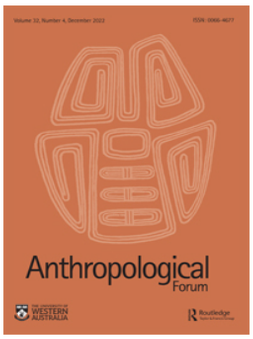

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Anthropological Forum

A Journal of Social Anthropology and Comparative Sociology

ISSN: (Print) (Online) Journal homepage: https://www.tandfonline.com/loi/canf20

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To cite this article: Julie Spray (2022) Disruption in Bio-Psycho-Social Context: Children's Perceptions of the COVID-19 Pandemic in Aotearoa New Zealand, Anthropological Forum, 32:4, 325-350, DOI: 10.1080/00664677.2022.2113501

To link to this article: https://doi.org/10.1080/00664677.2022.2113501

Published online: 05 Mar 2023.

ANTHROPOLOGICAL FORUM
2022, VOL. 32, NO. 4, 325–350
https://doi.org/10.1080/00664677.2022.2113501

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RESEARCH ARTICLE

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Disruption in Bio-Psycho-Social Context: Children's Perceptions of the COVID-19 Pandemic in Aotearoa New Zealand

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ABSTRACT

Children growing up during the COVID-19 pandemic have seen unprecedented restructuring of their childhoods through lockdowns, virtual schooling and other public health measures. Theories of biographical disruption developed from individual experiences of life-altering diagnoses predict that unforeseen events such as the pandemic will restructure individual perceptions of their future life narrative. Such theories have been developed from adult experiences, however, with scholars suggesting that normalcy may be more salient to children's experience of chronic illness. Children's experiences might be expected to vary from those of adults' due to their different structural position and younger life history which shifts children's perceptions of temporality, normalcy and disruption. Empirical evidence from young people with chronic illness, meanwhile, describes diverse experiences of continuity and disruption, while the rhythms and interruptions of childhood chronic illness remain without an adequate explanatory framework. Aotearoa New Zealand's zero-COVID approach presents a unique opportunity to understand children's perceptions of disruption and continuity. I worked with 26 children aged 7–11 living in diverse locations in Auckland, developing a comic-based method to elicit children's perspectives and co-construct narratives over virtual or in-person research visits. Juxtaposed with caregiver experiences and paediatric asthma research, I analyse children's perspectives to suggest how children differently make sense of and accommodate crisis events. I argue that moving beyond biographical disruption to address the bio-psycho-social factors producing diverse ruptures, discontinuities and interferences will more completely represent children's experiences of chronic illness and life crises.

KEYWORDS

COVID-19 pandemic; childhood; graphic ethnography/comics; biographical disruption; asthma

Introduction

I drew comics with 10-year-old Blaze outside on his grandfather's deck until the spitting rain forced his mother, hesitating, to move us indoors.[1] It was early December 2021 and the New Zealand government had recently abandoned its zero-COVID

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approach in favour of a new and complicated 'traffic light' framework for managing COVID-19 risk as the virus settled into communities. Auckland had entered the traffic light system at 'red' level, and while there were no official restrictions on private in-person gatherings, we adults were still calibrating our risk tolerance. Blaze's mother had chosen an in-person research visit over the Zoom option I offered, but she had seated us outside for risk reduction. As she resettled us at the dining table 1 offered to wear a mask and she said no, but tentatively, perhaps uncertain about the rules of hospitality.

Blaze, meanwhile, was unfazed by any of it. Still dressed in school uniform, he answered my questions about his experiences of the pandemic as if he were describing his everyday school life. Blaze normally lived in Japan, so he had been through a year in 'state of emergency', and then, to visit family for several months in New Zealand, he had spent two weeks in hotel quarantine before being caught in the strict lockdown imposed with Auckland's Delta outbreak in August.

> 'How have you found it to be living in COVID-19 times?' I asked him.
>
> 'Um', said Blaze, evenly. 'Well, because it's been going on for such a long time it almost feels like normal life'.
>
> 'It's kind of crazy really', I replied, referring both to the extraordinariness of living through a pandemic and also the way that the extraordinary could feel normal.
>
> 'Hmm and it almost feels like um, something crazy is going to happen', Blaze agreed, nonchalantly. When I probed, he added, 'Like, one of my friends might get COVID. Family member'.

Intrigued and a little perturbed by his neutral affect, I asked, 'What's a big feeling that you had during all of this time?'

> 'Um … ' Blaze said. 'I don't know … that's another new question I've never asked myself'. He didn't think he had been scared, or bored, or annoyed, or happy.
>
> 'You were just kind of chill', I commented. And his feelings hadn't changed since the beginning, when he didn't know much about COVID.
>
> 'I still feel chill about it', he said.
>
> 'Was everybody else also pretty chill', I asked?
>
> 'Yeah', said Blaze. 'We didn't talk much about COVID'.

How does the life-threatening become normal, everyday life? This is a question I had already been pondering prior to the pandemic in my work with children with asthma. Asthma is a life-threatening, though common illness. In my research in the US and New Zealand, children described to me their acute fear that they might die during exacerbations – rare events that punctuated otherwise near-normal life – when their struggle to breathe became so severe they required emergency care (Spray and Hunleth 2022; Spray, Fechtel, and Hunleth 2022). And yet, in general, children were not that interested in talking about asthma, especially outside of those acute moments. As my American colleagues and I reached for creative activities to entice their attention, the message we got from children was that asthma management was, well, boring. Where parents would for hours detail

their efforts to control their children's asthma, children were more likely to view asthma as an annoying hassle, not worth more attention than it took to puff an inhaler.

When I returned to New Zealand to undertake two studies: one of children's roles in asthma management, and one of children's perspectives on the pandemic, I was not expecting much overlap. But in my early interviews with children about the pandemic, I was surprised to discover the same problem that had plagued me about researching children's perspectives on asthma in the US: New Zealand children did not find the pandemic particularly remarkable. Yet many of their accounts, captured in the comics we drew together, still featured extraordinary disruption. Even Blaze's comic began with a rupturing event: 'Oh no! State of emergency!' a wide-eyed figure exclaimed while watching the news. Three panels later, Blaze's comic showed his mother informing him his teacher had COVID (Figure 1).

Yet contrary to my expectation, very few of the 26 children I spoke to expressed serious anxiety about the pandemic, though many had experienced passing moments of worry.[2] While about half of the children emphasised the start of the most recent lockdown as a rupturing event, they did not comment on the pandemic as an extraordinary strange. Many did not even know the word pandemic, and they had forgotten New Zealand's earlier lockdowns. In fieldnotes, I wrote my impressions of their casualness, of my disconcertion at their blasé attitudes. Their emotional upsets were more directly related to lockdowns than the pandemic itself: children commonly expressed feeling bored, annoyed and frustrated, or sad and isolated in lockdown. Like asthma, COVID-19 was, above all, a *hassle*. More unexpectedly, many children expressed contentment and happiness about the perks of lockdown.

Why were children so unconcerned by a global pandemic that dominated global news headlines for two years and killed more people than the population of New Zealand? How is it that Blaze could experience disruption and also suggest he and his friends rarely spoke about COVID-19, consistently the predominant topic of adult conversation? New Zealand children had undoubtedly been unusually buffered from the pandemic's impacts, but Blaze had experienced most of the pandemic in Japan. The parallels between COVID-19 and asthma suggested that the answers to these questions were connected to childhood itself and its structural and temporal features. Children's perspectives, as biographically situated at the beginning of a life course and, in New Zealand, socially situated in small and cloistered worlds, might understandably be quite different from those of adults.

