



Hazelwood Health Study

Schools Study

Report of Round 2 Qualitative Findings

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Caveat

This report presents a preliminary analysis which has not been submitted to independent peer review. Subsequent academic manuscripts which undergo independent peer review may vary in their findings or interpretation.

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1. Executive summary

Background

This study is in response to expressed community concerns regarding the psychological impacts of the 2014 Hazelwood mine fire on children who were living and schooling in the vicinity. This is a longitudinal study to collect information at two yearly intervals from students in academic years 3, 5, 7, and 9 (in line with the National Assessment Program [NAPLAN] school years). The Hazelwood Schools Study (reported here as the Schools Study) is part of the broader Hazelwood Health Study, which has been commissioned by the Department of Health and Human Services to address the concerns of the community regarding the impacts of the smoke event.

Study aims and methodology

The Schools Study is assessing whether higher exposure to the smoke event is associated with greater trauma and distress amongst school-aged children. The study uses a mixed methods approach, including a quantitative survey to identify the psychological impacts of exposure to the smoke event with more detail explored via qualitative interviews. This report is focused on the qualitative interview component of the research. The protocols and rationale for the semi-structured interviews were designed to elicit further perceptions from children and adolescents in 2017 regarding the experiences and impacts of the mine fire, and specifically to address the following core questions.

- What, if anything, do children recall of the smoke event?
- What effect, do the students remember on themselves, their family, friends or others, and are these perceived as ongoing?
- What, if any, of the core symptoms characteristic of Posttraumatic Stress Disorder (PTSD) do the children report, namely intrusive thoughts, avoidance behaviours, and hyperarousal?
- What did students say helped them to cope at the time and what could be done to help respond to future events?

The data were collected from 46 primary and secondary school students from 22 November to 8 December 2017. A number of ethical approvals were sought and obtained, including from the Monash University Human Research Ethics Committee, Victorian Department of Education and Training, and Catholic Education Office of Sale.

The interview data were de-identified, coded and thematically analysed into two distinct groupings: 'remembering the fire/smoke/ash event' (*remembering the event*) and 'current aspects relating to the fire/smoke/ash event' (*current aspects*). This separation was done utilising specific interview trigger questions posed to participants. With further analysis and consolidation, *remembering the event* provided six emergent themes, while *current aspects* provided seven themes for discussion.

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The resultant thematic mapping was then triangulated to ensure validity, dependability and completeness of the findings. This was achieved by listening to the transcripts, and then comparing them to the notes and subsequent themes to accurately represent the experiences of participants

Key findings from the qualitative analysis of the interview data.

Remembering the event:

- Participants reported mostly negative experiences regarding the smoke (and associated fire) though some positive aspects were also reported, including making new friends, and going on outings and excursions.
- Participants reported being relocated from the area, including school relocation and field trips, together with disruption to normal daily routines, and having to catch buses to and from their new sites.
- Experiences of anxiety and stress resulting from the smoke and fire were proffered by some participants. Students reported that the relocation of schools and the need for being kept safe/inside resulted in feelings of confinement, both at home and school.
- Difficulty breathing, becoming sick, and having to wear masks and sunglasses, making it hard to breathe, speak and see, were reported as impacting on participant's health status.
- The positive support of family, including grandparents, was reported to be reassuring for participants, along with the communication of friends and school teaching staff about what was happening.
- The limitations the event imposed upon the normality/regularity of playing freely outside, playing sport and outdoor activities, impacted on many student's thoughts.

Though the participating students were young at the time of the mine fires (2014), they have a clear recall of their experiences of the event, including remembering the anxieties and stressors that occurred, and how it impacted their families, friendships and schooling.

Current aspects:

While the majority of the participants reported little to no ongoing concerns, some did express current concerns, as evidenced by the following themes that emerged from the data.

- The necessity to 'move on' concerning the smoke and fire; not wishing to remember it was apparent.
- The ongoing emotional responses when smoke or fire is evident in the area or on the news.
- Altered sleeping patterns; not sleeping well was reported by a few participants.
- Impacts on eating, with most reporting minimal alteration.
- Some minor changes to irritability.

- It was also evident in interviews that some of the above ongoing concerns (e.g. sleep, irritability) may be age-related (e.g. entering puberty)

As well as reporting some negative impacts, students also made positive comments including:

- The lack of smoke or falling ash in comparison to the time of the fire, meaning there was now less stress and anxiety within their families.
- Trust, better preparation and informed communication were suggestions for any future events of this nature.

Current aspects generally re-iterated the *remembered themes*, such as trying to avoid thinking about the event. Triggers, that participants said rekindled memories they otherwise tried to avoid thinking about, included the smell of smoke, the smoke emanating from the Maryvale Paper Mill, and media reporting of anniversaries of the Hazelwood mine fire. There is also further evidence in the data relating to some participants still experiencing nightmares associated with running, falling into the mine, and drowning in water.

The majority of students had little to say when asked specifically whether things were now better or worse, perhaps due in part to the participant's age and limited life experiences.

Discussion

The four key questions from the interview schedule were used to structure the interpretation of the data, with participants making the following points:

1. ***What, if anything, do children recall of the smoke event?*** For most participants, their recall of the event was vivid and detailed. This included recollections on the experience of the fire and smoke; being anxious or scared; feeling sick and coughing; disruption of routines and relocation of home or school; some relief from sharing the experience with friends or family; and being confined to indoors or trips away from the smoke. Others provided less detail, with some saying that they preferred not to think about the event.
2. ***What effects do the students remember on themselves, their family, friends or others, and are these perceived as ongoing?*** When participants considered the effects of the event at the time, the negative emotions associated with the smoke, difficulty in breathing, and experiences of disruption and relocation were very evident for some participants. When considering the present, the need to move on was expressed. However, for some participant's, triggers, such as anniversaries, media reports, and smoke in the air, seemed to rekindle the trauma of the event.
3. ***What, if any, of the core symptoms characteristic of PTSD do the children report, namely intrusive thoughts, avoidance behaviours, and hyperarousal?*** It is apparent from the participant's narratives that a number were exhibiting some symptoms of PTSD, such as intrusive thoughts in dreams, avoidance of thoughts about the event and trying to

think of something different, and hyperarousal expressed in being more restless when sleeping now.

4. **What did students say helped them to cope at the time and what could be done to help respond to future events?** The support from a variety of sources including family, friends, and school personnel was recognised as being calming and having helped participants to cope throughout the event. Participants stated that drawing, watching TV, Lego, playing Xbox and having pets close by were cognitive distractors from the event.

