [teachers] remain calm and that's good 'cause you almost see them as role models, and when they're calm, you feel you should be calm. And when you're calm, other people are calm.* (Neil, 15 years)

Due to the ongoing aftershocks, the children repeatedly tested out their ways of keeping their emotions to a manageable level. Many children reported learning over time to respond with more self-control to continuing aftershocks, for example:

> *I used to scream but now Dad said not to scream because it's ok, and it makes it a bit less scary… After the first few, you were gonna scream but then you had to think, it's not going to make it any better.* (Abby, 10 years)

During earthquakes, some of the children soothed themselves by using the cognitive coping strategy of "happy thoughts", moving towards a positive focus to reduce negative, and increase positive, emotions, for example:

> *I just think, 'oh these are just little ones, it'll be alright. Um, it can't hurt us.* (Sarah, 9 years)

Kevin reported visualising his pet to engender positive emotions:

> *Um, (pause) I just really think about positive thoughts [when there is an earthquake]…like I remember Angus [dog]. The first time I got him, he was so cute and I was really happy.* (Kevin, 10 years)

Interestingly, some of the youngest group, five year-olds, could use emergent cognitive coping strategies to engender positive emotions, for example:

> *I drawed a rainbow so that's the thinking I'm feeling in my head…just hide under a table and then I just get one of my friends to talk about something nice and den one of us, a friend and me just think of it after.* (Amelia, 5 years)

The above quotation is an example of how many of the younger children were able to demonstrate mixed coping strategies that sometimes showed emerging complex, sometimes more simple, variants as they dealt with stressors.

A few children were able to use humour as a strategy to regulate emotion, for example:

> *I make jokes about it all.* (Kevin, 10 years)

Practising humour, in the midst of stress and distress, requires a certain energy, cognitive prowess, and comic skill in finding a positive appraisal of the situation for self and others. Positive emotions created by these coping strategies may be *sustainers* that motivate and sustain children in their coping (Fredrickson, 2004). Research by Folkman (2008) has also suggested that experiencing positive emotions may be *breathers* by giving children some respite.

Many of the children reporting regulating emotions often in their lives could talk readily about how they felt. The children used multiple, inter-related processes for emotional regulation, consistent with coping research by Compas et al. (2001) and Folkman & Moskowitz (2004) which conceptualises strategies as processes using multiple dimensions and facets. Additionally, when the children were effective in coping with emotions, they could use other coping strategies, such as problem-solving, that appeared to have a positive accumulative effect.

"Working out what to do": Problem-solving

The children problem-solved around their difficulties. In the difficult disaster context, children were working out how to keep safe, for example:

> *You probably have to analyse the situation and then—'what's going on here?'—'Am I in any sort of danger?'…You think 'what do I do next'.* (Neil, 15 years)

Many were assisted by their competence in earthquake drills, learnt at school from a young age. This competence appeared to increase their sense of self-efficacy and agency, for example:

Well, we learned how to do um turtles[1] *at kindy [kindergarten], and that's just what we do at school.* (Craig, 5 years)

For some of the children, as a result of coping with and reflecting on their situation, they worked out priorities. Their perspectives on life appeared to alter, for example:

It's the little things that really count. You don't need power [electricity] or anything—as long as your family's safe. [My priorities] have really shifted. (Pippa, 15 years)

Working out new priorities in their changed context may have assisted the children to address their *new normal* (Mooney et al., 2011; Paton & Johnston, 2006) rather than going back to what was. Some children reported learning a greater appreciation of relationships, which is consistent with literature (Cryder, Kilmer, Tedeschi & Calhoun, 2006; van Wesel, Boeije, Alisic, & Drost, 2012) focusing on post-traumatic growth after adversity.

Many children learned to problem-solve around what they could change, for example:

You work out in life there are some things you've got no control over, but you can still affect your day to day basis from what happens… (Blake, 15 years)

Learning flexibility in trying to master what they could control, and leaving what they could not, appeared to enhance children's effective coping and positive adaptation. An interactive relationship between problem-solving and coping could have helped to regulate emotions as solutions were discovered, resulting in a shift of focus. Children's perception of their ability to problem-solve in the earthquake context also appeared to help them appraise present and future challenges in a positive manner.