Most social theory that informs our understandings of crisis and disruption, however, is based on adult perspectives. Sociologist Michael Bury's concept of biographical disruption, developed from adults experiencing onset of rheumatoid arthritis, predicts that

Figure 1. By Blaze.

unforeseen events (such as a pandemic) cause a restructuring of individual's self-concept and perceptions of their future life narrative (Bury 1982). Bury's concept has found wide resonance as an explanatory frame for experiences ranging from motor neurone disease to infertility (summarised in Engman 2019), narrativising adult experiences of crisis events (either their own or their child's) as a linear progression from crisis, through to diagnosis, acceptance and normalising (James 1993). Such a restructuring process, however, could be expected to look quite different for a person aged 6 as to a person aged 16 or 36. Indeed, scholars have suggested that biographical disruption does not occur for children with chronic illness because the illness is incorporated into identities that are still in formational stages and families are concerned with 'normalising' their children's illness management (Williams 2000; Knafl and Deatrick 1986; Prout, Hayes, and Gelder 1999). Simon Williams, notably, proposed that notions of 'biographical continuity' – where illness experience confirms or reinforces biographical expectations – may better characterise young people's temporal experience of chronic illness (2000). Studies investigating young peoples' chronic illness experiences, however, have found *both* references to normalcy and experiences of disruption (Bray, Kirk, and Callery 2014; Monaghan and Gabe 2016; Ireland 1997). Characterising young people's life with chronic illness as normalised may oversimplify what is actually experienced as 'shifting, disruptive and discontinuous' lives (Larsson and Grassman 2012). Young people *can* experience biographical disruption, as Bray, Kirk and Callery (2014) suggest in their study of young people with incontinence, but they also might experience biographical continuity or even enrichment following surgical intervention. Variations of normalcy and disruption may also co-occur within individual experiences; Monaghan and Gabe (2016) suggest the term 'biographical contingency' to describe the way young people downplayed and normalised their life with asthma aside from the 'only sometimes problem' of intermittent symptoms. These studies describe children's lives with chronic illness as a peculiar mix of normalcy and disruption, but leave explanations as to *why* under-theorised. If normalisation of childhood chronic illness is explained as an under-development of biography, then how are we to theorise children's experiences of disruption? And, since most children do have a self-concept and biography that expects survival, how does the life-threatening become normal?

Recent advances in neurodevelopmental science offer new frameworks for explaining children's perceptions. Children's brains are characterised by higher degrees of neuroplasticity – the brain's capacity to modify its structures in response to environmental information – than those of adults (Oberman and Pascual-Leone 2013), suggesting biology, as well as biography may influence how individuals interpret change. Moreover, because of their distinct structural positions in society, children's experiences of their worlds can be quite different from those of adults. When the crisis is at a global scale, then its interpretation will be different for the adult for whom health communications are designed and for the child whose access to knowledge is highly mediated; the adult financially responsible for a household and the child dependent on that adult for survival. What is considered to be normal, what is a disruption, and what is an ordinary disruption versus an *extraordinary* disruption is therefore likely produced through a confluence of biological, historical, biographical and social-structural factors. Aotearoa New Zealand's version of the COVID-19 pandemic presents a unique opportunity to understand children's perceptions of disruption and continuity. With the New Zealand population

experiencing, under the zero-COVID elimination strategy, long periods of near-normalcy punctuated by abrupt lockdowns, the pandemic in New Zealand was, in fact, very much like the temporal experience of asthma.

How, then, to understand children's perceptions of the pandemic? In my experience working with children for research about asthma, I had encountered the challenge of accessing children's emic views of a disease they had lived with as long as they could remember. To understand the mundane, we must capture mundane experiences, but of the mundane children (and adults) bore quickly. This is why participant observation is such an effective method; we learn about normal life experiences by living them alongside participants, from our etic perspective encountering the familiar as strange. There are many reasons, however, why such immersion often cannot be accomplished, including time and geographic constraints, institutional structures, caregiving or community responsibilities, and, as many have recently encountered, health and safety concerns. To access children's lived experiences of the pandemic, I therefore innovated a method that could be used in a short in-person or online encounter with children: making comics. Combining a common method used in child research – drawing – with a format that has seen recent popularity as a dissemination tool – that of comics or graphic narratives, this method had the added benefit of appealing to children as producing a product that is *for children*, if subversively so (Horsman 2014). Several children told me they already cultivated their own comic-making practice. And, as a cultural form, comics represent the everyday within the extraordinary and vice versa; Marvel heroes whose alter-egos live ordinary lives, and ordinary kids whose activities become heroic or heroically incorrigible but always remarkable.

Background Context

Comic-making for the Pandemic Generation study took place between November 2021 and March 2022, a period where rapid changes in the COVID-19 pandemic restructured the everyday experiences of people living in Auckland (Figure 2). As with adults, children's experiences of the pandemic in New Zealand were highly mediated by the government's response, which attained global recognition for suppressing cases of community transmission and limiting deaths. By January 2022, New Zealand had reported only 52 total deaths from its 5.084 million population. This was accomplished through an 'zero tolerance elimination' strategy which used a four-tier 'alert level' system, lockdowns, contact tracing and other measures to forestall further community transmission of any detected case (full details available at Ministry of Health 2021a). At the same time, national borders were closed to all but New Zealand citizens (and select essential migrant workers), who were required to undergo a two-week stay in a hotel quarantine facility under the Managed Isolation and Quarantine (MIQ) scheme.

Aside from international travel restrictions, the zero-COVID strategy meant that after the first significant lockdown between 23 March and 13 May 2020, near-normal everyday operations resumed in Auckland, with only brief level 3 regional lockdowns occurring in August 2020 and February 2021. Outside of these level 3 and 4 lockdown periods, Aucklanders experienced level 1 or 2 restrictions, which included mandatory record keeping, masks, capacity limitations on venues and physical distancing. For children, school and home life continued with few interruptions until an outbreak of the Delta variant triggered a sharp level 4 lockdown beginning 17 August 2021. This

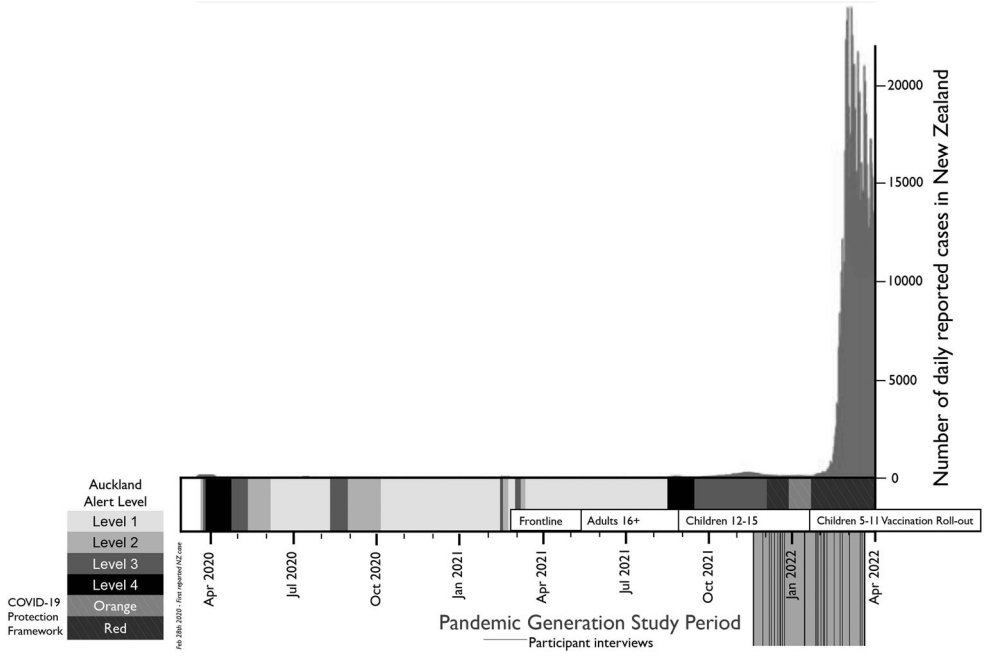

Figure 2. Timeline of the COVID-19 pandemic in Auckland alongside the Pandemic Generation study period.