Recommendations:

When considering possible improvements in responding to future events, the participants suggested the following:

- The provision of clearer communication with students from authorities, peer supports and others on the potential impacts of an event and what students can do to look after themselves and their families (including reassurance where appropriate).
- Encouraging resilience-building dialogue within families and between peers during and immediately following any future event.
- Better emergency planning for schools, including clearly mapped out relocation plans for schools, including where to go to maintain consistent schooling.

Improving communications and involving students in this manner should ensure that they are more aware and prepared than was the case during the Hazelwood event.

Given the ongoing impacts still being reported by some students, a comparison study of the data collected from round one and two would provide further insight into the effects of the event. There is also a need for further research to be conducted in order to comprehensively evaluate school children's perceptions of the fire event over a number of years.

2. Hazelwood Schools Study: Qualitative report

2.1 Introduction:

Australia is a country of extreme climatic conditions with bushfires becoming increasingly frequent (Intergovernmental Panel on Climate Change (IPCC), 2013). The conditions on 9 February 2014 were considered to be extreme, with two fires igniting in the Latrobe Valley. Embers from these fires are believed to have spotted into the Morwell open cut coal mine adjacent to the Hazelwood power station and the town of Morwell, leading to what became known as the Hazelwood mine fire (Teague, Catford, & Petering, 2014). The resultant coal mine fire burned continually for a protracted period of six weeks. The plumes of acrid smoke and falling ash impacted local residents, including those in nearby towns and smaller communities, depending on the day to day wind trajectory.

The 2014 Hazelwood mine fire was followed by community consultations held by the then Victorian Department of Health (now Health and Human Services). As a result of these consultations, the Hazelwood Health Study (HHS) was established with a series of research streams in line with the core questions arising from the community consultation. The Schools Study is one component of the Psychological Impacts stream of the broader HHS. The first round of data collection by the Schools Study, 2015/2016, involved quantitative surveying and qualitative interviewing of school aged children. Initial findings were released in 2017 (Maybery, Carroll, Berger, Lee & McFarlane 2017; Berger, Carroll & Maybery 2018). One of the key recommendations from this earlier work was for further research “... needed to explore and expand upon the current findings and to provide ongoing tracking of the wellbeing of these children and the broader community” (<http://hazelwoodhealthstudy.org.au/wp-content/uploads/2017/06/Schools-Study-Year-1-key-findings-summary-v1-170627.pdf>).

This report covers the qualitative interview data collection from 46 children involved in the first and now the second round of the Hazelwood Schools Study 2017/18. These reported experiences have been separated into ‘remembering the event’ and ‘current aspects’ relating to the event. This report provides the method of data collection, analysis, nuances of recall, and their current issues associated with the experience of the mine fire some four years on from the incident.

3. Study aims

The central research question for the HHS Psychological Impacts stream was set by the Department of Health and Human Services based on community consultations held in May 2014.

Is there evidence that people in general and susceptible sub-populations in particular (including children) who were exposed to emissions from the Hazelwood fire, compared with otherwise similar people who were not exposed to emissions from the fire, have a higher prevalence and persistence of psychological distress?

[\(http://hazelwoodhealthstudy.org.au/about/research-questions/\)](http://hazelwoodhealthstudy.org.au/about/research-questions/)

A consultative academic panel was convened, which unpacked the following four key questions:

- What, if anything, do children recall of the smoke event?
- What effects do the students remember on themselves, their family, friends or others, and are these perceived as ongoing?
- What, if any, of the core symptoms characteristic of PTSD, do the children report, namely intrusive thoughts, avoidance behaviours, and hyperarousal?
- What helped them to cope at the time and what could be done to help respond to future events?

4. Ethical approvals

Approval for this project was obtained from the Monash University Human Research Ethics Committee (MUHREC: approval number: CF15/44 – 2015000023), from the Victorian Department of Education and Training and the Catholic Education Office – Diocese of Sale. There is no central agency for approvals for Victorian independent schools, rather the school principal approves the research. They did so in the knowledge that the Monash Ethics Committee had given approval for the study. Additionally individual approval and consent was obtained from the principals of all government and non-government schools participating in the study and the Moe regional office of the Victorian Department of Education and Training was consulted prior to the conduct of the study.

5. Methods

The Schools Study utilises a mixed methods approach, combining survey and qualitative interviews to explore the impacts of exposure to the Hazelwood event. This report focuses on the qualitative interviews collected as part of the second round of the study.

The research team developed an interview schedule to elucidate responses to the four key research questions (Appendix 1), exploring the nature and extent of psychological and academic outcomes for students exposed to the Hazelwood mine fire event. Students from schools in the most exposed community, Morwell, were compared with those from schools in surrounding towns

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which had lower levels of exposure to the Hazelwood mine fire. The participant's data was transcribed verbatim; therefore the grammar, sentence structure and comprehension reflects the cohort. The data was further de-identified from the original transcripts and coded with a number (e.g. P.1) to ensure confidentiality. The quotations in the thematic analysis provide descriptive narratives, being unaltered or corrected in anyway.

5.1 Schools and recruitment

This component of the Schools Study is part of the broader mixed methods study, where students in academic grades 3, 5, 7 and 9 from 20 schools across Latrobe City were recruited in 2015 and will be followed up every two years until students reach grade 9. The details of the recruitment into the larger quantitative survey are provided elsewhere (Hazelwood Health Study, 2017). As part of this program of work, 69 students were interviewed in 2015. For the qualitative part of the research design, the focus was on interviewing students from all seven mainstream Morwell schools, as Morwell has been shown to have been more exposed to smoke from the Hazelwood event (Emmerson, Reisen, Luhar, Williamson, & Cope, 2016). However, because there is no non-government high school in Morwell, it was necessary to select interview participants from a nearby Traralgon high school to ensure an appropriate cross-section of schools (primary/secondary and government/non-government).

As involvement in the Schools Study ceases after grade 9, students who were in grades 3, 5, and 7 in round 1 were invited to be interviewed again in round 2 in 2017. In total, 46 of the 58 continuing students now in grades 5, 7 and 9 agreed to be interviewed, representing a participation rate of 79%.

5.2 Data collection

Open-ended semi-structured questions (See Appendix 1) were determined through an academic panel consultation process. The interview questions had a distinct separation between 'remembering the event' and 'current aspects relating to the fire event'.

The interviews were conducted by student researchers who were provided with in-depth training by researchers experienced in qualitative interview techniques. The times were selected by the schools to minimise student class disruption, including utilising free periods. The interview sessions were conducted between 22 November and 8 December 2017.