"Everything's gonna be alright": Positive appraisal and reframing

The children's use of appraisal was consistent with the Lazarus and Folkman (1984) transactional model of coping, where appraisals of challenges as well as their capacities to respond are part of the coping process. Examples included:

I just think everything's gonna be alright. There's not going to be anything, you know, destructive. (Elise, 9 years)

It's kind of like a game...trying to put ah, um, a positive spin on the whole thing, 'cause if you always think of it negatively, it'll always be that big scary event that happened. (Neil, 15 years)

Children able to positively interpret their situation appeared to experience enhanced optimism and *benefit finding* (Tennen & Afleck, 2002). The latter term, benefit finding, is defined by Helgeson, Reynolds, and Tomich (2006, p. 798) as "the positive effects that result from a traumatic event". The children who used positive appraisal and reframing effectively were able to use this strategy in real-time to minimise perceived threat, for example:

You never know. It could be wee ones [aftershocks] after big ones. (Joshua, 5 years)

For the five-year-olds like Joshua, almost half of their lives had unfolded within a context of ongoing earthquakes and aftershocks. For the children, their acquired knowledge of earthquake sequences and a capacity to perceive positive aspects of a difficult context appeared to enable them to positively reframe an earthquake as an aftershock. Many of the children accommodated positively to their context, for example:

I'm not so bothered. It's kind of sick but it's become the normal thing. (Prue, 15 years)

Acceptance of a situation by reframing it as *normal*, when not linked with resignation or helplessness, has been found to be an effective coping strategy (Cardena, Dennis, Winkel & Skitka, 2005; Pine, Tarrant, Lyons & Leathem, 2015). Hannah comments on earthquakes and her capacity to accommodate them:

Like um, I used to be really scared of them but I'm kinda getting used to them now. They're not so bad. (Hannah, 15 years)

The coping strategy of reappraising self, situation and surroundings in a positive frame of reference may have enabled these children to feel less helpless as they redefined the situation, for example:

Now you can drive through town and see everything's getting better. (Pippa, 15 years)

Capacity for positive reappraisal and reframing has been linked to psychological adjustment (Compas et

1 Turtle is the name the young children give the action of *drop, cover and hold* which is the core of the earthquake drill designed for children by the NZ government agencies (MCDEM & Ministry of Education.

al., 2013) and well-being (Roelofs, Bögels & Arntz, 2011). The children who were able to appraise and reframe positively appeared to be coping effectively and adjusting to their situation. Psychological adjustment and positive appraisal may have also contributed to the children's broader consideration of the needs of other people.

"Are you ok?": Helping others

Repeated earthquakes and aftershocks appeared to give some children occasion to learn about helping others. Many children indicated an increase of empathy, for example:

> *I hadn't had something like that happen to me before. So I sort of learned how to look after everybody. (Elise, 9 years)*

Children in all age groups talked about how they could help others. Joshua reports how he would help a friend coming into the city:

> *Are you ok? Have you feeled an earthquake before? (Joshua, 5 years)*

As a strategy, taking care of others, especially during earthquakes was adaptive and had aspects of distraction as it allowed the children to focus on something other than their own fear or anxiety. This possibly diminished impact and increased a sense of self-efficacy. Helping others may also have increased children's social competency. Improved skills in understanding others may have included how to more accurately judge whom to approach for support and help. While learning to look after others, the children also appeared to take comfort in the security of knowing there was someone they could personally go to for support.

"Go to someone": Getting support

"Going to someone" appeared to have several aims: to obtain and use emotional support; to discuss solutions; and to feel safe and protected. Cody provided one example:

> *…I was just making sure I was with my parents the whole time… making sure I was with someone in my family so I could be safe. (Cody, 10 years)*

In terms of support-seeking, the present study was consistent with the literature where, in disasters, children seek out support and guidance from proximal and known adults (Jensen et al., 2013; Miller et al., 2012). Seeking support occurred in participants in all three age groups. It appeared that seeking out and being in the proximity of adults enabled children to reference adults' reactions, gave children reassurance, and may possibly have provided them with models of effective coping and coping assistance, for example coaching.