strict lockdown continued through to 2 December 2021 for Auckland and other parts of the North Island. Although schools had previously been closed during levels 3 and 4, they opened in limited capacity with public health measures from 17 November 2021. Children from year 4 (approx. age 8) and up were required to wear masks in schools and student numbers were limited through cohorting and half-time attendance (Ministry of Health 2021b).

The August 2021 outbreak evaded elimination and ended the hitherto successful zero-COVID strategy, though Delta cases never exceeded 200 per day. Following mass vaccination efforts that achieved 90% vaccination rates of the population aged 12 and over in most regions, the government replaced the alert-level system in December 2021 with the COVID-19 Protection Framework (known colloquially as the 'traffic light system') that aimed to suppress transmission but maintained most hospitality, retail, services and education at close to normal levels. Under the traffic light system, schools at red or orange levels remained open with health measures in place, including physical distancing, masks, and mandatory staff vaccinations.

Children under 16, meanwhile were the one group left unprotected by vaccination as the Omicron variant took hold in the country from mid-January 2022. The Pfizer vaccine for 5–11 year olds was approved by New Zealand's medical safety authority, Medsafe and the New Zealand government for a roll-out beginning 17 January 2022, but even children in this age group who got vaccinated immediately were far from completing the three dose regime required to minimise Omicron's risks. Consequently, the largest proportion of the population who tested positive for COVID-19 in New Zealand's first real wave were children (Martin and Xia 2022). By this stage of the Pandemic Generation study,

the children I was interviewing either knew someone who had tested positive, had themselves tested positive, or described large numbers of classmates isolating after exposure. Children's experiences of COVID-19 therefore shifted from indirect to direct effects of the virus over the course of the study period, a shift that was reflected both in the content of children's comics over time and in the few opportunities I had to follow up with children after the research visit.

Making Comics with Children

The comic-based interviews were part of a wider study of children's representation and inclusion in COVID-19 public health promotion. I recruited 26 children aged 7–11 (mean = 9.15 years) through personal networks and advertising on community Facebook pages representing different areas of Auckland (Table 1). Because communities of similar ethnic and socio-economic background tend to cluster by geographic regions, recruiting for geographic diversity helped to achieve a broadly diverse representation of the varied childhoods that Auckland children experience. The study participants included, for example, childhoods lived in overcrowded homes in dense urban South Auckland, in affluent East Auckland where the backyard pool has a slide, and in the semi-rural forested mountains of West Auckland. As the recruitment strategy relied on parent gatekeepers, the parents who reached out to me were more often New Zealand European (white) and middle-class, with a particular overrepresentation of health and education professionals. Roughly half the child participants identified as New Zealand European, while the other half represented Māori, Pacific and Asian ethnic groups in equal measure. Five children identified as having a disability, most commonly boys with ADHD.

I invited caregivers to decide with their child whether to participate over Zoom or in person. For the 16 families who chose in-person visits, we used variable health measures

Table 1. Table of participant characteristics ($N = 26$).

	N (%)
Age	
7	3 (12)
8	4 (15)
9	8 (31)
10	8 (31)
11	3 (12)
Gender	
M	12 (46)
F	14 (54)
Ethnicity*	
New Zealand European	13 (50)
Māori	5 (19)
Asian	5 (19)
Pacific	5 (19)
Geographic location	
North Auckland	6 (23)
East Auckland	4 (15)
Central Auckland	2 (8)
South Auckland	6 (23)
West Auckland	8 (31)

*Some participants identified with more than one category. 'Asian' participants included Chinese, Japanese and Indian. 'Pacific' participants included Samoan, Niuean and Fijian. Six children in the 'NZ European' category had at least one parent who had migrated to New Zealand from Europe or the United States.

depending on caregiver comfort and current alert level (researchers fully vaccinated, pre-visit symptom screen, some visits were held outside and in others the researchers wore masks). I worked with 10 children over Zoom, and the choice of online participation was usually connected to parent precautions or presence of symptoms in the family, and sometimes convenience. Families often preferred in-person as children were experiencing Zoom fatigue from online schooling. A student researcher also accompanied me to two in-person and one online visits. In-person visits enabled more contextual data that assisted interpretation, captured after the visit in field notes, including a sense of the home and neighbourhood environment, family dynamics and relationships with pets. Usually caregivers were interested in the visit and while most gave the child and I space and privacy to work together, when I invited caregivers to share their perspectives they were keen to talk at length about their challenges and impressions of their child's experiences. I found these adult perspectives provided useful context for interpreting what their child shared, especially as parents would often bring up aspects of the family's pandemic experience that were unremarkable or forgettable for their child. Some parents also spoke to me over Zoom but because they were not formally invited to participate in the study many left their child alone with me for the duration of the online visit.

At the beginning of the Zoom or in-person visit, I explained to children that I was a researcher interested in hearing children's ideas and stories because often the adults making decisions for children about the COVID-19 pandemic had not actually talked to any children and they sometimes made mistakes. If the child chose to participate, we would begin by making a brainstorm of their memories, and from there the child could choose which aspects they would like to illustrate in their comic. Building on a prior methodological innovation, *drawing together* (Spray 2021), I explicitly positioned myself as co-participant and co-drawer to facilitate empathic and egalitarian relationalities. Children could choose to draw their own comic, or they could tell me what to draw, or we could draw it together, but children had creative control. Most children drew all or part of their comic, but some preferred to have me draw. When children chose to draw their own comic I co-participated by asking questions or engaging in conversation about what they were drawing, offering prompts ('what would you be thinking or saying in this panel?') and drawing a picture of us working together (Figure 3). Most children chose their own pseudonym or 'secret name' under which to author their comic. I recorded our conversation throughout the brainstorm and comic-making processes. When the visit was over I invited the child to keep any drawings they wished and either photographed, scanned or digitally exported copies. Two children had not completed their comic to their satisfaction by the time I left and their caregiver sent me a photograph of their finished comic a few days later.[3]

After the audio recordings were transcribed, I analysed the transcripts and comics by identifying themes from a subset of transcripts and iteratively developing a codebook that I used to code the remaining data, supported by NVivo software. Among the most dominant themes were experiences of disruption or references to normalcy, but I also found in children's talk or drawings a number of phenomena that evaded either definition: temporal discontinuities, strange familiarities and uncertain peculiarities. These ambiguous experiences invited a deeper analysis of the forms that disruption can take and the bio-psycho-social factors that influence how children interpret and experience the normal, the disruptive and the unsettled in-between.

Figure 3. Two sisters drawing comics with Julie. Illustration by Julie.