5.3 Data

The data were transcribed verbatim to script by a professional service with extensive experience transcribing qualitative research interviews. A qualitative researcher undertook the thematic analysis. To limit potential for bias in the thematic analysis, the analyst researcher was provided with the interview questions, the transcripts, and the interview recordings, and was given only a brief general outline of where this aspect of the study fitted within the larger structure of the study. The intention of this approach was to let the data speak for itself rather than enforce any fit with existing findings.

6. Analysis

6.1 Thematic analysis

The researcher conducted a thematic analysis on the data which involved reading and re-reading the transcripts and listening to the recordings whilst also separating the data into generalised clusters (Braun & Clark 2006). The data was further analysed and separated into themes of 'remembering the fire/smoke/ash event' (*remembering the event*) and the 'currency of the fire/smoke/ash event' (*current aspects*). The nuances of these two separated interview conversations, remembering the event and current aspects (Figure 1), were further scrutinised according to methods outlined by Streubert and Carpenter (2011) and again condensed into manageable themes (Figures 2 & 3).



Figure 1: Separation of the interview data

6.2 Triangulation of data

As member-checking (where participants determine the accuracy of the findings); was not deemed suitable due to children's age and capacity to understand the research process, a triangulation of the data was undertaken to maximise validity, dependability and completeness of the findings

(Streubert & Carpenter, 2011).¹ This triangulation involved randomly selecting transcripts and listening to the associated recordings to ensure the accuracy of the transcription and then revisiting the notes and subsequent themes to ensure that they accurately represented the experiences of the students. In total, 17 transcripts out of 46 (i.e. 37% of all interviews), were subjected to this process.

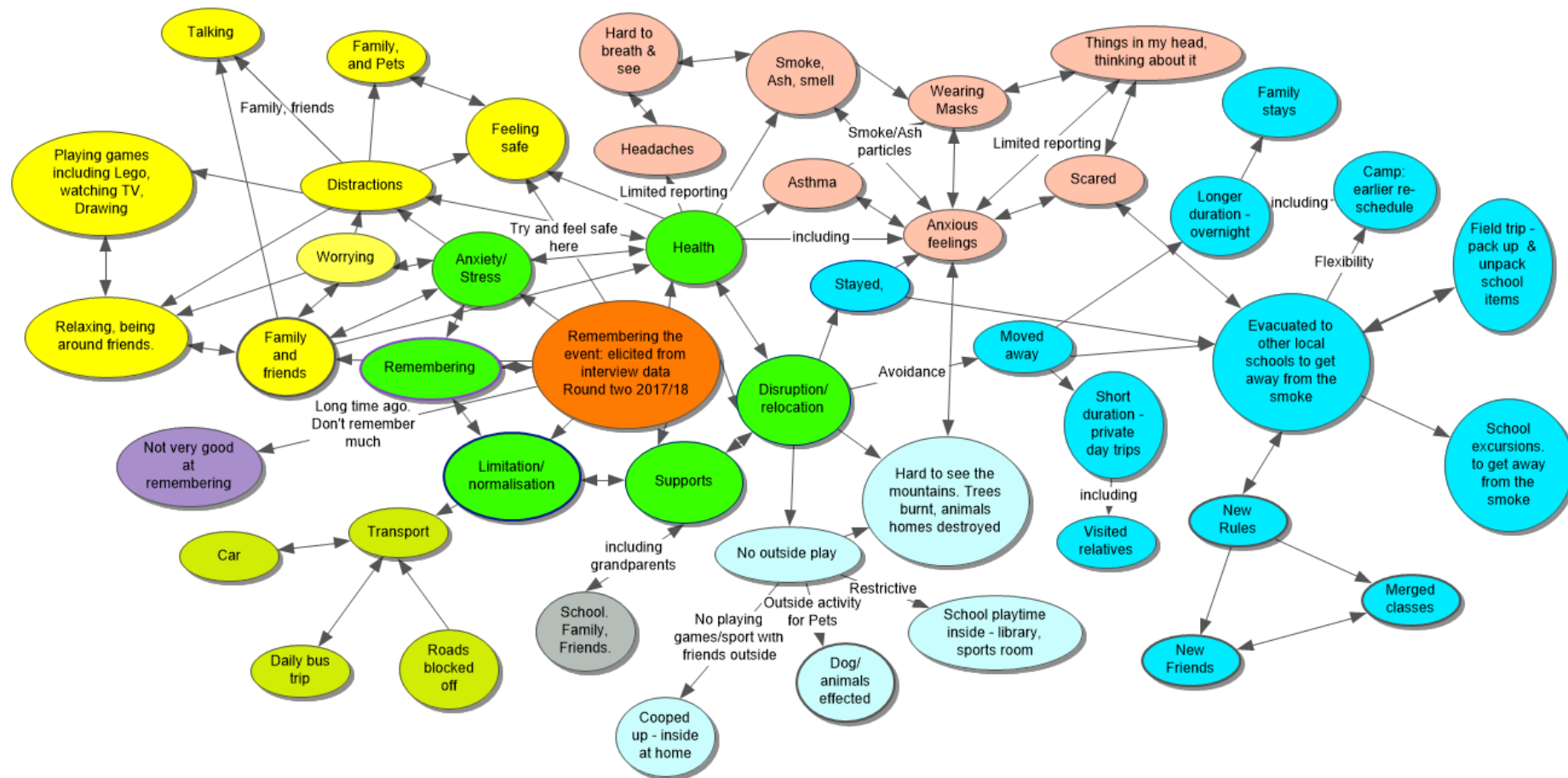
7. Findings

As already noted, the findings from the interviews are reported in two distinct ways: remembering the event, and current aspects.

7.1 Remembering the event

The following six themes emerged from the interview data in the context of remembering the event: Remembering; Anxiety; Health; Disruption/relocation; Supports (school, family and friends); and, Limitations/normalisation. These core themes are visually depicted in Figure 2 (green discs), with each theme illustrated by the participant's narrative, thus providing insight. Further extrapolation of the participant's narrative showing the interplay between the themes and subthemes is visually depicted with the arrows (Figure 2).

¹ Triangulation is an approach to research that uses a combination of more than one research strategy to confirm completeness/confirmation of the findings in an investigation (Streubert & Carpenter, 2011.p.351)



Remembering:

While some participants seemed to have minimal recollection of the event some 4 years in the past, others had a vivid memory of the event. Participant P.8 noted that it was “...very orange and like dirty outside as I was looking out the window wondering what was going on” with P.44 adding that it was “... very smoky, hard to breath and see”. Another participant remembered “... looking out the back window and seeing the fire as there were no houses between my house and where it was – seeing the red line, three inches long, tall and looked like it was surrounding us. We evacuated from the house to Churchill because it was too close. Don’t remember much. Just a little memory, I guess” (P.43).