Many children mentioned qualities in the person from whom they sought support. For example, Joshua stated:

> *Tell my Mum and Dad - I can tell people I trust. (Joshua, 5 years)*

Research with adults (Fraley & Bonanno, 2004) and children (Gaffney, 2006; Osofsky & Chartrand, 2013) states that secure attachment facilitates the development of trust and social relationships. Children in the present study, who demonstrated secure attachment, appeared to have feelings of trust and assurance that caregivers would be available to them in time of need. They felt secure in employing the coping strategy of "going to someone". Seeking support often provided an external resource that may have contributed to the children being able to "get on".

"Getting on" and "moving on"

Much disaster research examines data from surveys taken soon after the event (Masten & Osofsky, 2010; Navarro et al., 2016) and longer term strategies around actively choosing to "get on" is rarely discussed in the disaster literature.

In the Time 1 interviews, children who appeared to be managing their situation effectively allowed themselves to project into a future not governed by earthquakes. They were "getting on", for example:

> *…some of them are ok. They're getting on—like me. (Connor, 10 years)*

> *You get better—three or four steps more and one step back, so you are getting further on. Going faster forward than you are back.* (Abby, 10 years)

Although the aftershock sequence was diminishing, the children deciding to "get on" did not appear to be passive. Instead, they were consciously focused on coping by getting on with their own life course.

By Time 2, the children reported "moving on", concentrating mainly on their future life, for example:

> *Forget about it eventually, move on…get on with your life.* (Elise, 10 years)

Amelia focused on new interests:

> *I've got a new life. I've got a life of singing.* (Amelia, 6 years)

Children in Time 2 interviews reported actively using their coping repertoires, practised during their recovery, for everyday challenges such as school work and relationship conflicts:

> *I think, like everyone felt a way of how to how deal with earthquakes, and that it was very stressful, and maybe they're applying that sub-consciously to other situations as a coping mechanism.* (Pippa, 15 years)

Concerning being able to move on, the current analysis suggests that facing a disaster may have enhanced coping abilities in some children, and may have accelerated coping skills. Nan provides one example:

> *I think it's kinda made me stronger in a way… [I] might be able to face up to more now.* (Nan, 15 years)

There is some evidence that in times of adversity, effective coping may promote children's self-beliefs in their ability to cope with present and future challenges (Seery, Holman & Silver, 2010). In this respect, the final point can be made by one of the children:

> *Because I know myself that I can get through big earthquakes then I could probably get through this [new challenge].* (Rachel, 9 years)

Conclusion

Findings demonstrated that it was not just the use of certain coping strategies that enabled effective coping. It was the *way* the children were able to employ these strategies that underpinned adaptation. Age appeared to influence the form of coping strategies employed but not the strategy as such, because children continue development throughout a disaster. Broad developmental and age related elements from the present study are mainly consistent with existing research on children's coping and development by Franks (2011) and Skinner et al. (2003). That is, the children demonstrated an increasingly complex use of coping strategies as their age and developmental capacities increased. They also used adaptive strategies that were similar to adult strategies but often in developmentally appropriate forms. For example, younger children using play to problem-solve how to react in earthquakes, older children using more cognitive strategies.

However, the current findings also suggest that coping skills in children experiencing a disaster may emerge at a younger age than is reported in previous studies. This was seen for example in five year-old Amelia's reported use of emergent cognitive forms, "the thinking I'm feeling in my head" to regulate her emotions during an earthquake. Younger children appeared to be more reliant on adult support, and referenced adult reactions to assist them in their coping. Interestingly, the exceptional nature of the challenge they were facing also appeared to encourage older children, from 15 to 16 years of age, to seek support from adults and to gauge danger by referencing adults' reactions, particularly reactions immediately following earthquakes. By Time 2, older children were reporting less referencing of adult reactions and more instances of seeking support from peers.

Coping strategies appeared inter-linked and complementary. This reinforced prior research, by Zalewski, Lengua, Wilson, Trancik and Bazinet (2011), who found children who are more effective with one coping strategy may also be more effective in their choice and use of other strategies. For example, children in the current research reported using multiple strategies of minimising, working out what to do, and focusing on "getting on" when facing an earthquake aftershock. When employed effectively, there was often a cumulative positive effect between strategies, for example between problem-solving and emotional regulation. This was consistent with coping research by Lazarus (2006) that found coping strategies can complement one another. The children's large coping repertoires appeared not to be indicative of distress, but rather enabled them to address the many challenges of an aftershock sequence that can, as in the Canterbury context, persist for years. This reflects a conclusion from Alisic, Boeije, Jongmans and Kleber (2011), that children with a bigger repertoire of coping strategies may have better recovery outcomes after potentially traumatic events.