Biographical Disruption and Beyond

One weekend in August 2021, Lola was named player of the week in her netball game. She took the trophy home to show her mother, and she imagined how, at school assembly on Friday, she would go up on stage for the formal awarding. Yet, she discerned from her mother on Monday, the country would be going into lockdown that night. She would not go up on stage. Instead, she told me in November, she had been waiting ever since for lockdown to end. '5 months later…' she wrote in her comic (Figure 4). 'I can't believe lockdown's still here'. It had actually been only three months. When I asked Lola to tell me something that had happened for her at the beginning of the pandemic, we talked around in circles; I was imagining March 2020, and she was telling me about this year, 2021. Time had both expanded and contracted for Lola. She did not think of lockdown as normal life, exactly, because she still had the trophy that should have long ago been re-awarded to someone else. But she had gotten on with life. 'You're the only one I talk to about the pandemic', she told me. I had talked with her twice.

The debate over whether or not children experience biographical disruption has set the discussion in binary terms: disruption versus normalcy; contingency versus continuity. Originally associated with the *onset* of chronic illness, biographical disruption has never represented an adequate framework for understanding the recurring changes, disruptive events and challenges engendered by many chronic illnesses across a life course. Instead, the potency of the biographical disruption concept may have glossed over what are actually

Figure 4. Lola's comic.

multiple, distinct bio-psycho-social processes of interpreting and coping with illness or other major events. In other words, biographical disruption is not the only *form* of disruption germane to chronic illness experience. The comics of children like Lola showed that the pandemic's disruptions could appear in different ways, shaped by different confluences of biological, biographical and structural factors.

For Lola, biographical disruption appears as an experience of lockdown as a *rupture*. She missed out on a major biographical event, receiving her trophy on stage. Her experience of biographical disruption was different from that of adults, however, not least because her access to information was highly mediated by her mother, who brushed off her questions. Additionally, the temporal patterning of her lockdown experience indicates *discontinuity*: she is in a period of misalignment, waiting for normal life to resume. In the everyday rhythms of life, the blurry boundaries between continuity and discontinuity are only sometimes brought into relief – when she sees the netball trophy on her shelf long after she was meant to have returned it for the next player of the week. Lockdown, after-all, is not dissimilar to school holidays, except for the parts where it is not. And, her comic illustrated Lola experiencing the pandemic as *interference*. She could not do what she wished to do – see friends. Eventually, she pestered her mother to allow her to break lockdown rules and thus overcame the interference.

Parsing the distinctions between rupture, discontinuity and interference is important because the experiences are produced through different processes and require different kinds of *work*. As I will go on to show, these processes can be located in the plastic neurobiology of human brains as influenced by socio-structural and biographical experiences. Rupture, as I see it, is akin to Bury's (1982) conception of biographical disruption, occurring when an illness or event is unaccounted-for by an individual's taken-for-granted cognitive structures, systems and explanatory frameworks for everyday and expected future life. Rupture requires re-surveying the landscape of the body and its world and a redesigning of neural architecture to incorporate these new body- and life-scapes into a cognitive schema for self-understanding and operation. Discontinuities, meanwhile, occur when an individual's experience is misaligned with their cognitive schema for interpreting that experience, necessitating a modification to or shift of schematic structures so that the world may be taken-for-granted once more. Discontinuities do not turn a world upside down and do not require an overhaul of foundational neural architecture, but they do demand a cognitive shift in schema that demands momentary attention, conscious or subconscious, to reroute a neural connection or modify a schema. Interference, meanwhile, may present as unexpected but not unfamiliar challenges to carrying out life within those established structures, requiring additional energy, time or strategies to navigate or accommodate the obstacle and resume (as close to) 'normal' operations. As they are experienced, ruptures may be accompanied by shock, upheaval or fear, discontinuities by disconcertion and interference with annoyance, frustration, stress or anger. In the following sections, I detail how I saw these three forms of disruption playing out through children's experiences of the pandemic, what might be producing them, and why children's perceptions of disruption might differ from those of adults.

Rupture

Like Lola, the comics of about half of the children in the pandemic generation study featured *rupture* as a primary experience of the pandemic. Most children had only vague memory of New Zealand's first major lockdown in March 2020; instead, the recent August 2021 lockdown had come as a shock to what had prior-to been experienced as normal life. Many children represented the moment of *finding out* about lockdown, including eight-year-old Santa who drew herself hearing the news from friends at

school (Figure 5). Eleven-year-old Loki instructed me to draw his story of expecting to see his friends at school the next day only to hear he would not be returning to school after all (Figure 6). Nine-year-old Lachie told me about not getting to participate in school speech finals the week after lockdown. Children drew the shock of finding out that the things that are meant to happen tomorrow or next week might not happen, of realising that structures of life thought to be predictable could not be assumed secure.

Having the things we expect to happen, not happen, actually occurs all the time, however. Children get sick and miss school. An event gets cancelled because of poor weather. We do not make stories from these occurrences – though unexpected, they are not remarkable changes. It is not the change in events itself, therefore, that we experience as disruption, but a prior-to unknown *cause* of the change that turns something from an unexpected but mundane cancellation to a rupture – what Bury describes as disruptions to the explanatory frameworks people normally use to understand their world. If Lola had missed receiving her trophy on Friday because she unexpectedly woke up with a cold, this would have been a disappointment. But because she missed going on stage because of an unknown cause – a lockdown – this became an abnormal disruption that sat outside of her schema for normal life.

Figure 5. By Santa.

Figure 6. By Loki.

Yet children seemed to experience rupture differently from adults.[4] Not only had they largely forgotten the pandemic's first major rupture in March 2020, by the end of the study period children were no longer commenting on the August 2021 disruption either. And many children did not describe ruptures at all – if they had even experienced such disruption it had faded from memory, no longer salient. Seven-year-old EvilPiggie, who I worked with in late February 2021, couldn't remember first hearing about COVID-19 and, like Blaze, conveyed no shock or surprise about the pandemic. He vaguely remembered the first lockdown, that time in year 2 where he had to learn from home, and how that was harder. When I asked about a big feeling he'd had about the pandemic he responded that he didn't know how to answer the question.

'Have you felt scared of it?' his mum asked.

'Hmm not really', EvilPiggie responded, 'but like I haven't been all jolly like, hooray!'

'The stupidity of mankind, is one of my thoughts about it', said EvilPiggie's mum. She had big feelings about the pandemic.

'Do you know why the pandemic is such a big deal to us grown-ups?' I asked.

'Yes'. EvilPiggie replied.

'Yeah what do you reckon?' I asked.

'Well', said EvilPiggie, neutrally. 'First thing is killing lots of people, the virus, so'.

Neuroscientist David Eagleman (2020) has recently advanced an emerging view of how brains work as *liveware*, a model that suggests, at least partially, why Lola was so preoccupied with her experience of lockdown as rupture while EvilPiggie, four months later, could declare mass death with such casualness. Liveware, according to Eagleman, describes an organ that is constantly reprogramming its own operation in relation to the body-within-a-world it occupies. To do so, highly plastic human brains formulate models of what to expect from the world – or schemas – modifying and refining these models when confronted with sensory information that is different from what was expected. These models manifest as material structures within the brain: particular constellations of neural cells produced through neurogenesis and changes (strengthening, weakening, adding or pruning) to the synaptic connections between nerve cells (Pascual-Leone et al. 2005; Feldman 2009; Oberman and Pascual-Leone 2013).