Another participant’s recall was “... I remember being really paranoid ’cos my older sister was like freaking out about it, and I was younger ... I’m really scared or whatever. I mean now I’m sort of over it” (P.34). These memories are reflective of a number of similar narratives alluding to the recall of the event by participants.

Anxiety:

The aspects of being worried, scared, and nervous are succinctly illustrated by “... I remember being over in Morwell for a family thing and it was like covering half the sky; it was pretty scary to see and to breathe in [smoke] ... realising how everyone else was affected like it was scary for us knowing that it could have been us” (P.29).

Another aspect causing anxiety was referred to in this statement “... scary ... Scared that the house will go ... most people were scared (P.28) while P.37 said “... staying with your uncle?” ... It actually made me a bit nervous and – but I still felt calm and okay. Nervous about not having a home”. Another reflective stance was “... scary because it was so close, you could feel it standing in the backyard [of the house]. ... scary at home as we were evacuated to Churchill” (P.34).

Looking at anxiety relating to schooling, the following long narrative by P.31 encompasses a number of sentiments “... relocate our school there [Moe] for a couple of months ... It made me feel pretty stressed because we had to get to school earlier in the morning so we could catch the bus over and just the school was always in a whirl and everyone just ... All the teachers were stressed so they took – they were a bit angry and yeah ... a little bit [stressed] because of all the work we had to do in school with moving everything and just having to get up earlier so we can catch a bus earlier and then being home a bit later because the bus was late some days”.

Participant P.31 continued “... When I heard that it was really bad on the TV it made me a bit scared. Even though my house was pretty far away it still made me worry that it was going to come closer and the ash was just going to not go away ... I was confused why we were moving schools if it wasn’t that bad and - my mum she was always on edge a little bit and she was always just a little more angrier I guess. She didn’t mean to be but the stress just – sometimes stress is a lot for people and they just don’t know how to handle it”.

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While some participants talked openly about feeling scared and anxious, others talked about distracting themselves with enjoyable activities to help them avoid thinking about the event. This included watching television, with P.16 sharing an innovative strategy of her grandmother's, "... she would watch scary movies with me to help it go away so I have different nightmares instead of the ones that I have with the mines". Other activities such as drawing and playing games were mentioned by a number of participants, with P.2 noting that he would "just draw, talk to my brother, talk to my family, play board games and all that, so it just kept my mind off of it", and P.14 adding that "... I just got on my Xbox". Using Lego blocks was also mentioned by some students, with P.37 noting "... the thing that made me happy when I was nervous was just like because I got to bring a little bit of Lego with me so I played with Lego". Finally, P.8 added that "... so I sat down on my bed, really scared and that, after I got told what was happening and just cuddled up with my dog".

Health:

The main discourse of participants was centred on "... It makes you kind of feel sick because like it gets into your body" (P.36) another stated "... got a bit sick after a couple of days or something from the smoke Coughing, not feeling good half the time, checked out by Mum to see if it was asthma" (P.41) with P.26 concluding "... Really smoky outside like it was quite heavy and you could, if you breathe it in you could tell you were breathing in like lots of ash and smoke ... if you're outside for too long during the smoke like your throat would burn".

The majority of participants reiterated memories like "... I'm a netballer and our season got cut short because of it because the grounds that we played at they were always covered in ash and just – it was a health risk for all the kids. My friend Ella she had to wear a mask a lot of the time because she's got really bad asthma. She can't handle – she couldn't handle it. So every morning as soon as she got to school, before she got out the car she had to put on a mask and then before the bus came and we were all waiting outside for her she had to wear the mask and everyone else was fine" (P.31).

Comments relating to health issues are epitomised in these final narratives "Probably sick and dizzy from all the [smoke, smell and ash] ... most of my friends because they're asthmatics and stuff just the way they were breathing it in and like that" (P.30), to the concern for siblings as demonstrated by "... My brother he's got asthma ... [the smoke event] worsened him a little" (P.39).

Disruption/relocation:

The challenges associated with living in the area were recorded by a participant as "... Oh some days it'd be bad, [smoke] depending on wind I guess but just have to really see whether you're ... cover your mouth or anything to - [at home] closed the windows. We moved yeah moved schools

for a bit” (P.32) while others reported “... because they blocked off all the entries here and in Morwell. But and I had to go to Nan’s at night because then the – our – the back of our house caught on fire” (P.28).

P.39 noted that “... around that time I was pretty interested in firefighting and stuff so I sort of understood the risks behind the smoke and knew that it was obviously bad for everybody’s health ... wasn’t something that we needed to be worried about straightaway... we left and went up to Lakes Entrance for a – just a while, while the fire was burning ... just to get a bit of an escape”.

Another participant described the disruption as “... lots of smoke was coming across throughout, to where, specifically where our school was. So every day we had to get to school early so we could catch a bus and go to a Moe or Newborough High School to go there until the mine fire stopped. I liked getting outside, getting to do stuff that I usually do by myself. But now that it was there [the smoke] I couldn’t get lots of exercise, so I couldn’t really get any exercise for the whole time the mine fire was on (P.35).

There was limited response regarding the external environment. P.46 voiced two words “... burnt trees” while another participant exclaimed that it was “... hard to see the hills, mountains and stuff” (P.44). Positive recollections were provided by P.1 “... I was just happy that we could be back at school; it was refreshing to be back at the school I’d been in for quite a few years”.

Supports: Family (including Grandparents), Friends and School

The role of family, friends and others in providing support during the event was mentioned, and ranged from being relaxed in the company of friends, “... Relax, being around friends helped to forget what was going on. Played games, watched TV”(P.44) to the concerning remark from P.8. “... I remember mum – the look on her face when she came into my room. She looked very worried and very concerned and stuff. It’s something that you don’t really want to see on your parent’s face”. P.41 remembered “...watching TV, so scared – just like that adrenalin. We talked a lot in class and to my friends ... how scary it was and shit and that was probably mostly it. Talked about people, houses ... just to see if they were okay”. Finally, P.27 added the calming recollection of “... Mum and Dad were, just like said it was okay”.

Another (P.34) proffered “... I mean most of the time my mum would comfort me”, then continuing the dialogue “... when we moved sort of to our grandma’s for the months, I felt a little more at ease ’cos I knew it wasn’t going to travel all the way to Melbourne. ... Most of the time my mum would comfort me, and I would just sort of try to distract myself from it, and that seemed to help”.

Other positive aspects were also disclosed such as “... I hung out with my friends a lot more at home and in school we all came really close ... So a lot of them came over to my house [mums] or I went over to their house and we hung out yep” (P.31).