Findings did suggest that it is too simplistic to divide coping categories into adaptive/effective or maladaptive/ineffective as such. This is consistent with research by Leipold and Greve (2009) that states it is important to understand both the context of using a strategy and the pertinence of choosing that strategy. For example, the children's use of disengagement and distraction by "taking my mind off it" could be adaptive in reducing distress, specifically when faced with uncontrollable

events such as earthquakes. This use of distraction may have given some respite, allowing the children to remain operational and able to use their other coping strategies.

The way that children used their coping repertoires appeared to have a major effect on their capacity to adapt following the disaster. For instance, a key element that emerged was *flexibility* in many children's choice of coping strategies, meaning that they employed a range of different strategies to better manage diverse challenges. This finding was consistent with Cheng (2003) who suggested that flexibility gives children more options in how they use their coping repertoire. Flexibility may have also increased the children's ability to engage in anticipatory coping, by working out how to deal with possible, future difficulties such as school examinations. However this additional conclusion remains tentative until more research is undertaken. Flexible use of coping strategies appeared to increase adaptive responding in many of the children, and may have promoted children's experiences of self-efficacy, agency, and optimism. For example, the children's experience of increased efficacy in using problem-solving or helping others may have had secondary benefits in helping the children experience a sense of control and increased agency over what could happen to them. It is therefore important to consider coping as a dynamic process over which children who cope effectively can exercise some control.

Not only could many children use their coping flexibly, they generally children chose strategies that were pertinent to the stressor and/or their needs. In other words, strategies were chosen that were adapted to the challenges or that responded to their needs at the time. For example, children reported problem-solving when they were able to influence the challenge, and sought support when they needed reassurance. In contrast, children who appeared to be struggling did not demonstrate flexibility or pertinence of choice, but reported the rigid use of a few coping strategies such as avoidance and withdrawal and demonstrated little capacity for emotional regulation. Maladaptive coping was also characterised by the persistent use of ineffective strategies. Children who appeared to be coping did not persist in using a strategy when it was not effective. For example, if a child was unsuccessful in trying to help someone else, he or she would sometimes change strategies and, "go to someone" or use distraction. This flexible and pertinent use of coping repertoires is consistent with research examining competence in coping with young adults, by Cheng and Cheung (2005) and Kashdan and Rottenberg (2010).

Children's coping skills appeared to be sustained over the period of the study. Children who were able to cope effectively at Time 1, 20 months following the first earthquake, reported being able to cope with new challenges at Time 2, 36 months after the first earthquake. This finding was comparable to rare precedents, where longitudinal research on competence and effective adaptation following adversity suggest there is a substantial continuity of adaptive functioning over time (Masten & Tellegen, 2012).

There was not a particular repertoire or combination of coping strategies that predicted adequate adaptation in the current participant sample. Rather, a range of repertoires was identified among children who appeared to be coping effectively. These different repertoires may have been a result of: the children facing dissimilar disaster challenges, for example: extensive or minimal house damage; appraising events differently; having divergent capacities; or variable access to nearby resources, for example parent and teacher support. This highlights the potential to extend understandings of how event characteristics, coping repertoires, individual perspectives, family, and school contexts interact in contingent and dynamic ways in future research.

Although children are a potentially vulnerable group in a disaster, children in the present study were articulate and active participants in "getting through" the earthquakes and consequences. Their capacities to cope effectively appeared to reflect core processes in adaptive functioning post-disaster, identified in limited prior research. The present study contributes to understanding strategies children can use to cope effectively with disasters, where effective coping has been demonstrated by age appropriate functioning and a reported sense of well-being. The current findings suggest that children can learn effective coping and would likely benefit from interventions that support and coach effective coping strategies. Generalisations from this study should nonetheless be made with caution, because findings are nested in a specific culture and disaster context. Future research will benefit from focusing on how children cope with different types of adversities and in different cultural contexts.

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