Of particular relevance to experiences of disruption, brains are substantially concerned with calibrating *normalcy* so as to detect deviation from the norm. Because the brain receives a much greater flood of perceptory information than our attention has capacity to hold, data that is *static* – the regular perceptions of a normally functioning body; the systems and structures of everyday life – are encoded in stable neural networks and, once established, muted from attention. Data the brain finds to be predictable are taken for granted, unseen and unnoticed. Only if the brain's expectations are violated does it spend energy on representing the data and drawing our attention, because attention, biologically manifesting as electrical activity across synapses, carries a high-energy cost. This is why we don't tend to hold awareness of regular states of being – as described by sociologist Leder (1990) as phenomenological modes of 'dys-appearance' – we don't tend to notice our breathing or heartbeat or the traffic outside the window or that our

neighbours are wearing clothes. We do notice when our breathing becomes obstructed, or when we open the door and feel surprised to note snow where yesterday there had been none. We are startled when we drive on empty roads that are usually full of traffic, or see the people in the store wearing masks when last week masks were only for surgeons. And then our brain recalibrates the normal. We feel wobbly on land after being on a boat because our brain has calibrated itself to a new normal that is rocking.

We notice changes, but there is also a difference between a new and notable change and a normal change. The snow would be really startling if we lived in a part of the world that did not get snow, but if snow is a yearly event, then our brain encodes a schema for that. We notice the snow in order to link our perception to the schema for annual snow that, having not been accessed for a year, sits dormant in a deeper layer of memory. But if we have only just moved to this snowfalling region, we do not yet have a schema for snow and the brain must do the work of constructing one. If we have never seen people wearing masks in the store before, we will feel surprised by the sight until our brain has architected a model for public masking. And then, as the perceptory data for mask-wearing in stores become firmly connected through neural cells to our model for mask-wearing, we stop noticing the sight at all. Masks become just another piece of clothing our neighbours wear. Perhaps, seeing a bare face in a sea of masked ones becomes the change that draws our attention instead. Or, with frequent changes, we adjust faster, in essence learning *two* normals: the world with snow and the one without. Regular boat-riders can adjust their sealegs in seconds.[5]

So what is different about this for children? This process of encountering stimuli and constructing corresponding mental models shifts over human lifespan. As Eagleman describes, most of the architecture for these models is laid down and refined in early life, becoming calcified deep in the brain's structures. These brain structures consist of layers with varying degrees of modifiability, or neuroplasticity, so that some layers may be quickly rewritten and others are more conservative, constructed and modified slowly with repeated experiences over years, retaining unused mental schema deeply burned into it for long-term retrieval years later. These 'slow layers' of conservative memory provide a framework for fast layers, meaning that early experience develops the architecture upon which everything else is built. These deep brain structures may be thought of in terms of Bourdieu's (1984) habitus: the architecture and mechanics of the 'structuring structure' that guides our habituated ways of perceiving and acting in the world. As people age and discern the rules of the world, the brain is less frequently challenged with unexpected stimuli, the internal model of the body and the world settles into place, and that which is settled is locked away out of attention to conserve energy.[6]

Children, meanwhile, occupy a rapidly changing body (Christensen 1999) and often rapidly changing world. They are still calibrating huge amounts of perceptory information. There is much less that they can discard as established norms. Their highly plastic brains with few established slow layers are continually remodelling themselves as they acquire information about the world at the same time as that world and their body is in constant flux. They are, in effect, having constant experiences akin to first encountering the snow outside. They are continually recalibrating new schemas for normal: the rules at home do not apply at school; our feet outside remain dry in summer but become wet in winter. Sometimes, people start to wear masks. Without

the vantage point of years of experience, children cannot directly discern whether snow is a normal change or an anomaly. A pandemic could be a normal strange.

Indeed, I found that during the 26 conversations with children over the four-month period, children remarked upon their contemporary novel experiences, while past novelties faded from memory or relevance.[7] The rupture stories of the August lockdown peppered early interviews and largely disappeared from later ones. Eight-year-old Jonathan, whom I interviewed in February 2021, remembered missing his friends in 2020, but his rupture story focused on an event in November where, while at a funeral, his family found out that another mourner had just received a positive test result and they raced to a testing centre. Jonathan drew himself in a state of confusion at the funeral; he had not known what COVID-19 was, I realised as we talked about his comic (Figure 7). Jonathan only knew that there was a serious issue because, as he describes, someone spoke in 'like a kind of tone voice like, something's going to happen. So, I got confused and I was wondering what's going to happen'.

In mid-November 2022, Auckland schools reopened and children's comics reflected novel experiences of wearing masks and social distancing at school. Ten-year-old Sofia's comic, from December 2022, skips past any rupture that she might have experienced from the onset of lockdown to begin with the tent she made from blankets during lockdown and then the return to school, commenting on the strangeness of returning to the familiar, and a familiar that is now strange (Figure 8). By March 2022, children no longer commented on masks as strange, just annoying. 'I'm kind of used to masks now', commented EvilPiggie. Instead, children described the strangeness of half-empty classrooms while large numbers of children were quarantining as infections spiked. When I conducted a follow-up interview in early March with Santa and her sister, who were recovering from COVID, they were unfazed by their illness. 'The only thing that sucks' was that they'd missed out on a dance event. When I showed Santa the picture she'd drawn months earlier showing the rupture of lockdown she made no

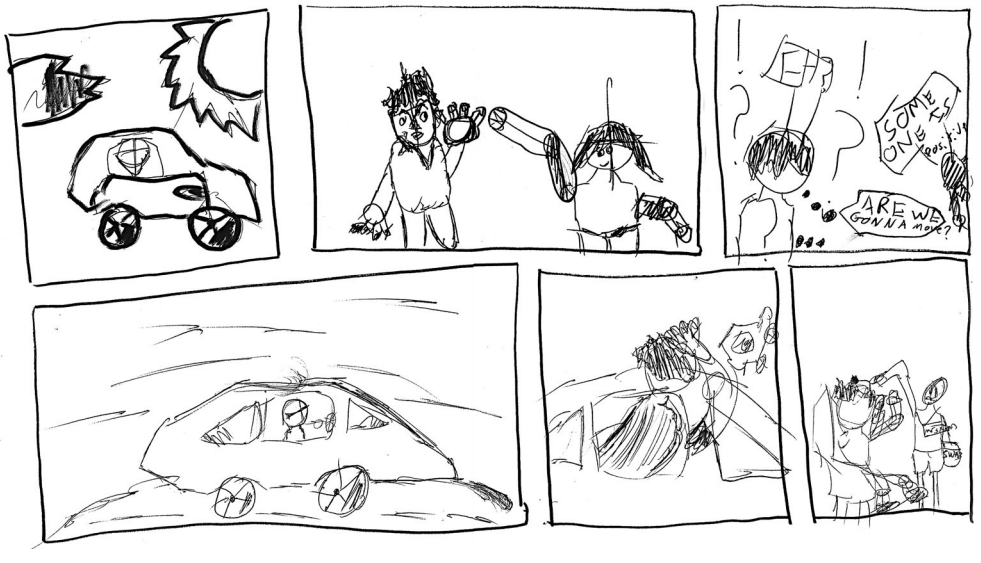

Figure 7. By Jonathan.