Grandparents were also impacted by having family members staying with them and by being directly affected by the fire. As P.29 explained “... *My Nan was living just near the mine fires, so she was evacuated and the rest of her street was. And that was pretty scary for her to know like that she was going to leave all her stuff, and it was scary for us as well ... my Nan had to move over here with my aunty while it was happening ... my Nan had a few friends, they had a farm; they lost all the dogs ... everything and to drive past like everything that had been burnt down was like pretty scary*”.

Family members were also involved with supporting the community, as these two accounts portray “... *I remember mum and dad would have to have the radio on all the time because they would have to get announcements about what was happening ... because dad has to, had to help out with welfare and whatever it was [Female participant explaining: evacuation] ... he [dad] had to help with chaplaincy stuff and be available for counselling and things like that* (P.26). While P.35 revealed “... *my mum worked at the council so like she was trying to, with the whole group I think she was trying to figure out how to stop it*”.

Limitation/normalisation (life routines):

The mine fire created countless limitations to the everyday regulated lifestyle of families and communities. The most frequently expressed concern was “...*not [being] allowed to play outside*” (P.45), while P.31 stated “... *I had to stay inside a lot because there was a lot of ash outside, we had a bit of our window that was broken and a lot of ash got caught inside the window so our whole back door was always black and dark. Yeah and I couldn't play outside with my sisters*”. Another participant stated “... *I stayed in the back of the house because I didn't want to see how far it [the fire] was going forward and that*” (P.41).

These were not the only disruptions impacting participant's family lives. Concern for family members was expressed succinctly by P.25 “... *my dad got stuck in the car ... they blocked the road off and so he had to stay in the car*”. School relocations were expressed in terms of “... *you had to remember where everything was and then when you get back to your own school you have to remember where all the things are*” (P.30). Other limitations of school evacuations included that classes and grades had to be consolidated. P.35 recalled “... *we didn't have much room, so like we had to have 5-6 in one, grade 3-4 and 4-5 together, 2-3 and grade 1's together, and grade preps in another, didn't have that much room*”.

While there was a focus on the disruptions associated with the event, students also commented on things returning to normal. P.26 stated “... *I know it would be sorted out so I wasn't really worried; I just got on with things ... I know that you could see like, when it was really smoky outside like it was quite heavy and you could, if you breathe it in you could tell you were breathing in like lots of ash and smoke*” P.29 added “... *after it had all calmed down, it was just like realising oh my god that happened, but we were okay I guess*”.

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The trips away to the bush and other places were a welcomed distraction to the participants. P.39 explained “... *We were in Primary School; our school setup excursions and stuff for us to go out ... away from the smoke*” with P.24 recalling the school camp “...*we went for a couple of days. Swan Hill we went through the old day village thing. It took our mind off a lot of it [the fire, smoke, ash]*” while P.10 conveyed the virtue of bush outings “... *we had lots of fun and we made stuff with the sticks and leaves yeah that’s what we did*”. Another positive aspect was reported by P.44 who said “... *It was exciting going around to other schools*”.

For some participants, recall of the event was still sharply focused in detail; while for others the detail was fading. Hence, it was imperative that the current aspects relating to the fire were captured in this study.

7.2 Current aspects

The data that emerged from the participant’s narratives relating to current aspects of the Hazelwood mine fire provided seven distinct themes. These themes were: moving on, emotional state, sleeping, eating, irritability/concentration, recovery and future directions. Each theme will be elucidated by the narrative of some participants; while further discourses are depicted in Figure 3.

Moving on:

Most narratives reflected that participants no longer thought about the event “... *I kind of don’t really care about the mine fire – it’s like it is passed*” (P.45) or “... *I guess it’s just been so long*” (P.26). P.43 stated “... *No, I know it happened and it didn’t hurt me*” while P.6 commented further “... *Not really ... the smoke was really scary to be in but you get through it, I guess. You’ve just got to keep moving on and think what’s happened has happened. You can’t really take it back from what’s been done*”. Another student noted, “... *Just a memory now. [Smoke] ... Focusing on school... just focus on what I’m doing at the moment*” (P.32). P.24 was emblematic of many of the students with the following “... *It’s not that worrying so you just think about it for a while and then you just get on with what you do*”.

Emotional state:

There was some evidence of ongoing distress associated with the mine fire, as outlined by these words “... *guess that’s where all my depression and anxiety just started I guess from the fires*” (P.1) and from P.46, “... *sometimes it’s too much to handle – I just stop thinking about it and think of a different topic to think about*” and P.20 expressing concerns about not wanting to “*dream about my house catching fire*”.

Some participants reported personality changes, such as P.8 intimating that “... before [the fires] then I was just all happy and bubbly and stuff and yeah now I’m very quiet and just try to be in the background ... because when I’m stressed out I either stress eat which apparently is bad or I have to keep moving and keep my mind active so I start cleaning and stuff or something”. P.16 stated that “... Since that happened [the fire] my brain has not been the same. I think it’s just messed with my brain a bit and the smoke just got to me too much ... got to my head it feels like I have been sleep walking lately ... It’s about different kinds of fire but one of the me falling into the mines when the fire was going on and it really petrified me and I went all weird, and then I’ve always been cautious around the fire”.

Triggers to the event were noted, such as references to the anniversary of earlier 2009 ‘Black Saturday’ fires (P.5). P.10 noted that news stories on other events such as hot days brought back memories of the mine fire, “Sometimes when I watch the news ... normally if it’s really hot one ... a fire and if it was near us I’d probably always have my asthma pump with me”. Another participant was concerned with the negative connotations resulting from media on the mine fire, stating “... and people associated that negative connotation with Morwell and I think that affected business and stuff negatively” (P.39). A reflective voice also came from P.46 “... Sometimes I do think about the smoke, mostly like the factory places where I think they make paper [Maryvale Paper Mill] and how it’s polluting the land. Like probably the future, what it’s going to look like or is it still going to happen like that when I’m like your age or something”. This concept of ‘thinking about the smoke’ was further evident in the comment of P.23, who stated “... I was worried about it in case if it spread and most of the trees got burnt and there wasn’t enough oxygen. [Now] Yeah, but not as much as I used to”.). For some, participating in the Schools Study survey reminded them of the event, with P.34 stating “... surveys remind me of the 2014 fires”. P.15’s comments concurred “..... I don’t think I’ve ever thought about it only when this comes up”.

Sleeping:

The majority of participants reported experiencing no changes to their sleeping patterns, however there were some who did report changes that they attributed to the mine fire event. P.16 commented “... Yes it’s [the fire] really affected me that much I cannot sleep that well at all ... Since that happened [the smoke event] my brain has not been the same its been keeping me up [till 4am; watch movie] and I’ve never been up that late till now”. P.16 went on to describe dreaming about getting hurt, “... Sometimes I will hurt myself too much that I will actually not go to sleep at all and my mum would actually have to tuck me in and make me go to sleep ... I would roll off the bed and hit myself on the side table,... sprain my ankle..., trip over wires in my bedroom... I think it was me just trying to run away from the smoke ... it would scare me that much”. When asked if it still happened “... no, no stopped a bit... messed with my brain”.

There were also poignant nightmare narratives related to recurrent dreams for a period of time after the Hazelwood event, such as “... burnt down the whole school... It was kids running and I was really petrified. Like it didn’t feel like a dream – it felt like real life until I slept in too late – like an hour past school and then my mum told me to get up and she scared me really bad, and I just kept on having nightmares since that day until I stopped a couple of years ago” P.16.

Others shared dialogue like P.39 “... Yeah I have had trouble sleeping but that was sort of before the fire, – stay up a bit later now ... ever since then, so yeah. [Impacted sleeping] I don’t know, it might have – might have like at the start of it when it first happened” such as P.24, who commented “... Yeah, I got more restless now when I sleep and I don’t sleep much but it’s not really worrying about it, it’s just suddenly now I can’t sleep as easy ... used to sleep really well, now I fidget a lot in my sleep and stuff”, and P. 23“... [sleeping problems] And I still do. So when I lay down and try and go to sleep, I hear all these weird noises that aren’t really there and it’s basically the fire and it’s getting put out and stuff and when it’s spreading to the trees. ... Like the whistling type noise, yeah”.

While some participants talked about sleep-related changes associated with the mine fire event, two others attributed their changes in sleep to the wider changes associated with puberty.

Eating:

The majority of the participants confided that they had not experienced eating problems; however, P.16 reported “... Yes I’ve eaten a lot lately because that kind of helps me, ... I’ve eaten much more and I have gained [weight] – I am not myself anymore – I’ve been eating different and I have been eating way too much. ... Well ever since the day when it [the fire] started my mum says not to eat anything and then that’s probably just tired me out and made me eat more because she was scared that smoke got to it [food] because we always leave the door open and she doesn’t want to do anything like that. ... Yes I still eat so much”.

Impacts on eating, however, need to be considered in the context of age-related changes and pre-existing issues, as there were students who talked about issues to do with eating that were not influenced by the Hazelwood event. Some participants disclosed that they had eating problems that existed prior to the event, including P.37 “... No, I’ve always been a fussy eater” and P.45 “... but I’ve had eating troubles a lot longer than the fire has actually been around”.

Irritability/Concentration:

Statements of improving temperament over time subsequent to the fire came from P.24 “... A little bit but, yeah, that’s happened more so now that, it’s actually started to get better of late because Mum and I used to butt heads a lot but we’re getting better now which is good, but yeah. After it happened [the fire], we used to all fight a lot but it would just be over stupid little things which just

made us all crabby which was strange but, yeah” and from P.16, “... Yes I think I was in year 3 or 4, I would have a really hot head since then but I have calmed down this year – I really haven’t been out of my classroom so it’s kind of affected me with my head – temper until I finally got over it and I started back to normal and not really that bad. It’s just affected me a bit too much and it made me a bit angry of hitting and doing other stuff like that”.

In some instances, it was unclear whether the concerns raised by students were fire-related or not, such as P.45 who admitted to *“... I do sometimes have a bit of a short fuse – like if they are being told off or somebody gets angry at them I tend to go”*. Other students gave a more considered response like P.39 who said *“... Yeah I – I would say that but I’m not too sure if it is a result of the fire, I don’t know, I think that sort of, that reaction runs through the family”*.

P.13 advanced the discussion with *“... Well I’ve always had anger management but I was younger before the fire happened, I’m not really sure if it, I’m not really sure because once it was happening I started doing anger management stuff. So it might have helped but I’m not really sure”*.

In the main, participants revealed they had no problems in relation to concentration, with most relating issues that were in existence prior to the mine fire or happened afterwards but they didn’t consider them as being linked to the event. For example, P.41 *“... I used to always daydream in class”* and *“... Yeah, but I’ve kind of always been like that”* [No change since the fire] while P.24 advised *“... I’ve always been really fidgety and not concentrating very well”*.

Recovery: School, family and friends

The major response reported by participants was that normality had to some extent been restored by the smoke and ash going away, *“... once it had become under control and the smoke had kind of cleared, things just went back to normal and there wasn’t like much else done”* (P.26), though there were other ongoing changes and disruptions that impacted on participant’s lives. There were changes from a schooling and friendships perspective *“... we are also getting a new school bell. [new school warning system]”* (P.46), and *“... Well, no I don’t know; besides most of them [friends] I don’t really talk to because they go to a different school now”* (P.41). Concurring with these changes, the comments of P.13 proffer resilience and positive application *“... but some people have left to other towns. Makes me feel a bit sad because we were best friends and stuff and they had to move so quickly, but I just got over it and made new friends I guess”*. Another expression was *“... Not much has changed. It gets sad sometimes having all your mates that you’ve hung around with for six and a bit years and then you go to a different school and you’ve got to start from scratch again, so yeah, it makes it sad sometimes but you get over it”* (P.24).

Some positive expressions were forwarded by P.1 *“... but I got to know some kids from different schools out in Moe, and then I came here with some of them, and I know them, so yeah”* and *“... I guess because it’s like people are closer together like as family and friends”* (P.42). Discourses

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relating to bullying at school were also reported “... *like I felt that I was bullied a little more [previously]... like my mum have a job [since the fire] so we get a lot more money and I don’t get bullied as much*” (P.45).

The impacts on family, including grandparents, was expressed by a number of participants, such as the words of P.23 “... *I think about my family all the time*” and as P.16 states “... *she [Nan] has been really affected to it so I could have helped her more when it come to that ... My sister she is kind of like me but she was probably more affected by everyone than me*”.

Other aspects of family life were also shared, like “... *Well, my parents were planning on splitting up as the fire sort of started, so I guess the only thing that’s really changed is my Mum and my sister and I moved out*” (P.43) with P.29 stating “... *I guess being closer with family members in case of that kind of emergency again*” and P.6 reiterating the same sentiments of family and friends by “... *I think we’ve all kind of grown to be close and have each other’s backs when you’re going through a hard time*”. Personal impacts of hard times were also proffered by P.3 when summing up the recovery “... *other events that happened in that year that kind of affected everything. Like my dad had a really bad accident, and you know, family problems and issues, and then, you know, all that stress ... but now it’s really good*”.

Other positives reported included being able to play outside with friends when at home/school. The resumption of sporting activities; having ‘fresh air’ to breath and not worrying about pets.