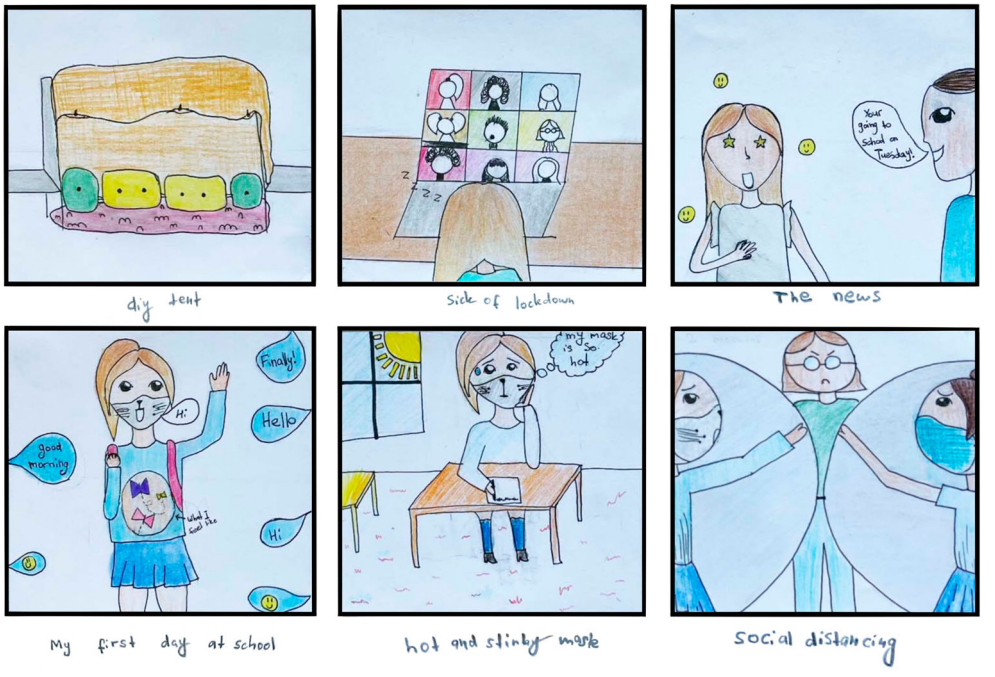

Figure 8. By Sofia.

comment. She only worried at night that her house would burn down because they'd left their computer plugged in. Now that the strange virus was familiar, her mind was calibrating expectations for other risks.

Discontinuity

When I talked to nine-year-old Izzy over Zoom, I struggled to elicit much comment from her about the pandemic. Thinking the conversation a failure after my questions elicited only a string of 'I don't knows', I suggested we try drawing her comic. To my surprise, she filled two pages illustrating her memories of lockdown: getting stung by wasps in the backyard treehouse; playing and watching movies with her brothers; visiting the dairy (convenience store) to buy lollies, and a birthday party with red velvet cupcakes where two friends consecutively visited her outdoors for an hour. The only experience of disruption that appeared in this picture of idyllic childhood was the wasp stings (Figure 9).

It was only after talking to her mother that I was able to realise the significance of the pandemic to Izzy's experience. She drew going to the dairy to buy lollies because this was the *only* place she went outside of the house. She drew playing with her brothers because the family had abandoned online schooling. Her birthday party consisted of consecutive outdoor playdates because of the pandemic restrictions at the time that allowed contact between no more than two households at a time. She drew red velvet cupcakes because blowing out candles on a cake was deemed an infection risk. Initially, I thought Izzy had just drawn her favourite experiences in a world she regarded as normal. After all, her life was more or less the same as it was during school holidays. She did not differentiate between the wasp stings that are a fixture of childhoods globally or experiences that

Figure 9. By Izzy. Izzy chose the name of her friend Izzy as her pseudonym, so it is her friend Izzy whom she is referencing in the comic.

directly manifested from the pandemic. Her comic did not show lockdown as a rupturing event but in almost every panel she marked discontinuity, expressed most directly in the annotation: 'Yay we don't Have to go to School'.

Izzy, I came to realise, was telling me of a strange, if strangely happy time. Something had changed, but Izzy couldn't verbally express what. Izzy's mother Kelly, meanwhile,

who chatted to me after Izzy had finished her comic, shared a narrative consumed by the pandemic's restructuring of everyday life, from the stresses of working from home while home schooling the children, to careful decisions made about who the family would and would not see. Having long established a strong sense of life's systems and structures and of the childhood she expected to create for her children, Kelly pinpointed the disruptions that were direct consequences of the pandemic. Izzy's experience of discontinuity was more vague than Kelly's, expressed in ways so subtle that I almost missed it. In those months of lockdown Izzy inhabited a childhood that tracked almost normal, except for moments when the tracks slipped sideways. The schema for holiday or weekend was a fine mental model for the pandemic until she could not have a normal birthday party and the discontinuity, like a camera operator caught in the background of a film, momentarily tripped the neurocircuitry that had assumed one version of the world.

Discontinuity is different from rupture, though. Where rupture upends the foundational schema of operation, requiring the establishment of new explanatory frameworks, discontinuity occurs where individuals, operating on one framework for normal, encounter something unexpected that stutters or unsettles the taken-for-granted back into consciousness. Because children already have a schema for playing at home – and lockdowns bled into school holidays – they already had a basic mental schema for normal life that meant the everyday experience of lockdown could, for long periods, disappear from attention. When the discontinuity draws attention, then consciously or subconsciously the brain must modify existing schema – for example, strengthening neural connections between newly linked ideas – or shift between schema (this is not holiday, this is lockdown).

For New Zealand children, this cognitive work of accommodating discontinuities was very much shaped by their social position as children and the cultural constructions of childhood that influenced the environments their brains were making sense of. The comics of children like Izzy reflect an ambiguity between normalcy and disruption that was *deliberately cultivated* by the adult world with the intent of protecting them. Some families described conscientious efforts to create lockdown routines for the express purpose of quickly reconstructing a continuous experience for their children. Parents were also encouraged by expert commentators to downplay or conceal their own alarm or anxiety about the pandemic. 'Don't talk to your kids if you are feeling anxious or fearful', celebrity microbiologist Siouxsie Wiles advised parents in a March 2020 op-ed for a popular online publication (Wiles 2020). 'They will pick up on your anxiety and that will make them anxious'. Instead, Wiles advised parents to 'Stay calm, and if they start to get anxious, acknowledge their feelings and suggest you talk about it another time'. Such advice may well have protected children from anxiety but it did so through a pretence that also sent children the message that the pandemic was a normal strange, essentially gaslighting them about the extraordinary disruptions that were to come. 'I don't know if we educate them enough about COVID', Izzy's mum Kelly mused to me after Izzy had finished her comic, telling me they had tried to shelter the children from too much information. Many children did not find the news media or government press conferences particularly accessible, and most pointed to parents as their main source of information.[8]

As a result of this highly mediated environment, children's everyday experience during the pandemic could be very similar to hitherto-known everydays. They may

have quickly accommodated the pandemic's ruptures into new schema for understanding and operating in the world, but their previous schema for normal life could also work pretty well – until those disconcerting or strange moments when they did not.

> 'When we were in the supermarket, I just think, oh my god, oh my god, oh my god, all of these people with masks on', Lola told me in that November interview. 'Well yeah they're pretty obvious because it's lockdown but … ' she trailed off.
>
> 'Yeah what do you think when you see people with masks?' I asked.
>
> 'I'm just like, oh, oh my god it's still lockdown! Whoopsie'.