Future Direction:

There was a limited response to the interview question regarding whether students had any suggestions in relation to helping children deal with future events similar to the mine fire. This limited response likely reflects the young age of many of the participants. However, there were a number of interesting responses, such as P.44’s remark on communication which echoed the rhetoric of a number of participants “... *I think probably just get told about what’s happening, be aware of everything that’s going on and ways to prevent it and stuff and get your mind off it. I think it’s just a good way, so you know everything’s going to be fine and everything*” and the supporting voice of P.43 “... *Probably just have, make sure that you do know what’s going on and be warned and ready to go*” and finally P.42 being more practical by suggesting “... *just getting support from friends and family and maybe wearing masks for the smoke so you didn’t breathe it in*”.

Staying calm (P.21) and having clear messages of when to evacuate as stated by P.34 “... *Well I’d say that like the terms of evacuation needs to be really clear,... just smoke, it doesn’t mean that you’re immediately in trouble, and that everything’s okay and you’re in a safe place, and if you need to go then you’ll be able to go*”. Further advice came from P.32 in the form of “... *Better preparation, better I guess protection against fires, yeah stuff like that*”.

Families were also considered as imperative to future considerations. P.21 suggested “... *listen to what your parents say, and that it’s okay*” and P.20 stated “... *Staying around my parents, it felt like I was a bit more safe, and I wasn’t very scared when I was around my parents*”. Similarly, P.4 said “... *Just have family nearby so that’s about it. Just because you’d be able to talk to them because they’ll know a lot more than ... younger kids*” and finally the words of P.3 “... *Probably just stay close with your family and friends ... just spend lots of time with them to try not to think about it and stuff, you know, because just knowing that everyone is safe and everything, yeah*”.

Some unusual proposals for preparing and responding to a mine fire were proffered like “... *Washing the grass so if the fire comes it won’t catch that on fire*” (P. 28), and practical actions like “...*Get more helicopters out and fire fighters*” (P.17), and, on the subject of evacuation “... *Probably go to Melbourne and just stay there until everything has calmed down*” (P.30). P. 9 concludes “... *They should stop school and – until the fire stops. They move out of their house and go camping until the fire results come back in*”. On the question of shelter, P.1 had an answer “...*I think that there should be like a shelter that kids can go to, like not a shelter, as such, but more like an activity thing. So, like a hall in the town and they can just go there and like, do some activities to get their mind off the fire*”.

An understanding of others and their needs was expressed by P.34 “... *I’d say that I have a better sense of empathy for other people who are like “Oh I was in a house fire, there was fire near me”, I can sort of relate to that enough that I can help them better than what I could before*”. Final considerations were wonderfully expressed by P.8 who acknowledged “... *I reckon everyone’s done a wonderful job helping everyone out and just how supportive everyone was to each other, just random strangers which were helping people that they didn’t even know. I couldn’t ask for anything really more than that*”.

8. Discussion

While some participants had limited recall of the event 4 years later, others had very vivid stories about the event and its impacts. While a number of the participants reported little to no ongoing concerns, some did express concerns. The depth and diversity of responses has been clearly laid out in the previous findings section including the need for general distractors such as drawing, Xbox and pets. Some 11 participant's voices have not been recorded as they either concurred with others, have limited recall or reported not being impacted by the event.

In order to structure this mass of data, the following discussion has been framed around the four key questions from the interview schedule.

What, if anything, do children recall of the smoke event?

As shown in the analysis, for most participants their recall of the event was vivid and detailed. This included recollections on the experience of the fire and smoke; being anxious or scared; feeling sick and coughing; disruption of routines and relocation of home or school; some relief from sharing the experience with friends or family; and being confined to indoors or trips away from the smoke. Others provided less detail, with some saying that they preferred not think about the event.

What effects do the students remember on themselves, their family, friends or others, and are these perceived as ongoing?

The effect of the fire event on the participants, their families and friends ranged from having a minimal impact to having a serious impact on their lives. Triggers such as anniversaries and media reports seemed to rekindle the trauma; even the regular smoke emanating from the local paper mill was articulated as concerning for one participant, nearly 4 years after the fire occurred. It is apparent that the event generated stress, anxiety and worry for families which flowed through to irritability traits for participants and family members. The separation/relocation of family members, including grandparents, demonstrated the disruption to family structures and accommodation.

The need to move on from the event for some participants was evident in the transcripts. When questioned about whether anything had changed, the participants referred to normality, or lack thereof, which was also demonstrated in the narratives relating to schooling, family relationship issues, accidents, parental work changes and separation of siblings. Some participants expressed the sadness they experienced with their friends moving to other schools or permanently leaving the area.

Some participants stated that drawing, watching TV, 'Lego, playing Xbox and having pets close by were cognitive distractors from the event. Examples of the above distractors were exemplified by P.14 "... I just got on my Xbox", with touching remarks regarding pets proffered by P.8. "... so I sat down on my bed, really scared and that, after I got told what was happening and just cuddled up with my dog". Another more current response was 'focusing on school', while the common response was 'just not to think about it'. The ongoing effects associated with the event are more evident in the answer to the following question.

What if any of the core symptoms characteristic of PTSD do the children report, namely intrusive thoughts, avoidance behaviours, and hyperarousal?

It is apparent from the narratives that a number of students reported responses which align with symptoms of PTSD. An outline of the three key domain areas targeted in the Schools Study survey and interviews, as well as exemplar statements, are provided below:

- **Intrusive thoughts** are involuntary cognitions that may be described as unwelcome, unpleasant, distressing, or disruptive, and can often feel difficult to manage for those who experience them (Mace, 2007). Examples of intrusive thoughts were recognised in some participant's responses, such as "... It was kids running and I was really petrified. Like it didn't feel like a dream – it felt like real life until I slept in too late" (P.16). Another example is from P.20 who states "... I didn't want to dream about my house catching fire". While P.23 stated "... So when I lay down and try and go to sleep, I hear all these weird noises that aren't really there and it's basically the fire and it's getting put out and stuff and when it's spreading to the trees. ... Like the whistling type noise, yeah".
- **Avoidance behaviours** entail seeking to evade, restrict, or withdraw from situations perceived to be threatening or difficult to confront (Pearlin & Schooler, 1978). Examples of avoidance behaviours recognised in participant responses included a statement by P.46 that, "... I just stop thinking about it and think of a different topic to think about" and the words from P.8, "... I have to keep moving and keep my mind active so I start cleaning and stuff or something... and yeah now I'm very quiet and just try to be in the background".
- **Hyperarousal** encompasses the experience of a cluster of psychological and physiological symptoms, including difficulties concentrating and sleeping, feelings of irritability, heightened alertness, acute anxiousness, and being easily startled (Yehuda & LeDoux, 2007). Examples of hyperarousal were recognised in participant responses, such as the words of P.24 "... Yeah, I got more restless now when I sleep and I don't sleep much ... it's just suddenly now I can't sleep as easy" and P.39 "... stay up a bit later now ... ever since then, so yeah". Participant P.45 admitted to "... I do sometimes have a bit of a short fuse – like if they are being told off or somebody gets angry at them I tend to [let] go".

The participant's narratives provided evidence of responses commonly associated with PTSD symptoms, though some of these aspects could be associated with other problems either before or after the fire event. Evidence of irritability and concentration deficits, both at home and at school, were articulated by participants, though here again alignment to the fire event was evident but somewhat challenging.

[What did students say helped them to cope at the time and what could be done to help respond to future events?](#)

There was little response to the question of what could assist student's in future similar situations, though the general consensus was for greater communication of what was occurring to be disseminated. In contrast, the value of support from a number of differing entities was recognised as being calming in such an event.

The supportive engagement of friends, family (including grandparents) and the role that schools could play in the future was particularly evident as a recovery tool. Emergency and individual planning was proffered, so that everyone in the family or school would know what to do if an event like this occurred again, which would thus reduce stress at a time of disaster. Stronger official communication in regard to determining whether to evacuate or not was also referenced as an area for improvement by participants. However, there was also the profound statement of P.8, who acknowledged *"...I reckon everyone's done a wonderful job helping everyone out and just how supportive everyone was to each other, just random strangers which were helping people that they didn't even know. I couldn't ask for anything really more than that"* this summed up the generosity of the human spirit in the face of adversity and challenge.

9. Conclusion

It is apparent from the student's memories of the event that it was an intense and distressing experience for many, which had an effect on numerous participants, their families, friends and their schooling at the time. The common refrain of participants that the event was now over and that they were safe was affirming. This was reinforced in the consideration of the current impacts, with a core theme coming out of the analysis on the need to 'move on'. While for many, the ongoing effects of the event are minimal, others are still reporting concerns, with characteristics of PTSD evident in their responses. How this traumatic event will affect participant's lives if, or when, they encounter similar events in the future is unknown, therefore a number of recommendations have been made.

10. Recommendations

The participants, when considering possible improvements when responding to future events, suggested the following:

- The provision of clearer communication with students from authorities, peer supports and others on the potential impacts of an event and what students can do to look after themselves and their families (including reassurance where appropriate).
- The need to encourage resilience building dialogue within families and between peers during and immediately following any future event.
- The need for better evacuation planning for schools, including clearly mapped out relocation plans, including where to go to maintain consistent schooling.

While not specifically raised, the insights provided by the students highlight their potential to become involved in disaster preparedness and response. This involvement would be in accord with Article 12 of the United Nations Convention on the Rights of the Child (United Nations, 1989). Involving students in this way would also provide them with reassurance that there would be a more coordinated response between emergency agencies, schools, students and families. It would also mean that all parties are more aware and prepared than was the case during the Hazelwood event.

It is important to note that these recommendations, particularly the focus on clear communication and planning, have been separately raised in the Older People, Community Wellbeing, and Adult Psychological Impacts Streams of the HHS (Walker, Carroll & Chisholm, 2017; Duffy & White, 2017; Jones, Lee, Maybery & McFarlane, 2018).

While there are telling findings from this second round of interviews, there is a need for further research to be conducted in order to comprehensively evaluate any ongoing impacts of the event in the coming years. A comparison study of the data from round one and round two would provide insight into the impact on the participants of the event.

Further to the traumatic fire event of 2014, the community has also witnessed the closure of the Hazelwood power station and Morwell mine, and the closure of a number of ancillary industries providing support for the infrastructure of the mine that subsequently became unviable. The impact on the participants, of these and other issues, such as loss of friends, cohesion and support, requires further investigation

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13. Appendix 1: Schools Study interview schedule

Research Question	Potential Questions	Prompts
Part 1: Unstructured Questions		
Think back (recall the event) questions	Think back to the time of the smoke/mine fire: Can you tell me what you remember about this time, if anything? How did that make you feel?	Can you tell me more about that?
	Where did you live during the time? What school did you go to during the time? What was it like being at home during the time? What was it like being at school during the time?	How did that make you feel?
How the fires might have impacted?	What if any effect did it have on you? What did you do about it at this time, if anything? What, if any, effect did it have on your family? What did your parents do, if anything? Your brothers or sisters? What, if any, effect did it have on your friends? What did your friends do, if anything?	What was that like for you? Can you tell me what you mean?
If it impacted what was the reaction?	What happened at school at this time? What was different? What was the same? What about now.....? Does what happened still effect you? If yes, in what way? Does what happened still effect your friends? If yes, in what way? Does what happened still effect your family? If yes, in what way? Does what happened still effect school? If yes, in what way?	What do you mean by '..'? Earlier you said you felt '..' can you tell me more about that?
Impact of Event Scale		
Intrusion	Do you worry or think about the smoke at all? If yes, what about? If no, what stops you from worrying or thinking about it?	
Avoidance	When you do think or worry about it, do you try not to think about it? If yes how?	
Arousal	Have you had any of these problems since the smoke? Trouble sleeping? Trouble eating? Losing your temper? Paying attention? If yes to any can you tell me more about it? Tell me how each has changed because of the smoke/mine fire? Tell me how each has changed since the smoke/mine fire?	

Part 3: Unstructured Questions		
Resilience	<p>What, if anything, helped you with the (<i>emotion if they have described one</i>)? Please explain and give examples.</p> <p>Were there things others did that really helped? If yes, what and give examples.</p> <p>Were there things that you did that really helped? If yes, what and give examples.</p>	How did that help you?
Final questions	<p>Have things changed at home since the smoke/fire? If yes, in what way?</p> <p>Have things changed at school since the smoke/fire? If yes, in what way?</p> <p>Have things changed with friends since the smoke/fire? If yes, in what way?</p> <p>Has anything else changed since the smoke/fire? If yes, in what way?</p> <p>What do you think – are things better or worse since the smoke/fire? What makes you say that?</p> <p>What is one thing, if anything that would have really helped you at the time? How might that have helped you?</p> <p>What do you think needs to happen for kids like you in these sorts of situations? Then? And now?</p> <p>Is there anything else you would like to add?</p>	<p>Can you tell me more about that?</p> <p>How did that make you feel?</p> <p>What was that like for you?</p> <p>Can you tell me what you mean?</p> <p>What do you mean by '<i>emotion</i>'?</p> <p>Earlier you said you felt '..' can you tell me more about that?</p>