Given children's neuroplasticity, it may seem surprising that 1.5 years into the pandemic Lola was still shocked to see mask-wearers in the supermarket. But in New Zealand, mask wearing had not been a component of the first major lockdown nor were masks mandated or encouraged at lower alert levels between lockdowns. And, critically, at the time I spoke with her, Lola had only recently been *allowed* to go to the shops. Under alert level 4, only one shopper per household was permitted to go grocery shopping. Lola was commenting on a novel experience, mediated by age-based structures of society. Moreover, until the moments where the masked people in shops brought it into sharp view, *lockdown* had become forgotten, backgrounded by the brain as a staple of life that did not require attention. Lola was not living in a state of rupture, but she was experiencing discontinuity – like her trophy, the masked-shoppers told her this was not a new normal but a liminal wait for life to resume.

Izzy, on the other hand, may have been perturbed by the discontinuities when she noticed the mix of strange with the familiar, but the strange was also an appreciated escape from the demands of school life. Discontinuities, therefore, might require energy to adjust to but are not necessarily distressing for children. Discontinuities, in fact, may be a normal and expected biographical experience of being a child.

Indeed, children generally imagine themselves growing up, and so their expected biography involves a set of dramatic biological and social changes: they know their bodies will get bigger, they will go to work instead of school, they will become independent adults and, perhaps, parents instead of dependent offspring. While such changes unfold mostly in the direction of adulthood and not the reverse, however, they are not gradual and seamless. Bodies and circumstances suddenly change. In her landmark study of Danish schoolchildren, Christensen (1999) describes the tendency of children to remark upon quite mundane bodily changes – scabs, new teeth – suggesting a process of grappling with the novel phenomena their biology produces and reconciling those experiences into cognitive schema for how to occupy and operate their body. Socially, moreover, children do not wield a great deal of power over their circumstances. The conditions of their lives largely in the hands of adults, children variably encounter discontinuity as they are moved between schools or homes, experience new classrooms and new teachers with new rules or parental breakups and even new parents (Spray 2020b).[9] Children may have a general sense of a biography that will unfold before them, but what their future self will look like and the actual processes of getting there are often vague (James 2005).

If children are constantly generating and shifting between new schemas throughout rapidly changing childhoods, then children will not have the same perspective as an

older person to distinguish a normal discontinuity from an extraordinary change. The COVID-19 pandemic may have produced discontinuities for children, but, particularly in their mediated and cloistered world, they may not recognise how *anomalous* those discontinuities are. Even when provided with some context, children did not quite grasp the unprecedented nature of this pandemic. Seven-year-old EvilPiggie explained that his COVID-19 vaccine was outside of the routine immunisation schedule, commenting, because 'I've not been through a pandemic in my life. Pandemics are really rare to happen'. Perhaps hearing of the flu or polio epidemics, EvilPiggie posited that people experience pandemics about three times in their life, meaning 'people who are alive now, they've been through this'. Without years of experience with which to calibrate an extraordinary disruption, the pandemic became yet another normal discontinuity. Indeed, when I saw Lola five months later and asked how she now felt seeing people wearing masks, she shrugged. 'Mm, it's kinda normal for me now'.

Interference

In the bronchial tubes of children with asthma, inflammation festers or subsides, creating temporally different experiences of the body (Spray, Fechtel, and Hunleth 2022). There are times when children may not have symptoms, others when wheezing or coughing interrupts their activities, and moments where acute exacerbations threaten survival itself. Yet children with asthma often do not detect symptoms such as chest tightness or wheezing that concern parents or doctors (Fritz et al. 2007; Callery et al. 2003). Their brain, I suggest, has disappeared those symptoms as another form of normal. As with the brain that has a schema for dry and a schema for snow, an individual may have a schema for a body that breathes freely and a body whose breathing is laboured. Both may be interpreted as normal states of being.

The laboured body, however, can produce interference to functioning that, at a certain threshold, must be dealt with either through removal – treating the asthma symptoms – or through accommodating the interferences.[10] The bodily intrusions of chronic illness, therefore, may be a normal part of children's everyday but still represent interferences that disrupt their ability to accomplish immediate goals. Asthma symptoms, like a pandemic's lockdown, get in the way. Pandemic restrictions, like asthma symptoms, must be waited out, negotiated or accommodated.

Unlike adults, children I worked with did not convey a sense of *biographical* interference – the pandemic intruding on their progression towards a future self. Children were upset to miss key experiences such as birthdays and camps, but did not convey a sense of a restructured life course, even as the pandemic restructured their childhoods. Children may not interpret interference in relation to their biographical selves in the same way as adolescents or adults, I suggest, because although children have vague expectations of growing up, in their day-to-day life growing up is not a primary *goal* (Harris 1998). As Kathryn Stockton (2009) has argued, in contemporary Western societies middle childhood and adolescence have in fact become periods where social structures are created to *delay* growing up. Children and young people are shielded from adult concerns and responsibilities so that they can focus on schooling and avoid the risks of independent life, delayed maturation seen as an investment in the future adult. While children's growth is measured and marked through school year levels and height charts, they are not expected to approach anything like adult bodies, responsibilities and activities for

some time. Indeed, in studies including my own, children paint dire portraits of adulthood as a time of responsibility and stress and more freedom but no fun (Spray 2020b; James 2005). Children's goals are instead, firstly to survive, and secondly, to live a good life while biology and social structures move them towards adulthood. For many, this means enjoying the benefits of cloistered childhood protected from the intimidating complexities, obligations and dangers of the adult world.

So while adults expressed concern about children falling behind in school due to lockdown's interruptions to schooling, no children expressed this concern. Instead, children were concerned with how the pandemic had interfered with their ability to live a good life. Lockdown interfered with their social lives, preventing them from seeing their friends. Restrictions interfered with their ability to play the games they sought. Once schools reopened, social distancing rules interfered with their ability to create physical intimacy and attain the benefits of touch. Masks interfered with their ability to breathe comfortably. Experiencing symptoms and needing to get tested interfered with going to school to participate in the ongoing projects of cocreating social ecologies. Children sought continuity not in *who I am* – because who they are is always changing anyway – but in pursuing the good life. Nine-year-old Charlie, for example, remembered the good life as rolling in the sand at the beach to become a sandman and scootering through his neighbourhood with his friends (Figure 10). In his comic, he draws himself in his living room remembering his sandman and scootering days, before depicting himself struggling on a laptop with online school, looking sadly out a window, suffering the indignity of a nose swab, and walking up a hill with his family. 'I hate

Figure 10. By Charlie.

walks', the ant-like figure on the hill complains. Charlie wanted to be playing running games with his friends. Many children expressed sadness at 'missing out': the result of interference to the activities that facilitate children's relationship-making. As nine-year-old McKenzy put it, 'I really wanted to go back to school to play my game with all my friends. Then I realised that none of my friends are at school'. They were all at home quarantining too.

Yet, if children's goals involve surviving, why were children more concerned for their social lives than for their survival? The pandemic did threaten children's ability to survive. Yet there are all sorts of activities that threaten our lives, and the energetic compromises required to hold all risks in our attention would impair other functioning. Part of children's survival work is, therefore, calibrating risk, to determine how to allocate limited and energetically demanding attention. These risk calibration processes are evident throughout children's everyday talk and activities: they catalogue morbidity and mortality to identify causes of death, illness or injury; they seek information about unknown dangers – sharks, volcanoes, crocodiles (Spray 2020b). They learn they must live with a degree of risk – driving cars, for example – and learn that dangers can strike unexpectedly; an innocuous insect turns out to have a shocking sting. They build schemas for understanding their world and its dangers in order to predict risks. As they gain experience, their brains compare expected with actual outcomes or perceptions, calibrating the degree of risk – the likelihood and the severity of the consequences – that they might safely take.

Indeed, children's comics are full of such processes of risk calibration and future prediction. Children drew moments of fear or worry, usually associated with a new experience and uncertainty about what it meant. Santa drew herself awake at 1am worrying about her COVID-test result. The pandemic's existential threat may have brought other risks to the fore; along with Izzy's wasp stings and Santa's worry about electrical fire, Kitten (age 8) drew herself after she broke her leg on the trampoline during lockdown. While many children recognised that the life conditions wrought by the pandemic were unusual, with only a short frame of reference, they did not necessarily distinguish between the pandemic and other unpredicted disruptions. Wasp stings, bone breaks and lockdowns were all shocks to children's calibrated sense of normalcy. Their brain learns, in those moments, what it had disregarded as predictable is not: carefree playing can carry hidden dangers from insects, bodies can break, tomorrow's normal school day may turn into months of lockdown. In their first experiences, these ruptures are all unusual to children, all the while childhood is full of unusual first experiences.

The first time she had to get tested, McKenzy remembers, she felt scared because 'I thought everyone dies when they get COVID. So I thought I was going to die'. When I interviewed her months later, however, McKenzy had been tested again the day before and was waiting for her result, unfazed. At this stage in the pandemic cases among her classmates were rising, a dangerous problem, she acknowledged, because 'you would feel like hanging out with them and you didn't even know they had COVID'. This time though, McKenzy felt confident the result would be negative. She just wanted to return to school and see her friends. Her sense of risk recalibrated to a new normal, COVID-19 had shifted from an existential threat to an interference.

Concluding Discussion: Beyond COVID-19

Contrary to some suggestions that children do not experience biographical disruption (Williams 2000), these children's stories of living through the COVID-19 pandemic show they can experience ruptures; children's worlds can suddenly change in ways unaccounted for by the explanatory frameworks and future expectations upon which they operate. In the context of biographies focused on immediate survival and thriving over vaguely imagined future selves, however, children's experiences of rupture may be more concerned with short-term events and experiences. And, without the decades of deeply consolidated architecture governing expected modes of operating in the world, their highly plastic brains can rapidly incorporate new cognitive frameworks for a world turned upside down. Evidence of biographical disruption from childhood chronic illness, therefore, may only be captured in the immediate aftermath of a diagnosis. What may linger are the discontinuities that occur as frameworks children expected to rely on stutter and are refined. As their brains work to discern and dys-appear the normal, children, like Izzy in this study, may struggle to identify and articulate verbally such ambiguous, fleeting and subconscious embodied experiences, especially from a youthful vantage-point still calibrating the range of life's ordinary and extraordinary experiences and risks. Comic-making may offer one method of accessing children's perceptions of strangeness beyond obvious ruptures.

Often children's neuroplasticity and this ability to accommodate disruption can be celebrated as evidence of children's 'resilience' or adaptability. The problem with framing children as resilient, as I have written previously, is that it can become a mantra that justifies adult inaction and assuages adult discomfort at children's suffering (Spray 2020a). Focusing only on the presence or absence of rupture in children's experiences may generate a picture of children content with what is for them, near-normal lives, but omits the ongoing interferences that children must devote time, energy and attention towards managing. Children may have quickly incorporated the shock of lockdown's onset into new and normalising explanatory frameworks, but they have been continually impacted by the interferences wrought by lockdowns and other restrictions. Interferences are energetically costly to accommodate or remove. The question is not how are children resilient, it is what gets sacrificed for their survival.

This view of children as constructing and reconstructing normalcy while also accommodating interferences strongly resonates with research into children's asthma experiences (Monaghan and Gabe 2016; Ireland 1997; Protudjer et al. 2009) and likely therefore has general relevance to other chronic illnesses and crisis events also. Multiple studies have found children to be centrally concerned with establishing normality – a baseline frame of reference – through which they may interpret their asthma experiences. Yet while children discursively minimised the severity of their asthma to emphasise their ordinariness, they also share the challenges of interference – the hassles of monitoring symptoms, taking medication, and accommodating bodily limitations. In a body that is optimising energy in pursuit of a good life, their brains dys-appear as many interferences and risks as they can to get by while frustrated caregivers draw their attention back to untreated symptoms. With asthma, unfortunately, those dys-appeared symptoms can cause life-threatening exacerbations, moments that may, for children, be most memorable for the rupture to assumed survival.

In taking a bio-psycho-social approach to children's experiences with a view upstream to local policy and cultural-structural context, this article models an alternative to the limiting cognitive-developmental paradigms for childhood illness, distress and trauma that have persisted in clinical practices (including paediatric asthma management) (Woodhead 2009). Viewing how children make sense of disruption in narrow biological terms, as developmental models tend to do, overlooks how adults, operating on particular socio-political assumptions about childhood (and health), govern children's opportunities to encounter risk and develop skills and their access to power, information, resources, communication tools and other people with whom they can co-construct meaning. These constraints on children's ability to gain experience create the appearance of biological limitations which simultaneously obscure and justify those age-based governing structures. Conversely, when appropriately contextualised, developmental science has much to offer childhood studies theory. A period of biological maturation is (the only) universal of childhood, and these biological changes interact with socio-structural influences to produce distinct experiences of a body in the world (Spray 2020b). Developmental neurobiology has undergirded this article's theoretical insights into how children experience, interpret and navigate a life in crisis. Interdisciplinary bridges will produce stronger scholarship when they go both ways.

Notes

1. This study was supported by a Rutherford Postdoctoral Fellowship from The Royal Society Te Apārangi and a project grant from the Maurice and Phyllis Paykell Trust. Samantha Samaniego assisted on the project with support of a University of Auckland Summer Research Scholarship.
2. One child had received therapy for generalised anxiety.
3. The implications of the comic-making method for children's self-representation are discussed in Spray (nd).
4. As I was writing this in a cafe I overheard an older woman at the table next to me exclaiming, two years into the pandemic: 'It's turned the world upside down. A terrible, catastrophic event. It's turned the world upside down'.
5. The example Eagleman uses is the 'backwards brain bicycle': a bicycle that has been engineered to require steering in the opposite direction to the tyre. In the process of learning to ride a backwards bicycle a person must unlearn to ride a typical bicycle. With enough practice between the two, however, a person can learn to ride either way, flexibly shifting between dual-cognitive schema.
6. This process may not be as directly correlated to biological age as social age – what experiences a person's society accords them at different ages. Recent claims that brain development does not reach completion until age 25 reflects the recent 'extended adolescence' or 'delayed adulthood' created out of the political and socio-economic constraints that Western capitalist societies apply to young people. In their early twenties, most young people are newly encountering and learning to navigate the adult workforce, and the brain is accordingly adjusting its structures to these new experiences.
7. As an extreme example of this phenomenon, nine-year-old Miky, who has ADHD, focused his comic entirely on the experience of recently visiting his Gran in England, with no mention of the pandemic – or his stay in MIQ – at all. Only with his father's prompting did he remember having Google meets with his class during the recent lockdown.
8. Almost all children had a very localised perspective on COVID; few knew about anything COVID-related in other countries and they also did not recognise that New Zealand had been any different.

9. Such disruptions are more frequent for socio-economically marginalised children.
10. Children, to the despair of their parent, will often accommodate, rather than treat symptoms by, for example, putting more energy into working their lungs, making bodily adjustments such as shifting posture, or discontinuing activities (such as stopping physical exercise to rest).

Disclosure Statement

No potential conflict of interest was reported by the author(s).

Funding

This work was supported by Maurice and Phyllis Paykel Trust; Royal Society of New Zealand.

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